

Title: Renewable energy finance accessibility for empowering SMMEs participation in the
Energy Sector

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A research project submitted to the Gordon Institute of Business Science, University of
Pretoria in partial fulfilment of the requirements for the degree of Master of Business
Administration.

04 November 2024

ABSTRACT

Given South Africa need for sustainable energy solutions, and access to reliable energy studying the role of project finance in supporting SMMEs is essential. Accessible renewable energy finance for Small, Medium, and Micro Enterprises (SMMEs) has become increasingly important as SMMEs businesses play an important role in encouraging sustainable energy solutions. This study aims to understand the barriers that SMMEs face in securing funding for renewable energy projects, despite their potential contributions to the sector. Existing literature highlights various challenges, including limited access to capital, skills shortages, and complex regulatory frameworks, yet it often overlooks the nuanced experiences of SMMEs.

To address this gap, a qualitative, exploratory research approach was employed, involving 12 semi-structured interviews with SMME representatives, financial institutions, and industry experts. The findings reveal that positive outcomes for SMMEs in the renewable energy sector are achievable when financial products are tailored to their needs and when there is strong collaboration among stakeholders. Additionally, SMMEs that possess innovative capabilities, and a clear understanding of market demands are better positioned to navigate the challenges they face

The research contributes to the existing body of knowledge on renewable energy finance in providing insights into the factors that enable SMMEs to overcome barriers and succeed in the sector, underlining the importance of project finance together with supportive models, partnerships to enable sustainable energy development.

KEYWORDS

Renewable Energy, Project Finance, SMME Participation, Financial Accessibility

DECLARATION

I declare that this research project is my own work. It is submitted in partial fulfilment of the requirement for the requirements for the degree of Master of Business Administration at the Gordon Institute of Business Science, University of Pretoria. It has not been submitted before for any degree or examination in any other university. I further declare that I have obtained the necessary authorisation and consent to conduct this research.

Noluvuyo Spani

04 November 2024

ABBREVIATIONS

ACRONYMS	DESCRIPTION
4IR	Fourth Industrial Revolution
BBBEE	Broad-Based Black Economic Empowerment
BIP	Black Industrialist Programme
BRICS	Brazil, Russia, India, China, and South Africa
CO ₂	Carbon dioxide
CSP	Concentrated Solar Power
DTIC	Department of Trade, Industry and Competition
EE	Entrepreneurial Ecosystems
ESD	Enterprise Supplier Development
FCA	Financial Conduct Authority
GCGS	Green Credit Guarantee Schemes
GDP	Gross domestic product
HSE	Health Safety and Environmental
IDC	Industrial Development Corporation
IPP	Independent Power Producers
IPPs	Independent Power Producers
IRP	Intergraded Resource Plan
JETIP	Just Energy and Transition Implementation Programme
MCEP	Manufacturing Competitiveness Enhancement Programme
NDP	National Development Plan
NECOM	National Energy Crisis Committee
NEF	National Empowerment Fund
NYDA	National Youth Development Agency
PFMA	Public Finance Management Act
PPP	Public-Private Partnership
PV	Photovoltaic Solar
R&D	Research and development
RBV	Resource- Based View
RE	Renewable Energy
REIPP	Renewable Energy Independent Power Producer Programme
SA	South Africa
SDG	Sustainable development Goals
SEDA	Small Enterprise Development Agency
SEFA	Small Enterprise Finance Agency
SMMEs	Small, Medium, and Micro Enterprises
SSA	Sub-Saharan Africa
SSEG	Small-Scale Embedded Generation
STEM	Science, Technology, Engineering, and Mathematics
WTG	Wind Turbine Generator

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1. CHAPTER 1: INTRODUCTION AND RESEARCH PROBLEM

1.1. INTRODUCTION

Renewable energy is essential for a sustainable energy future, driving technological advancements and increasing climate change awareness. The International Energy Agency (IEA, 2019) projects a rise in the deployment of renewable energy sources such as solar, wind, hydropower, and biomass. However, South Africa faces significant challenges in integrating renewables into its energy systems.

The cost of capital for renewable energy projects varies significantly across countries and technologies, with developing nations facing higher cost requirements (Horváth & Szabó, 2019; Steffen, 2020). Contrary, development initiatives support energy investment in Africa, which relies on public funds and international development finance because of the financial limitations of utilities and the restricted fiscal capacity of the government, which is crucial for bridging investment gaps. The literature argues that there is a gap in understanding finance strategies for renewable energy projects, including risk factors, and available contracts (Elie et al., 2021). Therefore, policy and regulatory enhancements are necessary to mitigate investment risks, optimise the use of public funds, and lower capital costs to create a more autonomous investment environment. International Energy Agency, (2024) identified four key areas that need attention: improving financial performance and effectiveness, improvements in frameworks, developing sustainable business models, and strengthening the provision of long-term finance.

Furthermore, Gohdes et al., (2022) found that projects backed through government initiatives have lower entry costs, whereas those financed through private banks face higher risks, resulting in increased entry costs. However, Alharbi et al., (2023) suggested that finding solutions to these challenges could accelerate the transition to renewable energy, and contribute to environmental sustainability, energy security, and economic growth through creation of jobs in the renewable energy sector. The literature suggests that SMMEs could play a key role in the energy sector, as they can contribute to job creation and economic growth. However, due to limitations in resources, finances, skills, and expertise, their involvement may be limited to certain areas of the value chain (Alharbi et al., 2023). Governments, large-scale businesses, and financial institutions can act as enablers to help SMMEs enter the playing field and become sustainable businesses that support economic growth. Alharbi et al., (2023) study findings identified three main types of management support for small businesses: mentorship,

networking, skills development, and capacity building; clear and actionable government policies and support schemes; and financial/ funding tools and products that are accessible to SMMEs.

This research aimed to explore accessible finance for renewable energy projects that could empower small- and micro-enterprises (SMMEs) to participate in the energy sector in South Africa.

Table 1.1: Classification of SMME (SA)



Enterprise Size	Number of Employees	Annual Turnover (in Rands) upper band
Medium	Fewer than 250...	R35 million to R220 million. Industry dependent.
Small	Fewer than 50.	R15 million to R80 million. Industry dependent.
Micro	Fewer than 10.	R5 million to R20 million. Industry dependent.

Source :([National Small Enterprise Act: Final National Integrated Small Enterprise Development Strategic Framework](#))

1.2. CONTEXT

Renewable energy projects in South Africa (SA) are currently funded through various structures, such as public-private partnerships, government incentives, grants, loans, and investments from financial institutions and private investors. Renewable energy projects are primarily financed through debt and equity investments, attributable to the capital-intensive nature of projects for solar photovoltaic (PV), wind turbine generators (WTGs), and concentrated solar power (CSP), which require significant upfront funding. Most renewable energy (RE) projects in SA depend on grant funding, with grants providing 95% of financial support. Loans contributed 3%, while private equity contributed less than 1%. The South African government is responsible for financing RE initiatives (Fotio et al., 2022), government grants usually support small-scale projects, and the implementation of large-scale RE initiatives in Sub-Saharan Africa (SSA). However, funding requires external financial assistance from borrowing foreign investment funds from international development agencies, regional development banks, and local financial development banks (IEA, 2024). Additionally, Adedoyin et al., (2020) study opposes coal

reliance, he argues environmental impact due to dependence on coal leads to significant carbon dioxide (CO₂) emissions contributes to global warming and climate change these findings highlight the urgent need for robust environmental policies that support the transition towards renewable energy calling for stricter regulations on coal production (Adedoyin et al., 2020).

Furthermore, Blissett, (2023) the research found that funding is available for renewable energy projects, through the just energy and transition implementation programme (JETIP), the programme involves a combination of concessional loans, grants, blended finance, and public-private partnerships, which are particularly focused on independent power producers (IPPs) to reduce private investment risks, the funding comprises 4% of grants, while the majority consists of loans and loan guarantees with South African government providing surety to minimise commercial risks and sovereign guarantees for financing. Edler et al., (2023) opposed current lending frameworks and policy conditions, he argues undermine principles of democracy, sovereignty, and human rights as such initiatives question South Africa's capacity to develop the renewable energy sector. Authors point out, that dependence on external financing and the conditions set by international lenders could limit South Africa's autonomy in making strategic decisions that support its national interests and developmental objectives.

The importance of green finance in encouraging emerging economies to adopt green energy sources promotes long-term environmental sustainability. Green finance can support projects, such as energy-efficient infrastructure, sustainable transportation, and green energy projects (Taghizadeh-Hesary & Yoshino, 2019). Additionally, Anas et al., (2023) suggested integrating renewable energy sources plays an important role in reducing environmental emissions, thereby enhancing ecological efficiency. Wu, (2023) investigated the key role renewable investments and green finance play in enhancing economic performance, study found green finance instruments such as green bonds and green credit attract investment through provision of financial incentives for environmentally sustainable projects. sector. These findings align with the broader literature that suggests renewable energy investments can stimulate economic growth through the creation of new industries and job opportunities renewable investments contribute to a more resilient and sustainable economy (Anas et al., 2023; Taghizadeh-Hesary & Yoshino, 2019; Wu, 2023).

Research into the small-scale embedded generation (SSEG) energy sector revealed that participation of small- and micro-enterprises (SMMEs) is limited, study found the sector faces

significant challenges due to the absence of a regulatory framework, which creates uncertainty for project approvals from local authorities (Baker & Phillips, 2019). Additionally, manufacturing renewable energy components and technology requires specialised expertise that are not readily available to small South African businesses the study found this leads to outsourcing and limited opportunities for local small businesses challenges such as limited financing access, market access, high capital requirements, and stringent industry requirements (Alharbi et al., 2023). The author findings suggest project finance risk diversification amongst stakeholders in green projects enables empowerment for SMMEs to contribute to economic development whilst promoting innovation and offer supportive sustainability practices. Ultimately contribute to long-term environmental and economic benefits for communities and societies (Alharbi et al., 2023; Doh et al., 2021).

Furthermore, literature studies conducted by Taghizadeh-Hesary and Yoshino, (2019) defined project finance as a loan structure that relies primarily on the project's cash flow for repayment, with the project's assets, rights, and interests held as secondary collateral. Project finance supports capital-intensive projects in sectors such as manufacturing, energy, health care, and mining including long-term infrastructure, industrial, and manufacturing projects that require large investments for producing goods and services.

The discussion highlighted the challenges in renewable energy finance accessibility for SMMEs. The evidence from the statements underscored the need to investigate financing strategies for renewable energy projects for SMMEs, exploring risk factors and barriers that contributed to their lack of participation in the renewable energy sector. This was the focus of the study. Recommendations from this research aimed to contribute to the existing body of knowledge and potentially lead to a more rapid transition to renewable energy, enhanced energy security, and economic growth through job creation in the renewable energy sector, facilitating improved financial support and empowerment for SMMEs. Whilst there were many variables around SMME participation in green energy projects such as competence and skills need, mentorship, etc., the study focused on access to finance as a vehicle towards improved SMME participation in green energy projects.

1.3. PURPOSE STATEMENT

The purpose of this study was to understand renewable energy finance access empower SMME participation in the Energy Sector. The research considered the SMME finance empowerment for green projects participation, and finance access to SMME to encourage participation in

renewable energy demand. Furthermore, investigated barriers that contribute to SMME lack of participation in renewable energy sector to solution for the theoretical need and business need.

Taghizadeh-Hesary and Yoshino, (2019); Wu, (2023) investigations support the role of project finance highlighting the need for finance policies to be implemented to boost energy efficiency projects, and further the study encourages the need to enhance green finance frameworks, provision of policies that support development, and increase capital investment for green financial product development.

Small, Medium, and Micro Enterprises (SMMEs) play a crucial role in diversifying emerging economic sectors, tackling underdevelopment, and exploring untapped opportunities. Particularly, technology-driven innovative SMMEs are fundamental to South Africa's international trade and growth, facilitating active engagement in the (Brazil, Russia, India, China, and South Africa (BRICS) economies (Sibiya et al., 2023) .Furthermore, Udeagha & Muchapondwa, (2023) conducted a study that provided a detailed analysis of the role of finance in achieving the United Nations Sustainable Development Goals (SDGs) within (BRICS) economies. The study highlights several significant benefits and outcomes, including the promotion of environmental sustainability through the reduction of carbon dioxide (CO₂) emissions and gross domestic product (GDP) for economic growth that ultimately affects environmental quality. Additionally, the study advocates for energy innovation which plays a crucial role in achieving energy efficiency and a low-carbon environment. Based on the study outcomes, recommendations for BRICS nations include acceleration of green financial products development and a strengthened capacity for banks to offer green credit facilities. Moreover, the study encourages BRICS nations to increase the funding allocation for research and investigate renewable finance solutions can be implemented while minimising associated risks (Udeagha & Muchapondwa, 2023).

There are significant opportunities for SMMEs in the small-scale embedded generation (SSEG) market segment of the renewable energy industry (Pepermans et al., 2005). However, the challenges SMMEs face in particular the capital-intensive nature of the industry and the high investment requirements for equipment and meeting project technology standards are significant factors. Baker et al., (2021) study provided insights into current opportunities for SMMEs, as the installation and maintenance services within the SSEG sector. Additionally, Jaegersberg and Ure, (2011) identified several key opportunities for SMEs within the solar energy value chain, it was found SMEs can leverage advanced solar technologies, such as high-efficiency photovoltaic cells, to improve energy conversion and reduce costs. Additionally,

innovations in energy storage, including advanced battery technologies thermal storage systems, and Hybrid energy systems that combine solar with other renewable sources like wind or biomass for consistent and reliable energy solutions. However, the article critiques the prevalent lack of collaboration and knowledge-sharing knowledge (silos) and misaligned stakeholder interests.

1.4. THEORETICAL AND BUSINESS NEED

1.4.1. Theoretical Need

Opeyemi et al., (2019), study suggests in sub-Saharan Africa, using renewable energy (RE) along with improvements institutional structures, regulatory framework, and finance can boost manufacturing exports. However, the overall impact on total trade is only positive when considering the regulatory framework and finance for the private sector. Additionally, controlling corruption effectively reduces business costs, and improves productivity, and competitiveness with supportive government policies and regulations to overcome negative trade effects of renewable energy. Whilst the study provided valuable insights, it relied on existing data as primary source and did not fully capture the dynamic and evolving nature of renewable energy markets. Additionally, the study's focus on institutional and regulatory frameworks might have overlook other important factors such as technological advancements and market access, which also play significant role.

Yadav et al., (2024) investigated how green finance and good governance affect the impact of renewable energy investments on CO₂ emissions in BRICS countries it was found when renewable energy investments are paired with strong governance and strategic green finance, CO₂ emissions are significantly reduced, which helps sustainable economic growth. However, they also discovered that the relationship is not straightforward and requires careful planning and allocation of resources to enable favourable environmental benefits findings emphasised the need for short term effective government action for renewable energy investments to lower CO₂ emissions for long-term green finance further boosts the positive impact of these investments on environmental sustainability. Despite these positive findings, the current green finance mechanisms and governance structures may not be fully effective. Moreover, (Brunnschweiler, 2010; Fotio et al., 2022; Steffen, 2018) findings highlight need for further research to explore finance for renewable energy.

The above literature findings and argument highlighted the need for more research into project finance, how it can be optimised to support renewable energy investments in different

governance settings. This gap shows the importance of creating tailored financial tools and governance frameworks to support the shift to renewable energy and maximise its environmental benefits (Yadav et al.).

The study contributes to the existing body of knowledge on SMME participation in green energy. It provides evidence of how SMME involvement in renewable energy infrastructure projects could drive economic growth, enhance energy security, and create jobs. The focus is on project finance the available financial options and potential constraints, the study expands on existing theories related to SMME participation in renewable energy projects. Additionally, it demonstrates the importance of accessible funding in encouraging SMME participation in renewable energy initiatives. Through the explored academic frameworks and strategy implementation models, the study applied theoretical insights to understand financial accessibility and the impact on SMME participation in the energy sector this research considered the latest literature from peer-reviewed academic journals.

1.4.2. Business Need

South Africa relies heavily on fossil fuels, which account for 85% of its energy supply. In contrast, green energy only makes up 15% of the country's energy use. Eskom, the main electricity provider, depends largely on coal, making South Africa one of the biggest polluters in the region (Ref) . These environmental challenges hinder efforts towards sustainable development, particularly in the banking sector. Although research has examined the effects of renewable energy and economic growth on the environment, it has not thoroughly explored how the expansion of the banking sector impacts carbon dioxide emissions (Sharafizad & Brown, 2020). Project financing is essential to promote sustainable energy solutions and reduce greenhouse gas emissions this can be done through funding renewable energy projects and green initiatives (Kim et al., 2021).

The development of local financial sectors is important to the success of any technology and commercialisation. However, the focus is on the role of green finance because gross measures of financial development are problematic; financial or credit market development and actual financing for renewable energy are not the same. Not all funds raised in financial markets are channelled toward financing green technologies, including renewable energy production. This disparity highlights the need for targeted financial mechanisms to support green technologies effectively (Alharbi et al., 2023). Moreover, SMMEs often face challenges accessing finance, but there are sustainable options available like government grants, green financing

programmes, crowdfunding, energy performance contracts, carbon offsetting, energy efficiency financing, partnerships, and capacity building which can help overcome financial barriers (Anas et al., 2023; Kim et al., 2021).

Additionally, Berger and Udell, (2006) study found financial constraints significantly hinder SMMEs from investing in innovative sectors due to high costs and risks. This was recently supported by Cecere et al., (2020) citing SMMEs face unique financial challenges compared to larger firms. SMEs often have limited access to capital markets and rely on external financing for significant projects like eco-innovation. Understanding the financial constraints and the role of project finance could help develop better financial instruments and policies to support SME growth and sustainability. (Berger & Udell, 2006; Cecere et al., 2020).

The presented arguments and literature gaps provide the business need for the study around finance needs considerations for renewable energy projects, and furthermore this study focuses on how to enhance SMMEs' contributions to economic development and environmental sustainability. SMMEs are key drivers of innovation and competitiveness. Addressing the financial challenges through supportive project finance could lead to increased investment in eco-innovation, job creation, and overall economic growth.

1.5. OUTLINE OF THE STUDY

- **Chapter 1:** The Need - This chapter delineates the necessity of the study, articulating the theoretical and business imperatives that necessitate an exploration into renewable energy finance accessibility for SMMEs, thereby underpinning the research's foundational premise.
- **Chapter 2:** Scholarly Discourse Review – This chapter on a comprehensive review of extant literature, this chapter synthesises current academic dialogues surrounding renewable energy finance, elucidating key concepts, and theoretical frameworks that inform the study's investigative trajectory.
- **Chapter 3:** Investigative Queries - This chapter is dedicated to the formulation of research questions poised to unravel the complexities of project finance's role in SMME empowerment within the green energy sector, aiming to discern the structural and participatory dynamics at play.
- **Chapter 4:** Methodological Framework - The chapter presents the research design and methodology, detailing the qualitative approach and interpretivism philosophy

adopted to examine the accessibility of renewable energy finance and the barriers in the energy sector.

- **Chapter 5: Analysis and Findings** - The chapter provides a detailed analysis of the adopted qualitative research methodology in the study, focusing on interviews with SMME stakeholders in the renewable energy sector. It details participant selection, the interview process, and data analysis techniques it illustrates the significance of understanding stakeholder real life perspectives.
- **Chapter 6:** This chapter presents a thorough analysis of the research findings, situating them within the broader literature on renewable energy finance. It interprets the results in relation to the research questions and objectives, offering insights into the implications for stakeholders in the energy sector.
- **Chapter 7: Recommendations** - This chapter provides key findings, discusses their implications for theory and practice, addresses study limitations, and offers recommendations for future research. It concludes with a call to action for stakeholders to support SMMEs in the renewable energy sector.
- **Chapter 7: Recommendations** - This chapter provides key findings, discusses their implications for theory and practice, addresses study limitations, and offers recommendations for future research. It concludes with a call to action for stakeholders to support SMMEs in the renewable energy sector.

1.6. SUMMARY AND CONCLUSION

Literature suggests that South Africa should adopt strategies to increase the proportion of clean energy in their overall energy mix through enforcing investments in green energy sources. Increasing lines of credit and accessibility from banks will encourage more projects and investments, while also improving risk management systems. However, this approach can impact economic growth and energy consumption, potentially increasing CO₂ emissions. In ensuring more sustainable and green economic growth, South Africa should prioritise reducing its carbon footprint. Renewable energy is crucial for a sustainable future, but its integration into South Africa's energy systems faces challenges. Financing strategies, risk factors with mitigants, and available contracts for renewable energy projects need further exploration. Empowering SMMEs through accessible financing can accelerate the transition to renewable energy, contributing to economic growth and a sustainable environment. This study aimed to identify the finance options available to SMMEs and provide insights into how limited access to

renewable projects can be expedited, allowing SMMEs to participate in electricity supply addressing the energy crisis, and stimulate job creation and economic growth.

2. CHAPTER 2: LITERATURE REVIEW

2.1. INTRODUCTION

This study aims to examine the accessible renewable energy finance for Small, Medium, and Micro Enterprises (SMMEs) in the Energy Sector. This research focused on the role of project finance for green projects to empower SMMEs to determine challenges that hinder participation in the renewable energy sector, such as skills, lack of capital investment, and entry barriers. The chapter provides a theoretical background based on previous academic research and findings. The objective was to investigate the reasons for limited participation and identify areas of development to encourage SMMEs' participation in the renewable energy sector growth providing accessible finance. As a pretext, the current state of energy in South Africa needs to be understood. This is given below.

South Africa acknowledges the significance of its renewable energy sources, the contribution of Independent Power Producers (IPPs) which is estimated to be 5% -10% of electricity generation. Renewable Energy Independent Power Producer Programme (REIPPP) has garnered praise for its procurement framework and active involvement of the private sector (IEA, 2019). To promote more “prosumer” (producer and consumer) based renewable energy alternatives, the president has eased licensing requirements for embedded generation (Baker & Phillips, 2019). Currently, there are 173 municipal-owned producers, and 13 private distributors licensed to supply electricity to consumers (Ngusale et al., 2021), the regulatory change opens significant opportunities for SMMEs to help meet the growing energy.

Efforts to address the electricity supply crisis through strategic interventions are currently underway, as highlighted in article Van der Poel, et al, (2022), President Ramaphosa has announced Eskom's initiatives to procure new generation capacity, streamline regulations for distributed generation, and promote rooftop solar installations (Government of South Africa, 2023). Additionally, Eskom aims to enhance the efficiency of existing power plants and invest in grid infrastructure through the just transition policy approach to reframe energy transitions as a task of rebuilding the economy from the ground up; however, there is still a lack of access to energy transition as a result of inequalities and affordability (Healy & Barry, 2017; National Energy Action Plan (NECOM), 2024; van Niekerk et al., 2022). Proposed strategies encompass solar and battery storage projects, legislative reforms, and the establishment of distinct entities to facilitate a competitive electricity market, despite these advancements, the government still faces substantial challenges on this front (Jason van der Poel, 2022).

The literature review focused on available project finance for SMMEs that enables empowerment considering industry challenges, enabling policies/ policy creation and mentorship as related to the topic.

LITERATURE REVIEW KEY CONCEPTS

2.2. PROJECT FINANCE

Project finance is referred to as specialised form of financing commonly used for large infrastructure projects, including renewable energy projects, where the project's assets and cash flows serve as collateral for the financing (Baker, 2015; Doh et al., 2021). Project finance enables the development and implementation of renewable energy projects providing the necessary capital and risk management structures to support these initiatives. Studies conducted Baker, (2015) and Doh et al., (2021) found finance can be tailored to suit unique renewable energy characteristics, including long project lifecycles, revenue predictability, and regulatory complexities. Furthermore, project finance enables the mobilisation of significant capital investments required for renewable energy projects, mitigates risks for investors, and facilitates the successful implementation of sustainable energy initiatives (Yadav et al., 2024)

2.2.1. Benefits of project finance for SMMEs

The integration of project finance in initiatives such as the Black Industrialist Programme (BIP) offers significant advantages for SMMEs through the provision of essential financial support for their projects. Black industrialist grant enables SMMEs to access funding through grants, preferential procurement measures, and tailored incentive packages, which are instrumental in promotion of growth and sustainability (Andreoni & Tregenna, 2020). The split structure Baker, (2015), entails a debt-to-equity debt. Additionally, the inclusion of SMMEs in such programmes supports their development and contributes to broader economic transformation and empowerment of black individuals within the economy (Bhorat & Khan, 2018).

Project finance offers several benefits for SMMEs, particularly in developing economies. The provision of structured finance allows SMMEs to undertake large-scale projects with funders not looking solely at their balance sheet these assist resource-constrained small firms with challenges to secure a contract with clients (Maksimov et al., 2017). Similarly, Coval and Thakor, (2005) note that funds could be done through bridging finance, where small margins of equity contribution are considered. Another perspective is Government should focus on

subsidising pre-investigation costs, such as market research and feasibility studies, and providing credible signals to enhance entrepreneurial confidence. Conversely, if financial intermediaries lack sufficient capital, entrepreneurs may face funding rationing, which would dampen funding demand and negate efforts to boost entrepreneurial optimism (Toms et al., 2020), the study suggests that effective policy should aim to balance risky investment through sharing and equalising rights and information between borrowers and lenders.

The type of finance, structure and loan terms is important to enable access to a broader pool of resources, as it often involves multiple investors, which can lead to more favourable loan terms and interest rates compared to traditional financing methods (Bharath et al., 2009). Moreover, project finance can enhance the credibility of SMMEs, as it requires thorough project evaluation and due diligence, demonstrating the viability and potential success of the project to investors (Moeuf et al., 2020).

Moreover, Alharbi et al., (2023) study note several important factors. Firstly, existing literature on green finance underscores the crucial role of funding in achieving sustainability. However, challenges such as the lack of long-term financing and low investment returns continue to hinder the widespread adoption of renewable energies. Secondly, the credit market is vital for financing these projects, but green lending has been shown to reduce banks' profitability, increase default risk, and lower credit risk. Despite these challenges, the significant commercial potential of renewable energy should encourage continued investment. Recent data indicates that renewable energy accounts for less than 30% of global energy generation, with many countries, including developed ones, having a relatively small share. Additionally, the cost competitiveness of renewable energy compared to fossil fuels remains an important issue. Thirdly, the success of innovative projects depends on increased financial flow, better intermediation, and efficient resource allocation, which are essential for the cost-effective deployment of dynamic technologies like renewable energy. Although the green bonds market is vulnerable to uncertainties such as pandemic, oil price fluctuations, and geopolitical risks, increased financial flow can mitigate these disadvantages, enhance market resilience, and support the technological viability of renewable energy. Therefore, green finance is expected to positively impact renewable energy production (Alharbi et al., 2023)

2.3. STRUCTURES AND POLICIES PROVISION FOR PROJECT FINANCE SUPPORT

Black Industrialist Programme (BIP) is one of government intervention strategy aimed at facilitating economic transformation and enhancing the meaningful involvement of black individuals in the country's economy. The policy is strategically crafted to accelerate the industrialisation process of the nation while concurrently promoting Broad-Based Black Economic Empowerment (BBBEE). Through the provision of project finance support to SMMEs, the BIP employs various mechanisms such as grants, preferential procurement measures, and specialised incentive packages (Andreoni & Tregenna, 2020).

However, the existing BBBEE framework which was developed to facilitate transformation towards inclusive society, black entrepreneurs are faced with barriers to entry Goga and Avenyo, (2022) resulting in slow transformation in different economic sectors. In contrary, the authors suggest that there are institutional biases from funders “Funding by the IDC has been skewed toward bigger businesses-loans have relatively short repayment periods compared to international standards and the IDC’s general loan -funding stream does not provide concessional rates” (p.97). Sustainable funding is required to ensure SMMEs are integrated in different stages of value (Goga & Avenyo, 2022).

Industrial implications green finance for renewable energy solutions entail diversification of finances from fossil fuel-based solutions, and this process might have negative financial implications. Industrial operations need to be streamlined to be aligned with finance realignment to avoid any financial constraints, policy framework designed in multiple phases to achieve alignment (On the other hand, Mitigation of the financial risk are necessary to stabilise the financing of renewable energy generation firms (Sinha et al., 2023).

The research probes deeper into the concept of project finance to empower SMMEs, discussed benefits and the policy provisions, including the challenges. Literature review continues the narrative from **Chapter 1** through analysis of challenges and opportunities for SMMEs within the renewable energy finance landscape, highlighted the need for clear policies and support schemes that enable SMMEs to overcome barriers and participate effectively in green projects.

2.4. SMME INCLUSION IN RENEWABLE ENERGY/ GREEN PROJECTS

South Africa's energy sector is transforming towards diversification and the integration of renewable energy sources National Energy Action Plan (NECOM), (2024) . Renewable Energy Independent Power Producer Programme (REIPPPP) is attracting private sector investments in onshore wind turbine generator plants, photovoltaic solar, concentrated solar power (CSP), biomass, landfill gas, and hydro technologies. Recent data shows onshore wind power as the primary energy supply source, followed by photovoltaic power and hydro (IEA, 2024; *OECD Economic Outlook, Volume 2023 Issue 2*, 2023). Moreover, the National Development Plan (NDP) envisions an energy sector that encourages economic growth, and the Integrated Resource Plan (IRP) serves as a strategic roadmap for electricity infrastructure development towards a more balanced and diversified energy mix that supports economic growth while prioritising environmental conservation and sustainability.

The energy sector presents numerous opportunities for SMMEs according to Jaegersberg and Ure, (2011) in production and installation process. SMMEs can leverage their flexibility and specialised knowledge to tailor solutions to individual needs, which is essential for the widespread adoption of renewable technology through participation in the licensing, certification, installation, and maintenance processes, SMMEs can create jobs and encourage regional economic growth. Moreover, the involvement of SMMEs in value chain stages can drive innovation and efficiency, to bring unique perspectives and solutions, integration not only benefits the SMMEs themselves but also enhances the overall competitiveness and sustainability of the energy sector (Shibin et al., 2020).

Nel-Sanders and Thomas, (2022) study underlines the role of government of development innovation-led Entrepreneurial Ecosystems (EEs) and promoting economic development. Also, Content et al., (2020) found that the relationship between entrepreneurship and economic performance is embedded in a regional entrepreneurial ecosystem (EE). EE is defined as a network of interdependent actors and factors coordinated to enable productive entrepreneurship. However, the study also reveals that the importance of specific ecosystem elements varies between clusters. A one-size-fits-all approach for improved EEs is ineffective instead careful analysis of the existing ecosystem is necessary before implementing effective policies. Content et al., (2020) study underscores the urgency for governments to establish robust innovation systems and suggests adopting models like the triple helix for innovation. The model describes innovation and technological advancement led through collaborative and

dynamic relationships highlighting the significance of communication, co-evolution, and the recurring overlay of interactions among institutions these interactions collectively shape the knowledge_infrastructure and innovation processes utilising network approaches to manage innovation ecosystems efficiently (Content et al., 2020; Leydesdorff, 2000; Nel-Sanders & Thomas, 2022).

Moreover, the research identifies systemic risks in EE development in South Africa, including challenges related to Fourth Industrial Revolution (4IR) readiness, policy implementation, and the impact of pandemic. Drawing insights from successful cases such as Silicon Valley, the study emphasised the need for the South African government to prioritise industry competitiveness, venture capital market enhancement, business support initiatives, human resource development, university-industry collaboration, government intervention in basic science, and enable a culture of risk-taking (Nel-Sanders & Thomas, 2022). The findings support the idea that ecosystems play an essential role in influencing the growth impact of various types of entrepreneurial activity.

Government, businesses, and financial institutions can enable SMMEs to enter the playing field and become sustainable businesses that help the economy flourish. However, SMMEs need management support, mentorship, networking, skills development, capacity building including clear and actionable government policies and support schemes. Finance structures that are accessible to SMMEs, these are considered in the discussion below.

2.5. BARRIERS THAT HINDER SMME PARTICIPATION.

Barriers impeding the participation of Small, Medium, and Micro Enterprises (SMMEs) in economic growth and development are diverse. Obstacles comprise difficulties in accessing funding, market information, regulatory frameworks, and procurement contracts (Bhorat et al., 2018). Moreover, institutional inefficiencies, corruption, and the complexities of policies further compound the challenges in broadening their market, with bribery impacting the profit margins leading to credit constraints and liquidity, Wellalage et al., ,(2019), the author study measured the impact of corruption the results showed an increase in credit constraint of about 7,65%, the study advocates for transparent regulatory frameworks, robust enforcement of anti-corruption laws, and policies that can lead to reduction of unethical behaviours (Amin & Motta, 2023; Bhorat et al., 2018; Wellalage et al., 2019)

2.5.1. Lack of funding initiatives

The absence and inadequate system processes for providing the necessary financial resources to support operations, projects, and programmes posit as significant challenge for SMMEs. Lack of systems hinders the effective implementation and sustainability of projects, impacting overall performance and outcomes. According to Cecere et al., (2020) a significant barrier to eco-innovation for SMMEs is the lack of internal funds, which hampers their ability to allocate resources for green research and development (R&D) projects, although external funding challenges are less severe, SMEs still face difficulties accessing finance due to high transaction costs and elevated risk premiums. The study highlights that public funding, such as subsidies and fiscal incentives, is essential for supporting eco-innovation. However, these funds are most effective when they complement rather than replace private investment, highlighting the need for a balanced approach to financial support.

2.5.2. Lack of Policies and Support Schemes

The challenges facing current energy policies in South Africa are multifaceted and include issues such as coordination, policy implementation and enforcement, technological barriers, and stakeholder engagement (Schmid & Lumsden, 2023). Challenges hinder the effective transition towards sustainable and renewable energy systems, overcoming political barriers, ensuring policy coherence, and engaging stakeholders effectively are crucial for the success of energy policies in South Africa. According to Andreoni and Tregenna, (2020) study analysed the Manufacturing Competitiveness Enhancement Programme (MCEP) in South Africa aimed to address two primary policy goals: the expansion of the manufacturing base, particularly in medium- to high-tech sectors, and the reduction of unemployment through support for sectors with high job-absorption capacity. The programme tackled financial constraints at the firm level through significant tax allowances and financial support measures, which included grant schemes administered by the Department of Trade and Industry (DTIC) and the provision of working capital loans, equity, and debt financing facilitated through the Industrial Development Corporation (IDC). This dual approach was logical, as the matching grant schemes provided immediate relief injecting capital directly into manufacturing firms, addressing the short-term financial constraints. However, MCEP's approach to mitigating financial constraints lead to reliance on temporary financial injections and a cycle of dependency, where firms continually seek external funding without developing sustainable financial practices (Andreoni & Tregenna, 2020).

2.5.3. SMMEs Mentorship

Relationships are essential in business, providing important resources through networks. Expanding these relationships involves navigating a complex web of companies, government bodies, and professional entities. According to (Sharafizad & and Brown, (2020) developing networks is crucial for sustainability and growth, also investing in training and mentorship programmes can enhance inter-firm networks that enable collaboration to boost entrepreneurial activities. Zarei et al., (2022) study emphasises the importance of mentorship services in accelerators, stating that intensive mentorship increases the expected value of income of new entrants. Furthermore, the author highlight business incubators and accelerator programmes are crucial in helping early-stage small businesses. Incubators offer a safe, supportive environment for one to five years, allowing businesses to grow stronger before tackling market challenges. However, this long-term approach might not suit industries that need adapt quickly. On the other hand, accelerators provide intensive mentorship, seed funding, and thorough evaluation processes to help businesses grow. Experienced entrepreneurs often mentor these businesses, helping them refine their business models and build important connections. (Zarei et al., 2022)

There are mentorship programmes available to assist SMMEs in enhancing their skills. Programmes are provided a variety of organisations, including the Small Enterprise Finance Agency (SEFA) the National Youth Development Agency (NYDA), Industrial Development Corporation (IDC), and (NEF) National Empowerment Fund (SA Cities Network, 2023). Assistance provided includes training, mentorship, and access to networks and markets. The NYDA has developed a Volunteer Enterprise Mentorship Programme specifically for young entrepreneurs to transfer business skills and knowledge. The mentorship programmes are essential in improving the abilities of entrepreneurs, leading to greater sustainability and growth of SMMEs in the renewable energy sector.

2.6. SKILLS REQUIREMENT AND COMPETENCY

The renewable energy sector skills include engineering professional services such as project management, design, construction, and technology. Opportunities in construction involve equipment installation, civil works, and road construction, SMMEs need to possess sector skills and qualifications to be considered competent in energy projects.

Diverse skills are necessary, according to Amalu et al., (2023) the expertise required in the energy sector includes Science, Technology, Engineering, and Mathematics (STEM). On the other hand, the industry has seen progressive growth with opportunities for individuals with diverse skill sets. Skills include manufacturing, quality control, system design and construction, regulatory compliance, client interaction, project management, and specialised technical skills from fields such as civil, mechanical, and electrical engineering. Moreover, the industry is made up of three key elements: academic, industrial, and entrepreneurial. In addition, hands-on training and practical experience in engineering, science, technology, photovoltaics, project management, marketing, and consulting are common requirements across all three elements (Amalu et al., 2023).

The recent energy challenges in South Africa represent challenges the local economy face, innovation can assist in developing the renewable sector and provide an opportunity for SMME participation in the energy sector and contribute towards economic growth to meet the electricity supply demand. SMMEs have a role to play, should they have the requisite competence and skills for participation.

Funding remains a challenge, this is discussed in the section below.

2.7. ACCESSIBLE FINANCE FOR EMPOWERMENT

The available funding structure as previously discussed in **Chapter 1.2** includes finance of renewable energy projects in South Africa provided through a diverse mix of financial institutions Baker, (2015) through debt and equity to support BEE companies.

Van der Spuy & Antonites, (2022) research on South African SMMEs financiers looked at several national and provincial public funding agencies that support entrepreneurs through funding assistance. National agencies include the Small Enterprise Finance Agency (SEFA), the National Youth Development Agency (NYDA), the Industrial Development Corporation (IDC), the National Empowerment Fund (NEF), and the Technology Innovation Agency (TIA). Additionally, three provincial public funding agencies are the Eastern Cape Development Corporation (ECDDC), the Free State Development Corporation (FDC), and the Limpopo Economic Development Agency (LEDA) (Van der Spuy & Antonites, (2022). The finance structure includes community ownership and economic development criteria to ensure the local community benefit from the renewable energy projects (Udeagha & Muchapondwa, 2023; Yadav et al., 2024).

Furthermore, Literature indicates that SMMEs can participate in the entire green technologies value chain especially in small equipment manufacturing activities, installation, civil works, retail, and maintenance should they have the required skills, competence, funding, and mentorship (Amalu et al., 2023).

2.8. SMME PARTICIPATION IN GREEN PROJECTS (RISKS)

2.8.1. Industry , Financial and Business Risks

Renewable energy construction risks include intrinsic risks associated with safety due to poor work quality work, cost overruns, and project delays leading to non-compliance with Health Safety and Environmental (HSE) policies that are often overlooked at construction sites. Therefore, risk identification should be assessed includes safety procedures, measures, and practices. **Chapter 1,2** highlights SMMEs are faced with challenges that include initial capital investment, and project initial costs barriers of entry, development for entrepreneurs.

Economic factors affecting risks include currency risk due to exchange rates and liquidity risks such as capital limitation to finance options and operational risks for power plants. Delis et al., (2023) study found businesses in different regions face varying financing costs due to factors such as country-specific macroeconomic risk and institutional risk-taking preferences. The empirical analysis showed that in regions with high risk-taking, firms exhibit higher investment risk and greater volatility in liquidity and returns. These findings indicate that firms in high risk-taking regions invest more, supporting the idea that economic risk tolerance drives greater investment activity. This assessment highlights the importance of considering both macro-level and firm-level risk factors in understanding financing costs (Delis et al., 2023).

Energy security risk, a non-financial measure encompassing economic, geopolitical, environmental, and reliability factors, is significantly influences climate change. (lyke, 2024) study found climate change impacts energy security risk, emphasised the need for clean energy investments to effectively mitigate these risks he argue while clean energy investments are generally beneficial, their effectiveness varies significantly based on regional and economic contexts the findings suggest tailored strategies that consider the unique challenges and opportunities of different regions to effectively address energy security risks related to climate change.(lyke, 2024)

2.8.2. Lack of Communication

Farisani, (2022) investigated the shortcomings of SMMEs, the study attributes failures in strategy implementation to current policies, laws, and regulations, the findings include national policymaker's lack of recognition and consultation with SMMEs as key stakeholders for policymaking and implementation strategies, and lack of involvement SMMEs in shaping strategies crucial for sustainability. Moreover, Sharafizad & and Brown's, (2020) study found that many participants were unaware of the advantages of connecting with businesses beyond their local area. Communication gaps and limited network engagement restricts SMMEs access to valuable resources, knowledge, and opportunities, hindering their competitiveness and innovation.

2.8.3. Licensing

Licensing can also be a challenge for SMMEs, (Ouedraogo, 2019) emphasises the importance of clear policies, regulatory frameworks, and measures such as standards and regulations in promoting the growth of renewable energy technology. However, in the context of Africa, challenges arise from patchy and inconsistent renewable energy legal and regulatory frameworks, insufficient policies for efficient market development, poor regulatory enforcement, governance issues, bureaucratic complexities, and delays in private sector project approval. Ouedraogo, (2019) findings highlight constraints combined with uncertainty in grid extension and integration processes for mini-grid systems, limit private and SMME sector engagement in renewable energy projects. Despite the existence of numerous renewable energy programmes at the national level, there's a lack of well-defined regional policies and immature implementation methods provide significant challenges to effective policy implementation.

2.8.4. Service Delivery

The challenges in service delivery encompass bureaucratic complexity, resource alignment, a siloed approach, and political influence, all of which can impede effective strategy implementation and hinder organisational performance. Bianchi et al., (2021) study confirms the importance of implementing effective governance mechanisms to address complex issues in public service delivery. On the other hand, there are positive news when it comes to service delivery, the REIPPP programme has been met with successful implementation and presented job opportunities for local and international companies delivering on energy demand projects for solar, wind, and CSP projects (Eberhard & Naude, 2016).

Public services inherently involve multiple organisations and necessitate the collaborative efforts of all stakeholders to create value. Fragmentation often results to inconsistencies in efforts to enhance community outcomes. Furthermore, discrepancies between short-term outputs and long-term outcomes along with unintended consequences of previously implemented policies, frequently arise from individual organisations (Bianchi et al., 2021). Additionally, Mansoor & Williams, (2024) advocate for adopting a public service ecosystem approach that integrates all individuals, technologies, and institutions involved in the service delivery process. Learning from both successful and failed collaborative governance initiatives across various contexts can enhance the dynamics and challenges whilst recognising the influence of culture, history, and traditions important in designing and implementing effective collaborative governance initiatives (Bianchi et al., 2021; Mansoor & Williams, 2024).

2.8.5. Finance for Project Completion (Cost Overruns)

A research study, Agyekum et al., (2022) puts an emphasises on significant obstacles that hinder project completion when addressing the challenges in financing green construction initiatives, identified impediment include a lack of incentives, risks associated with projects, capital expenditure, and initial capital cost. Stakeholders need to collaborate to overcome challenges, (Agyekum et al., 2022) proposes awareness is key to overcoming hurdles in the construction sector, keeping a close eye on these risks (monitoring), and addressing risks during the project planning phases. Furthermore, the study reveals differences may arise from the experts divergent efforts to implement environmentally conscious construction initiatives. One such initiative is the absence of a trustworthy and reputable information database that influences project pricing, which may lead to insufficient funding and project completion (Agyekum et al., 2022).

2.8.6. Technology and Innovation

SMMEs need technology and management support to help them gain access to the market, and support with scaling. Technology adoption for SMME is a significant issue that should be evaluated from a process standpoint, given the changing nature of new technologies in today's dynamic digital environment (Zamani, 2022). Technology adoption encompasses not only changes within the adoption process but also the rapid evolution of technology changes. Zamani, (2022) demonstrates the importance of studying technology adoption in SMMEs as a dynamic process and incorporating a comprehensive framework that considers the characteristics of modern dynamic technology.

The latest technological trends include the adoption and integration of Artificial Intelligence (AI) as part of business intelligence to increase processes and operational production. According to Gupta et al., (2022) investment in AI is growing with machine learning playing a significant role in processing data sourced from various sources and making adaptive-smart decisions. This presents an opportunity in the sector to participate in the latest technological advancements that include AI.

2.9. COLLABORATION WITH STAKEHOLDERS IN THE VALUE CHAIN .

According to Sibiya, (2019), collaboration between industry stakeholders, policymakers, and financial institutions is crucial for SMMEs to participate in the value chain. Large firms can mentor and support enterprises through supplier development programmes, and policymakers can reduce regulatory complexities. SMMEs can overcome barriers and unlock opportunities for growth and success in the market through partnerships. Additionally, VanSandt & and Sud, (2012) study supports the collaborative efforts for inclusive growth benefits economic growth, the study highlights the need for strategies that focus not just on how fast SMMEs grow, but also on how to grow, taking into account social and cultural factors, providing a framework for inclusive growth and alleviating poverty (Sibiya, 2019; VanSandt & Sud, 2012)

Collaborations across various sectors can empower SMMEs to play a valuable part in sustainable development and the attainment of sustainable development goals (SDGs). Transformation allows SMMEs to move from being passive participants to becoming proactive contributors in the value chain (Sjödin et al., 2020). Moreover, Uzuegbunam, (2024) recommends encouraging a culture of collaboration through public-private partnerships and community-based trust funds. Partnerships can leverage local knowledge and resources, creating a supportive environment for private investment in green finance.

2.9.1. Enabling Policies

The REIPPPP policy aims to encourage the integration of renewable energy sources into the power grid. This initiative aims to facilitate the participation of SMMEs in the renewable energy sector. It has attracted substantial investment from both local and foreign investors since its inception in 2011. However, despite REIPPPP's focus on economic development, which requires Independent Power Producers (IPPs) to allocate a specific percentage of their revenues to enterprise development, this requirement is not always met (Müller & Claar, 2021).

Additionally, the Small-Scale Embedded Generation (SSEG) initiative aims to boost the involvement of Small, Medium, and Micro Enterprises (SMMEs) in South Africa's renewable energy sector, through the adoption of solar photovoltaic (PV) systems in residential, commercial, and industrial settings (Baker & Phillips, 2019) the program has created significant opportunities for SMMEs to promote economic growth and job creation. However, it is faced with several challenges. The industry complex regulatory environment complicates the integration of renewable energy systems and financial barriers such as limited access to capital and high initial costs. On the other hand, there are concerns about grid stability due to the rapid increase in small-scale generators Baker and Phillips, (2019) note the process need for thorough planning and coordination as there are political and institutional resistance from established power utilities and vested interests complicating the transition to renewable energy

Despite these hurdles, the SSEG initiative remains a promising avenue for enhancing SMME participation in the renewable energy market and contributing to South Africa's energy security. Solar photovoltaic (PV) is the dominant system that allows for opportunities for SMME participation in the renewable energy business. Bhorat et al., (2018) the study found full participation of SMMEs could contribute to revenue losses for Eskom and Municipalities.

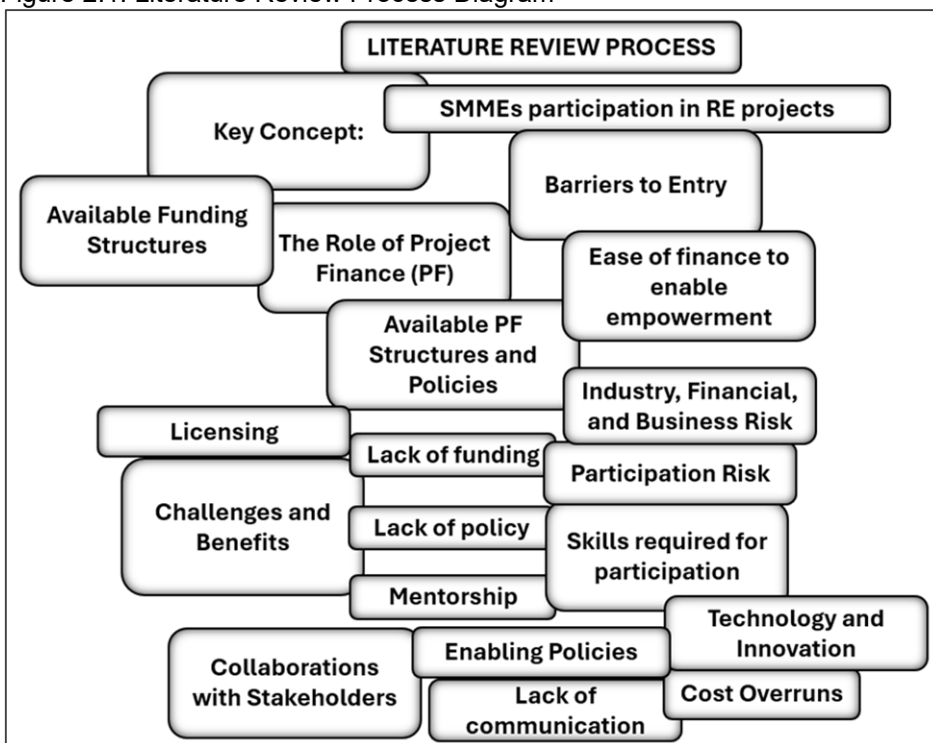
2.9.2. Participation in renewable Energy Sector

Renewable energy projects are essential for ensuring a sustainable energy supply and promoting economic growth. Climate change significantly impacts the energy sector, with disruptions to infrastructure posing challenges for stable electricity supply (Anas et al., 2023; Kim et al., 2021; Yadav et al., 2024). Taghizadeh-Hesary and Yoshino (2019) emphasised the important role of private companies in investing in green finance to achieve global climate goals, research demonstrates that Green Credit Guarantee Schemes (GCGSs) can reduce the financial risks associated with green projects, making them more attractive to private investors. (Adedoyin et al., 2020) concurs, he opposed the prevailing view that fossil fuel projects are less risky and more profitable. Findings highlighted the necessity for greater private sector involvement with SMMEs and supportive policies that could effectively address the challenges of green investments. Additionally, advocates for partnerships between the public and private sectors and community-based trust funds to pool resources and share risks, thereby developing a more conducive environment for private investment in green finance (Adedoyin et al., 2020). Encouraging innovation in renewables, the literature suggests the adoption of the Resource-Based View (RBV) theory (Barney, 2001), due to the demand and need for reliable sustainable

solutions and lack of skills in the market SMMEs can partner with innovative technologies businesses that offer customer-based solutions and make their resource available to the market and also increase their establishment to gain sustainable competitive edge (Barney, 2001). It is possible to create a conducive environment for private investment in green finance, ultimately contributing to sustainable energy development (Uzuegbunam, 2024), a statistical analysis employed a regression analysis identified the relationship between cultural values (such as individualism) and the size of financial investments in renewable energy through public-private partnerships PPP projects, it found individualism negatively affects investments showing a business culture with higher levels of individualism tend to invest less in green PPPs.

Figure 2.1 below depicts this research literature review and findings that led to the research questions as detailed in **Chapter 3**. Refer to **Appendix E** for Consistency Matrix.

Figure 2.1: Literature Review Process Diagram



2.10. SUMMARY

Literature Review place and emphasis on the importance of renewable energy in South Africa's energy mix. Highlighting the role of IPPs and REIPPPP. The chapter described the transformation of South Africa's energy sector towards renewable sources role and importance of collaboration between industry stakeholders, policymakers, and financial institutions for SMMEs success.

Based on findings, Resource Base View Theory is recommended as one of the models SMMEs to gain competitive advantage through focusing on SMME resources, the internal strengths and building on weaknesses and internal capacities, rather than concentration largely on external opportunities and threats (Robert M. Grant, 1991). RBV for small enterprises could mainly focus on internal strengths and weaknesses, according to Shibin et al., (2020) argues RBV theory could be adopted for SMMEs to enable participation in the supply chain to gain competitive advantage.

Additionally, literature provided valuable collaboration conceptual models such as Triple Helix framework, involving alignment through continuous learning and adaptation facilitated through partnerships with universities and industry collaborations. The Triple Helix model confirmed to be an effective framework for encourage innovation and sustainability among SMMEs (Leydesdorff, 2000). Furthermore, the concept of an entrepreneurial ecosystem (EE) provided a robust framework that explores opportunity for SMMEs to access project finance, it is crucial models highlight the importance of a thorough analysis to be conducted on existing ecosystem to identify the strengths and gaps specific (Content et al., 2020).

Literature review provided useful frameworks that were synthesised and integrated as part of the Innovation for Inclusive Growth Model to improve SMME participation through innovation to gain competitiveness, this can be realised through collaboration among industry stakeholders, and policies at micro levels that impact businesses and mitigate using financial instruments.

3. CHAPTER 3: OBJECTIVE AND RESEARCH QUESTIONS

The research objective was to consider the role of project finance for SMME empowerment in green projects participation in South Africa, and the accessibility to finance SMMEs to encourage participation in renewable energy initiatives. Literature emphasises the need to investigate finance accessibility that empowers SMME participation in the energy sector, especially in South Africa.

The research recommendations could support economic growth through job creation and SMME inclusive participation in the renewable energy industry. The study investigates SMMEs' accessibility to finance through renewable energy finance institutions, obtaining insights from Industry experts in the private sector (IPP) and examining the barriers SMME face in accessing opportunities. Literature suggests that a collaborative effort between industry stakeholders, policymakers, and financial institutions is required to enable an environment where SMMEs participate in the value chain. Thus, the research questions also consider collaboration efforts.

The following six themes and twelve questions were formulated based on the literature review as discussed in **Chapter 2**, Also refer to **Appendix A** for Interview Questions

Theme 1: Project Finance

RQ1: How does project finance empower SMMEs to participate effectively in green energy projects?

RQ2: What measures are being taken to assess the feasibility of current project finance investments that support and enable small, medium, and micro enterprises to actively participate in green energy projects?

Theme 2: Funding Structures

RQ3: What are the accessible funding structures existing for renewable energy that facilitates the participation of SMMEs and entrepreneurs?

RQ4: What are the key challenges in accessing funds for renewable energy projects and how do they impact SMME participation?

Theme 3: Barriers

RQ5: What are the main barriers contributing to SMMEs' lack of participation in the renewable energy sector?

RQ6: What are the key challenges faced by SMMEs in the renewable energy sector, and how can these challenges be overcome?

Theme 4: Contribution

RQ7: Which SMME green projects have the potential to contribute to value creation in the renewable energy sector?

RQ8: Are the current collaboration initiatives effectively implemented, and what are the policies facilitate collaboration for industry growth?

Theme 5: Collaboration

RQ09: How can collaborative efforts between industry stakeholders, policymakers, and financial institutions enable SMME participation in the renewable energy value chain?

RQ10: Are the current collaboration initiatives effectively implemented, and what policies facilitate collaboration for industry growth?

Theme 6: Skills Development

RQ11: What specific skills and resources do SMMEs need to effectively participate in green energy projects?

RQ12: How can mentorship and skills development programs enhance SMME participation in the renewable energy sector?

The chapter focused on the research questions that were posed to probe deeper into the topic under investigation

4. CHAPTER 4: RESEARCH METHODOLOGY

4.1. INTRODUCTION

This study aimed to investigate the accessibility of renewable energy finance, to empower Small, Medium, and Micro Enterprises (SMMEs) to participate in the energy sector. This research focused on project finance for green projects as a means of empowerment and examined the barriers preventing SMMEs from engaging in renewable energy initiatives.

Small businesses face significant challenges, including a lack of resources, market structure constraints, limited access to finance and expertise, and competition from established firms. These barriers deter innovation and hinder SMMEs' ability to compete effectively in the market D'Este et al., (2012).

Through comprehensive data gathering the study probed deeper into these findings. The qualitative research design employed in this study proved to be appropriate, as it provided valuable insights and allowed for an in-depth exploration of the topic under investigation. A qualitative, exploratory research methodology was utilised, incorporating semi-structured interviews for data collection. This approach facilitated a nuanced understanding of the challenges and opportunities SMMEs face in the renewable energy sector, ultimately contributing to the study's objectives and findings as discussed in **Chapter 5**.

4.2. CHOICE AND PURPOSE OF RESEARCH DESIGN

The study explored the underlying problems Small, Medium, and Micro Enterprises (SMMEs) face in accessing renewable energy finance it gained insights from information-rich participants. A qualitative, exploratory research method facilitated the investigation of real-life challenges, contributing to existing literature providing recent developments for scholars through findings derived from SMMEs, industry experts, and explanations from the financial sector. The research adopted a qualitative inductive approach, which offered a significant advantage investigating and uncovering specific perceptions related to SMME participation in the renewable energy sector (Bonoma, (1985) Boma's (1985) case study found that inductive qualitative research is effective for investigating complex problems that are often neglected in traditional theory-building and analysis. This approach allows researchers to probe deeply into intricate issues, providing a rich, contextual understanding that quantitative methods might miss. Furthermore, qualitative methods enable information sharing between scholars and practitioners, therefore providing a strong foundation for advancing knowledge. This integration of practical insights

and academic rigor underscores the value of qualitative research in addressing multifaceted marketing challenges (Bonoma, 1985). According to Creswell (2009), the benefits of an inductive qualitative approach include the enhancement, robustness, and validity of the research findings, grounded in real-world experiences and perspectives.

Moreover, the applied method facilitated the development of theory as described according to Bonoma (1985), relying on individual experiences that allowed for the identification of conditional concepts, including the social and ethical dilemmas associated with the challenges. The researcher followed the same concept in looking at challenges SMMEs face in accessing renewable energy finance. Furthermore, the study employed the SAGE (Systematic Approach to Generating Evidence) methods for qualitative research methodology and design, which emphasised a structured approach to data collection and analysis, ensuring rigour and depth in the exploration of the research questions (Bonoma, 1985; Bryman, 2016; McCracken, 2011).

The researcher focused on a selected sample of individuals from various industry groups, including financial sector experts, renewable energy industry specialists, and SMMEs, who were deemed information-rich participants relevant to the topic under investigation. Data gathering was conducted through semi-structured interviews, with follow-up discussions to stress-test the findings and ensure the robustness of the results (Saunders & Lewis, 2018)

On the hand, whilst the Delphi method is a structured communication technique designed to facilitate consensus among a panel of experts through multiple rounds of questionnaires, it was deemed unsuitable for this qualitative study for several reasons. The Delphi method's primary focus on quantifying expert opinions and achieving consensus would not effectively capture the diverse experiences and complexities of the participants' perspectives. This study aimed to explore intricate phenomena through detailed narratives and personal experiences, which may not be adequately represented through the structured numerical approach of the Delphi technique. Moreover, the emphasis on consensus could inadvertently suppress diverse viewpoints, limiting the exploration of unique insights that qualitative methodologies seek to uncover (Linstone et al., 1975; Rowe & Wright, 1999)

The research concentrated on project finance for green projects as a means of empowerment and examined the barriers preventing SMMEs from engaging in renewable energy initiatives. A descriptive-explanatory research design was adopted to describe the current state of green finance accessibility for SMMEs and the impact of participation in the sector, identifying the underlying factors influencing this relationship (Saunders & Lewis, 2018).

The descriptive research design provided an accurate and systematic account of the phenomena under investigation and the industry's behaviour, while the explanatory research assisted in identifying the causal effects contributing to energy funding and barriers to entry. The study successfully captured the latest industry trends regarding renewable energy finance structures that could lead to sustainable energy security, shedding light on real-life impediments that affect SMME participation in the sector. The description-explanatory approach enabled the researcher to articulate the current state of renewable energy finance structures and the level of SMME participation, thereby contributing valuable insights to the field.

4.3. PHILOSOPHY

The research implemented an interpretivism philosophy that poses reality into socially constructed and subjective topics; this approach was well-suited for the study as it allowed for the exploration of the complex and nuanced experiences of SMMEs in accessing renewable energy finance, which varied widely across different subjects (Bryman, 2016). Eakin & Gladstone, (2020) argue that enhancement of qualitative research requires a value-adding approach that extends beyond traditional methods, incorporating interpretation and the creative presence of the researcher to generate deeper insights played served a crucial role in formulating the interview questionnaires through establishing themes within specified categories and relationships to organise the data. This allowed the researcher to investigate what questions to ask, resulting in a comprehensive list of topics for inquiry (McCracken, 2011). Furthermore, Suzuki, (2003) refers to this methodology as employing pragmatic analysis, which provides a comprehensive and academic measurement applied throughout a particular field of research. It consists of an in-depth analysis of the set of procedures and concepts relevant to this specific topic, contributing to the body of knowledge. Furthermore, interpretivism integrates human interest into the study, as real-life problems were investigated and compared with the literature, as evidenced in **Chapter 6**.

4.4. APPROACH SELECTION

The research opted for an inductive methodology, enabling the derivation of fresh insights and theories from the gathered data, as opposed to validating existing theories, as suggested Saunders & Lewis, (2018). Three methodologies were considered: (1) Deduction, where a theoretical proposition is tested through a research strategy aimed at confirming or refuting the proposition based on empirical evidence; (2) Induction, which involves constructing a theory from empirical observations to generate fresh insights and understandings for explaining

phenomena; and (3) Abduction, which combine elements of both deduction and induction to formulate and test a theory in order to identify the most suitable explanation for observed phenomena utilising existing and new theoretical frameworks. An inductive approach was deemed the most suitable for this study, with a focus on fresh insights into the topic.

4.5. METHODOLOGICAL CHOICES

The research methodology used was qualitative, which provided for a more comprehensive understanding of the research problem (Saunders & Lewis, 2018). It allowed for an in-depth exploration of SMMEs' experiences and the perspectives of industry experts as well as the financial sector opinions. The research methodology design followed a qualitative method, that is based on focused groups refer to Demographics **Table 4.1** for detailed information on the study. McCracken, (2011) highlights the importance of qualitative research for its ability to uncover deep, nuanced insights into cultural categories and assumptions, while arguing that quantitative research excels in providing precise, generalisable data through well-defined categories and relationships.

Furthermore, Downey and Ireland, (1979) argue that qualitative methods are highly valuable in organisational studies, especially for evaluating environmental attributes. The study proposed a two-dimensional model that differentiates between what is measured (participant interpretations versus environmental attributes) and how it is measured (quantitative versus qualitative). Their findings support the use of qualitative methods as more effective for assessing environmental attributes, while quantitative methods are better suited for understanding participants' interpretations.

4.6. STRATEGY

The study collected data through 12 interviews, as detailed in **Section 4**. The interview guide assisted during the semi-structured interviews to elicit rich and detailed data from the interviewees. All interviews were conducted virtually on Teams, with the researcher's video switched on for the entire session. The semi-structured interviews consisted of two types of questions: (1) Main questions that covered the key research themes aligned with the research objectives, ensuring they were clear, concise, neutral, non-leading, and free of jargon and technical terms; and (2) Probing questions that explored the interviewees' responses in more depth to gain clarity and avoid ambiguity. This approach aligns with the principles of narrative

research, a qualitative method that delves into personal stories and experiences to gain deeper insights into individuals and groups (Wieland et al., 2024).

The data gathered through these semi-structured in-depth interviews with SMMEs, and financial institutions provided rich, contextual insights into their experiences (Clandinin & F. Michael Connelly, 2004). Furthermore, the method is described in Bryman, (2016), noting the importance of semi-structured interviews in qualitative research for capturing detailed and nuanced data

4.7. TIME HORIZON

The research employed a cross-sectional horizon, collecting data at a specific moment to gain the most recent insights (Bryman, 2016). Data collection was conducted over a specified timeframe of three weeks, in accordance with the researchers' schedule. A cross-sectional technique was adopted for this study (Saunders & Lewis, 2018), which is particularly effective for capturing a snapshot of current phenomena and providing timely insights into the research questions. This approach aligns with the methodology outlined in SAGE Journals, emphasising the effectiveness of cross-sectional studies in evaluating knowledge, attitudes, and practices within a defined period (Koni et al., 2022) . Employing this method, the researcher was able to gather relevant and up-to-date data, facilitating a comprehensive analysis of the studied phenomena.

Furthermore, the researcher received ethical clearance from the GIBS University Ethical Clearance Committee. Approval process involved a thorough review of the study's methodology, including the informed consent process, data confidentiality measures, and the protection of participants' rights. Ethical approval meant that the researchers demonstrated commitment to conducting the study responsibly and ethically, which is crucial for maintaining the integrity and credibility of the research findings. This step also ensured that the study complied with all regulatory requirements and ethical guidelines, providing a solid foundation for the research.

4.8. POPULATION

The population for this study was the renewable energy sector. Due to time constraints, accessing the whole population was not feasible, so a sample of four participants from each sector—Financial, SMMEs, and Industry experts—was selected. This research used sample data, which is a sub-group of the whole population (Saunders & Lewis, 2018). Renewable

energy sector SMMEs, financial institution, and industry experts made up the population, with government departments responsible for energy excluded from the study.

4.9. UNIT OF ANALYSIS

The researcher gathered and analysed data from recorded transcripts that were generated during the interviews (non-numerical data) Short et al. (2002). The analytical process involved establishing meaningful categories, selecting appropriate data units, and associating relevant categories with the data units. This methodological approach enabled the researcher to probe the intricate phenomena and advance theoretical frameworks through scrutinising propositions and alternative interpretations within the data (Saunders & Lewis, 2018).

The unit of analysis for this study was Small, Medium, and Micro Enterprises (SMMEs) operating in the renewable energy sector. SMMEs play a crucial role in the renewable energy value chain, and their financial accessibility is a key determinant of their participation in green energy projects.

Furthermore, the process of conducting narrative analysis involves five key steps, as outlined (Tomaszewski et al., (2020). The researcher initiated the process by carefully reading and re-reading the transcripts to extract and summarise the main elements. The narratives were subsequently categorised into fundamental components, including dimensions of time (past, present, future), location, and context. The next phase focused on identifying main themes that would help in interpreting the storyline, while also paying attention to any transitions between those themes. This included acknowledging interpretations or contradictions that may arise. Documenting smaller narratives embedded within the transcripts was also essential. The researcher linked the thematic insights to the wider body of literature and theoretical network diagrams, conducting comparative analyses of individual allowed for overall understanding of the data.

4.10. SAMPLING METHOD AND SIZE

Sampling, in qualitative research, refers to selecting a subset of individuals, or groups from a larger population to study and make inferences. The process involved choosing participants who could provide rich, relevant, and diverse insights, ensuring the representativeness of the findings (Short et al., 2002) The sampling utilised three population techniques; the diversification played important role in gathering knowledge from common industry stakeholders to ensure the validity of qualitative research findings. A purposeful sampling

method, commonly used in qualitative research, was employed, selecting participants based on their industry knowledge and experiences (Saunders & Lewis, 2018). Participants included twelve participants from the renewable energy sector comprising Funders, Industry Experts and representatives from Small and Medium Enterprises.

Selection criteria required a minimum of 5-10 years of relevant experience in managerial, project development, or business development roles. For SMMEs, participants needed 2-10 years of experience and relevant industry knowledge, including experience in start-ups. Signed consent letters from willing SMME participants are included in **Appendix C**.

Table 4.1: Summary of Sample Demographics

FUNDERS/ BANKS	INDUSTRY EXPERTS (IPP & PUBLIC AND PRIVATE SECTOR)	RENEWABLE ENERGY SMMEs
Senior Dealmaker and Associate	Head (Energy Transition & Sustainability)	Manager Director
Principal Deal Originator	Senior Project Manager	Director
Head of Technical Services	Senior Energy Transition Business Developer	Director
Manager Project Management Unit	Vice President Distributed Generation	Director

4.11. MEASUREMENT INSTRUMENT

Saunders and Lewis, (2018) suggest that common qualitative research tools include interviews, questionnaires, observations, documents, and video conferencing. Qualitative data collection was conducted through semi-structured questionnaires, allowing respondents to express their opinions in their own words. Microsoft Teams were chosen as the data-gathering means for this study.

4.12. DATA GATHERING PROCESS

Data collection was carried out through an interview guide that was developed in accordance with the literature review to effectively address the research questions (Saunders & Lewis, 2018). This guide played a crucial role in maintaining consistency and reliability throughout the interview process. The primary data source for the study consisted of semi-structured interviews that were centered around the themes outlined in the qualitative questionnaire. Employing conventional content analysis offered numerous advantages, such as providing a systematic

method for coding and analysing the data, as well as identifying essential concepts and relationships within the textual information. The insights gathered from the interview transcripts facilitated the identification of patterns that were relevant to the objectives of the research.

Appendix A includes the interview questions guide. The interviews were conducted in English, the business language of South Africa. Each interview lasted approximately 45 minutes; twelve questions were posed to participants. Participant anonymity was maintained throughout the study. See **Appendices B and C** for the consent forms for obtaining participants' permission, and **Appendix C** for company permission forms. The findings in **Chapter 5** highlight the effectiveness of this methodology in capturing rich, detailed insights from the participants, thereby enhancing the overall validity of the research.

4.13. ANALYSIS APPROACH

The data analysis approach followed a thematic analysis framework to identify categories, themes, and patterns (Saunders & Lewis, 2018). The researcher analysed the interviews and transcripts, noting themes that captured concepts relevant to the research questions. The data were coded using ATLAS.ti, a statistical analysis software, which facilitated the organisation and analysis of the generated codes. The researcher ensured data privacy and transparency through obtaining shared consent from all stakeholders to protect participant confidentiality (Davison et al., 2024).

The data analysis process included several steps. All twelve interviews were transcribed using Microsoft Teams recordings, and notes were taken during the interviews. The recordings were stored electronically, with backup files saved on OneDrive. This process was interactive, involving a back-and-forth approach of reading, writing, and listening to audio recordings to ensure that concepts were accurately interpreted. The results of this analysis are presented in **Chapters 5 and 6**.

Content analysis was employed to systematically sort and summarise the informational content of the data. The process began with the derivation of codes from the data. The researcher meticulously read all participants' responses to the same question, highlighting significant words or phrases and making detailed notes to emphasise key features (McIntosh & Morse, 2015).

The qualitative data in this study was analysed at two levels: textual and conceptual. At the textual level, the raw data underwent familiarisation, text segmentation, and coding. This meant that the researcher first became well-acquainted with the data, then broke it down into smaller

parts, and finally assigned labels or codes to these segments. This approach is known as inductive theorising and conceptualisation. (Bryman, (2016) explains that research methods like participant observation and semi-structured interviewing are employed to allow researchers to remain open-minded about the information they need to gather. This flexibility enables concepts and theories to emerge organically from the data.

At the conceptual level, the analysis focused on building frameworks connecting these codes and categories to create theoretical networks. This involved organising the data into broader themes and concepts, using specific quotes from participants to provide deeper insights. Network diagrams created with ATLAS.ti software were particularly helpful in this process. These diagrams allowed the researcher to organise and structure the data classifying it into codes, concepts, or themes, and linking them to the participants who provided the data. This visual representation made it easier to discern relationships between different codes and to identify connections that might not have been apparent when merely reading through the extensive qualitative data.

Following this, common themes were identified, and the data were initially sorted into broad categories based on similar characteristics. As these categories expanded, they were further subdivided into more specific categories to maintain clarity and manageability. Codes were organised into categories, with a comprehensive list of generated codes included in **Appendix F**.

The data analysis process followed the outlined methodology, starting with the transcription of the interviews. Next, the coding process began, during which the data was divided into smaller components and assigned descriptive labels. Notes were taken, and key phrases that represented concepts relevant to the study themes were grouped, segmenting sentences into specific categories.(Creswell et al., 2007). The findings in Chapter 5 illustrate the effectiveness of this analytical approach in revealing significant themes and insights that contributed to the overall research objectives.

4.14. QUALITY CONTROLS

Quality control was a crucial aspect of the qualitative research methodology, ensuring the accuracy, reliability, and credibility of the research findings. The study was enhanced utilising member checking and triangulation, which are two commonly employed techniques in qualitative research. Member checking involved returning the research findings to participants

to verify interpretations and ensure accuracy (Turner et al., 2017). This approach allowed participants to confirm that the researcher accurately understood their experiences, perspectives, and responses, thereby improving the reliability and validity of the findings.

Biases

Jordan and Troth, (2020) study on common method biases, highlights that biases can compromise the reliability and validity of measures mixing systematic method variance with the systematic variance of the focal construct. This can lead to incorrect judgments about a scale's reliability and convergent validity and can also bias the estimates of effects in multiple regression models. Additionally, common method biases can distort the parameter estimates of relationships between constructs, potentially inflating or deflating these estimates and affecting hypothesis testing, variance attribution, and discriminant validity. The potential for researcher bias was acknowledged, as further supported in Saunders and Lewis, (2018), due to the researcher's background and experience in the industry.

To mitigate this bias, triangulation was employed as a principle to corroborate and confirm the events, descriptions, or facts represented in the study (Turner et al., (2017). This involved using multiple data sources and methods to validate the information provided, thereby strengthening the overall credibility of the research. Comparing different data sources and perspectives, the researcher was able to enhance the accuracy of interpretations and provide a more comprehensive overview of the research phenomenon. Anonymity and confidentiality reduced social desirability bias, allowing participants to feel more comfortable providing honest responses (Jordan & Troth, 2020)

Transferability

The study also recognised the importance of transferability, which refers to the extent to which findings can be applied beyond the specific study context. To facilitate this, detailed descriptions of the research context and participants were provided, ensuring that valid data were shared to avoid errors in data collection. Adopting rigorous sampling techniques and incorporating data checking, the research aimed to yield trustworthy results (Saunders & Lewis, 2018).

To further improve quality, an interview guide was shared with participants prior to the interviews, enabling full participation and transparency. This ensured that participants were aware of what to expect, and the researcher adhered strictly to the shared research questionnaire without introducing new topics or deviating from the planned questions. Microsoft

Teams was utilised for conducting the interviews, and transcripts were generated during the interview process. However, a subsequent transcription process was undertaken to correct any errors in the initial transcripts, ensuring the accuracy of the data collected. This comprehensive approach to quality control contributed significantly to the integrity and reliability of the research findings.

4.15. LIMITATIONS

Understanding and addressing the limitations of qualitative research methods can significantly enhance the reliability and validity of findings. The primary drawbacks of qualitative research, as highlighted in the literature, include the potential for biases and subjectivity in data collection, analysis, and interpretation

Time of Study

Interpreting qualitative data can be particularly challenging due to difficulties in verifying the validity of the findings. The data collection process commenced in August following the receipt of ethical clearance but faced delays due to the unavailability of some initially identified participants. The researcher relied on available networks to secure interviews, particularly with finance and industry experts, which necessitated accommodating their schedules.

Conducting qualitative research is inherently time and resource-intensive, requiring a significant investment in data collection, analysis, and interpretation. Limited resources, such as time and participant availability, can restrict the scope and depth of qualitative research (Creswell et al., 2007; Saunders & Lewis, 2018; Turner et al., 2017). To mitigate time constraints, a longitudinal study was used. (Jebb & and Tay, 2017) affirm that longitudinal studies involve collecting data from the same participants over an extended period, allowing researchers to engage with participants more flexibly and accommodate their schedules, while capturing changes and developments over time. This approach is beneficial for understanding dynamic sectors, such as renewable energy, where ongoing developments are crucial.

Sample Size

The qualitative research involved a sample of 12 participants, including funders, industry experts, and representatives from Small, Medium, and Micro Enterprises (SMMEs) within the renewable energy sector. This limited sample size can influence the generalisation of the findings. To enhance the research, a longitudinal study is suggested for the future including

repeated observations and interviews with the same participants over longer periods the study would provide a more comprehensive understanding of the evolving challenges and opportunities SMMEs face in accessing renewable energy finance, thereby enriching this qualitative data and insights derived from the research.

5. CHAPTER 5: ANALYSIS OF RESULTS

5.1. INTRODUCTION

Chapter 5 presents the key findings from the data collected through interviews; The chapter includes the demographics of the population, the analytical process followed, and the themes identified from the analysis of data based on research questions. The chapter arrangement follows the identified eight key themes that emerged through the qualitative analysis.

Chapter 4 presented the research design and methodology, where it was established that a qualitative approach was suited for this study. The qualitative research approach was preferred for the study as it allows for in-depth exploration and provides rich, detailed insights into participants' perspectives and experiences on the subject under study. In particular, thematic analysis was employed to analyse primary data that was obtained from interview sessions. Thematic analysis was chosen as it is a well-structured approach that also provides in-depth narration allowing interviewees to present a comprehensive description of their experiences, emotions, and perspectives.

More importantly, the chosen research design and methodology helped to provide answers to the main research question in **Chapter 3**.

This chapter presents the qualitative analysis and findings of the study on the renewable energy accessibility of finance for empowering SMMEs participation in the energy sector in South Africa. The data for the study was gathered using interviews with 12 participants who included funders, industry experts, and representatives from Small and Medium Enterprises. The findings in this chapter serve as the basis for the next chapter which focuses on the discussion where findings are compared with the relevant literature to identify and explain any departure points.

5.2. SAMPLE DEMOGRAPHICS

The demographics Table 5.1 below illustrates the profile of participants that were interviewed to gather data on the accessibility of finance for empowering SMMEs participation in the green energy sector in South Africa. A total of 12 people were interviewed. These included 3 SMMEs directors and 1 manager and 4 funders who were represented by Senior Dealmaker and Associate, Principal Deal Originator, Head of Technical Services, and Manager Project Management Unit. A total of 4 industry experts were involved in this exercise and were

represented by Head of Energy Transition & Sustainability, Senior Project Manager, Senior Energy Transition Business Developer, and Vice President Distributed Generation.

All the 12 interviewees were males and declared that they have been in their respective industries for between 10 and 20 years. This excludes Senior Dealmaker and Associates who confirmed that he has been in the financial sector for 21 years. Experienced interviewees provided quality in-depth knowledge on the subject matter under examination.

Table 5.1: Profile of people who participated in the interviews of the study

Participant Demographics			
Interviewee	Role	Specialty	Experience (yrs.)
RENEWABLE ENERGY SMMEs			
Interviewee 9	Manager Director	SMME	14 years
Interviewee 12	Director	SMME	10 years
Interviewee 2	Director	SMME	18 years
Interviewee 5	Director	SMME	12 years
INDUSTRY EXPERTS (IPP & PUBLIC AND PRIVATE SECTOR)			
Interviewee 11	Head (Energy Transition & Sustainability)	Industry Expert	16 years
Interviewee 7	Senior Project Manager	Industry Expert	17 years
Interviewee 10	Senior Energy Transition Business Developer	Industry Expert	15 years
Interviewee 4	Vice President Distributed Generation	Industry Expert	18 years
FUNDERS/ BANKS			
Interviewee 1	Senior Dealmaker and Associate	Funder	21 years
Interviewee 6	Principal Deal Originator	Funder	10 years
Interviewee 8	Head of Technical Services	Funder	16 years
Interviewee 3	Manager Project Management Unit	Funder	18 years

5.3. DATA ANALYSIS PROCESS

Thematic analysis process which was used in the study started from data gathering exercise where each interview session was recorded using a record option in Microsoft Teams platform. During each of the interview sessions, the researcher was able to jot down some notes to supplement information gathered from recordings. The recorded audio data from each interview session was transcribed (converted from audio to text) before being exported to ATLAS.ti

software application (version 24) for comprehensive analysis to provide answers to the main research questions of the study.

ATLAS.ti software application was used to code the data and analysed it methodically. Fundamental coding functions in ATLAS.ti application such as open coding, code listing, in vivo and quick coding were used to analyse the qualitative data of the study. This was important in identifying emerging trends and developing themes from the qualitative data of the study. This was one method (inductive approach was used to identify themes based on the primary data gathered for the study) that was used to determine the relevant themes for the study. Deductive approach was also used to determine the relevant themes based on the literature of the study.

The qualitative data of the study was analysed from the textual level as well as from the conceptual level. The textual level used the raw qualitative data and included activities such as familiarisation with data gathered, text segmentation and coding process. On the other hand, the conceptual level was focused on framework-building activities such as interrelating codes, and categories to generate theoretical networks. Furthermore, quotations which are associated with specific codes were used to provide further details on the participants' thoughts.

Network diagrams from ATLAS.ti software application were used to provide a detailed yet concise analysis of the interviewees' thoughts on renewable energy finance accessibility for empowering SMMEs participation in the Energy Sector in South Africa. Network diagrams provided several benefits to this thematic analysis. It allowed the researcher to organise and structure data in classifying it into codes, concepts, or themes and linking them to participants (source of specific data code). This made it easier to visualise the relationships between various codes. This diagrammatic representation (network diagram) also made it easier to identify connections that are not so apparent to the eye when reading through the large amounts of qualitative data from interviewees.

In addition to the use of network diagrams to analyse the perceptions of interviewees, groundedness and density were used. Density reveals the number of connections between two codes while groundedness shows how frequently a code appears. Groundedness is particularly important as it shows dominant views of participants on a specific aspect of the study. The next subsections of this chapter present the qualitative analysis of the study based on eight themes that were named inductively and deductively.

A total of 118 codes were generated from the uploaded transcripts using Atlas.ti. This process was conducted with thorough consideration and rigor. The set of questions was the same for all participants, ensuring consistency translation, other information not related to topic was omitted. Transcripts were extracted directly from the interview recording on Microsoft Teams, then analysed and cleaned before being transferred to Atlas.ti and vivo for coding. Based on the research questions, it was expected that no new codes would be identified after the ninth interview. The majority of the codes were generated from the first six interviews. finding suggests that the first interviews offered a comprehensive range of insights relevant to the study's objectives. The early saturation of codes underscores the richness of the data collected from the initial participants. The inclusion of various stakeholders, such as SMMEs, industry experts, and funders, ensured a well-rounded perspective on the issues being investigated. This thorough approach to coding and analysis strengthens the validity of the study's findings

A word frequency analysis was conducted to measure the percentage of new codes and the number of words generated from each question. This involved creating a word cloud to visually represent the most frequently occurring words across all participants' responses. The word cloud highlighted key terms and themes, providing a clear visual summary of the data. This method helped identify the most prominent topics and the distribution of new codes, offering valuable insights into the commonalities and variations in participants responses

5.5. THEMES IDENTIFIED

The data were analysed as per the following 8 themes that were identified for the study namely: Empowerment of SMMEs to participate in green energy; Accessing finance for RE projects; Main challenges faced and strategies to support SMMEs in renewable energy, Contribution to value creation in the renewable energy, Collaboration initiatives, Supporting small businesses, Resource requirements for SMMEs to participate in green energy, and Contribution of mentorship and skills development programmes.

5.5.1. Theme 1: Empowerment of SMMEs to participate in green energy

This theme on the Empowerment of SMMEs to participate in green energy covered 2 research questions which included the following;

- **RQ1:** How does project finance empower SMMEs to participate effectively in green energy projects?

- **RQ2:** What measures are being taken to assess the feasibility of current project finance investments that support and enable small, medium, and micro enterprises to actively participate in green energy projects?

The responses of interviewees on the 2 research questions above follow in the subsequent subsections.

i.RQ1: How does project finance empower SMMEs to participate effectively in green energy projects?

The responses on research question 1 above are better presented in the network diagram in **Figure 5.3**. The **letter G** in Atlas ti. software application stands for an element that links codes. This means that all the aspects of the codes are elements of ways to empower SMMEs to participate in green energy projects. On the far left of network diagram in **Figure 5.3** are interviewees and their associated thoughts or opinions on the ways to empower SMMEs to participate in green energy projects.

Based on the network diagram in **Figure 5.3** it is shown that providing access to capital was the common method that was suggested by Interviewee 2, Interviewee 5, Interviewee 9 and Interviewee 12 (all who were representing the voices of SMMEs) to empower SMMEs to participate in green energy projects. Providing access to capital had the highest frequency of 4. In particular on this point, Interviewee 9 reported in detail as follows;

“Project finance can assist SMMEs by providing them with access to capital and the financial structures. Providing access to capital will help SMMEs avoid taking on too much risk and this empowers them to participate in green energy projects which are often capital intensive. Access to capital ensures that a project does not fail and an SMME can be able to finance innovation and technology and other essential cost to run the green energy projects. Getting access to capital is also an incentive that can spur SMMEs to participate in clean energy projects and strive to perform well”.

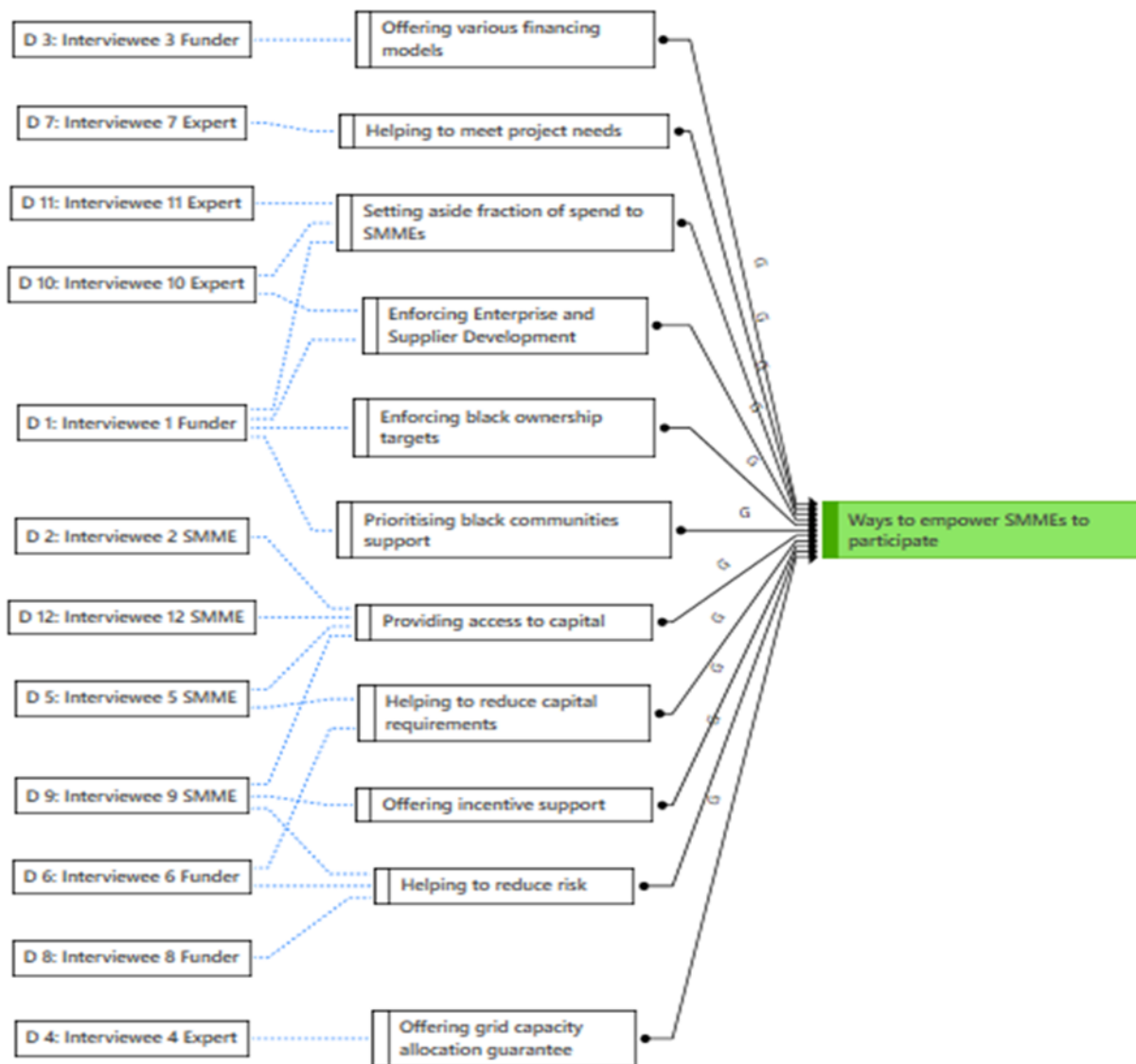
Helping to reduce the risk and setting aside fraction of spend for SMMEs were suggested as other common ways to empower SMMEs participate in green energy projects as suggested by interviewees and recorded high frequency of 3 each as shown. In fact, Interviewee 6, Interviewee 8 and Interviewee 9 were of the opinion that helping to reduce the risk empowers SMMEs participate in green energy projects while Interviewee 1, Interviewee 10 and

Interviewee 11 were of the view that setting aside fraction of spend to SMMEs is one of the ways that can empower SMMEs participate in green energy projects.

On the other hand, helping reduce capital requirements (Interviewee 5 and Interviewee 6) and enforcing Enterprise Supplier development (Interviewee 1 and Interviewee 10) were other less common methods (with a frequency of 2 as shown) to empower SMMEs to participate in green energy projects that were suggested by interviewees. In particular, Interviewee 1 reported in detail on his suggestion on using Enterprise Supplier development to empower SMMEs to participate in green energy projects;

“Enforcing Enterprise supplier Development through procurement perspective is one good way to empower SMMEs to participate in green energy projects. This involves the government prescribing the percentage of spend that should be allocated to black owned SMMEs. This can be blended with enforcing large corporates and benefitting SMMEs to hire a certain number of Black people from the surrounding areas. So this is almost a guarantee that SMMEs will get a fair share of projects in the green energy space. Actually, this should be done exactly similar to the ownership structure that the government prescribes where government gives directives that entities have to be at a very least BEE level four to benefit. This should translate into meaningful participation of SMMEs in green energy projects”

Figure 5.3: Ways to empower SMMEs to participate in green energy projects



ii.RQ2: What measures are being taken to assess the feasibility of current project finance investments that support and enable small, medium, and micro enterprises to actively participate in green energy projects?

There were several measures that were suggested by interviewees to assess the feasibility of current project finance investments as shown in **Figure 5.4**. The responses of the interviewees suggested that potential returns are a dominant (with the highest frequency of 4 compared to a possible total of 12 interviewees) measure that is used to assess the feasibility of current project finance investments to enable SMMEs to actively participate in green energy projects. In fact, Interviewee 1, Interviewee 5, Interviewee 8 and Interviewee 12 expressed that potential returns of the investments are measures that are taken to assess the feasibility of current project finance investments. In particular, Interviewee 1 provided details on this as follows;

“Green energy projects are capital intensive, so there is a lot of money that is invested in these green energy projects. Therefore, the first important consideration is that these projects have to be economically viable for the investor to take a risk. By this, I mean the green energy projects have to make profit. If they do not make profit, it is a nonstarter. There is not a single entity that can sink billions for charity. So, that is the first important consideration that has to be taken into account when investing in green energy projects. The other non-financial return that has to be realised from these projects is the impact they have on the communities. These projects have to support the local businesses through preferential procurement. They also have to create employment for the local communities and these measures help improve the quality of life of people in the surrounding areas and helps in the growth of businesses. These measures have a direct impact on the economic development of the country”

On the other hand, Interviewee 9 and Interviewee 10 suggested that financial due diligence is one important measure that is considered to assess the feasibility of current project finance investments to support and enable SMMEs to actively participate in green energy projects. Interviewee 9 expressed that financial due diligence in green energy projects involves comprehensive analysis and review of the green energy projects to assess their viability, potential returns and project risks. He further expressed that this financial due diligence helps project funders and or investors to make informed decisions pertaining to implementation of these projects.

Interviewee 2 and Interviewee 3 were of the opinion that standard measures are considered to assess the feasibility of current project finance investments to support and enable SMMEs to actively participate in green energy projects. Interviewee 3 described in detail that standard measures involve a few measures like pre-feasibility studies, technical feasibility, environmental studies, legislative environment and financial feasibility. He reported in detail as follows;

“When embarking on any projects in general, you have to consider standard measures to assess their feasibility. These standard measures include your pre-feasibility studies that come with your business case. These standard measures involve technical feasibility studies, environmental studies, legislative environment and financial feasibility. If the project has been proven to be viable then technical designs begin to take shape. These are sort of standard aspects or measures that indicate to you whether the project is bankable or not”

Other measures to assess the feasibility of current project finance investments that support and enable SMMEs that were mentioned by interviewees include current financial status, pre-feasibility studies, cash flow analysis, environmental impact assessment, and risk assessment. All the above-mentioned measures had a low frequency (groundedness) of 1 as shown in

Figure 5.4

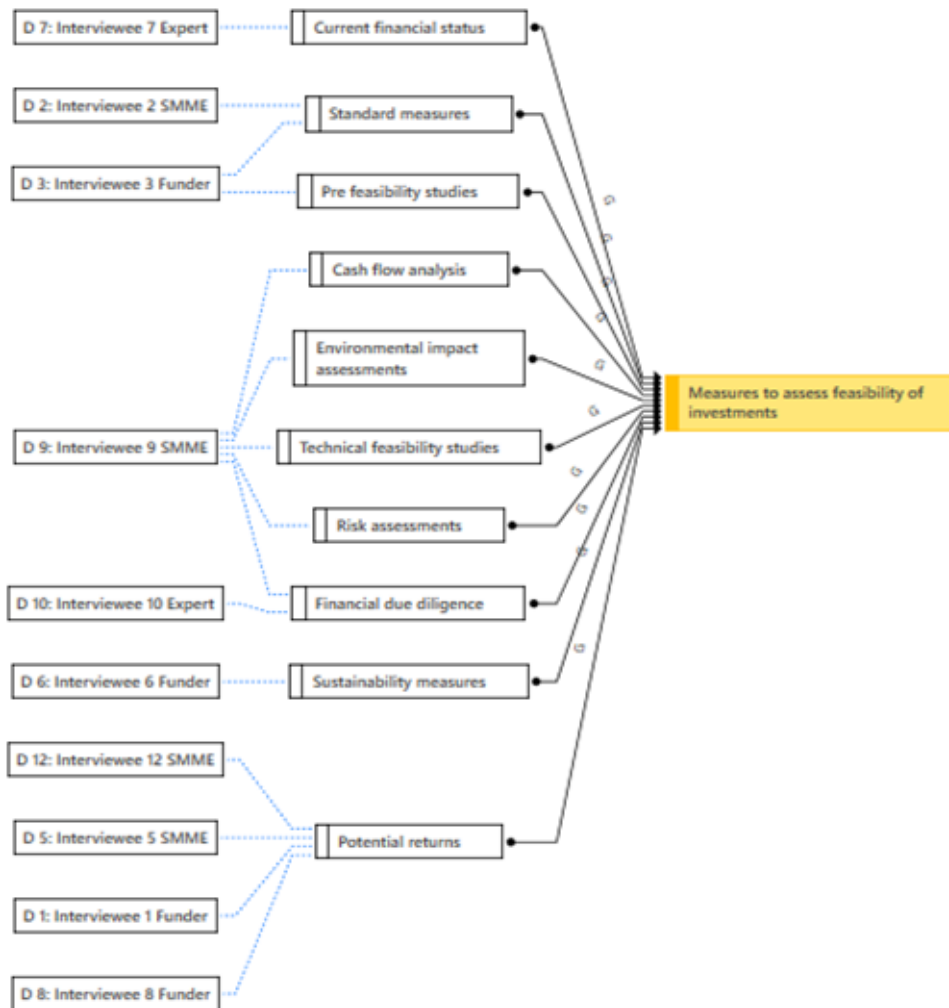


Figure 5.4: Measures to assess feasibility of current project finance investments

5.5.2. Theme 2: Accessing finance for renewable energy projects

This theme on accessing finance to support SMMEs to participate in green renewable energy projects covered 3 research questions which included the following;

- RQ3: What are the accessible funding structures existing for renewable energy that facilitates the participation of SMMEs and entrepreneurs?

- RQ4: What are the key challenges in accessing funds for renewable energy projects and how do they impact SMME participation?
- RQ5: What are the main barriers contributing to SMMEs' lack of participation in the renewable energy sector?

The responses of interviewees on the 3 research questions above follow in the subsequent subsections.

iii.RQ3: What are the accessible funding structures existing for renewable energy that facilitates the participation of SMMEs and entrepreneurs?

The responses of interviewees on research question 3 above are presented by a network diagram in **Figure 5.5**. Based on the opinions of the interviewees, as shown in **Figure 5.5**, it is clearly illustrated that equity financing is the main funding structure that exist for SMMEs in renewable energy projects. The equity financing recorded the highest frequency of 6 out of a possible total of 12. Furthermore, **Figure 5.5** demonstrates that Interviewee 1, Interviewee 2, Interviewee 4, Interviewee 6, Interviewee 8 and Interviewee 9 all contributed to the idea that equity finance is the primary funding structure available to SMMEs in renewable energy projects.

Additionally, Interviewee 9 articulated that the equity financing is a common financing mechanism for renewable energy projects which is done by raising the required capital by selling shares to investors. The investors in exchange receive ownership interest in the enterprise; earn voting rights and can also get dividends and capital gains. In support of this, Interviewee 6 who is one of the funders that was interviewed also suggested the same. He expressed his view in detail as follows;

“I think some of the important funding structures would be the ones that help SMMEs to address their major issue of having access to initial capital, So there is a structures like DTIC, which have funds that are available as grants, which help SMMEs to bridge that initial equity or own equity requirement. But over and above that within our structure, what we would do is then finance the equity participation of majority Black owned companies. We help them to participate in the larger structures. We only fund 90% of the required capital through equity capital. Usually, most SMMEs get the balance of the 10% through Department of Trade, Industry and Competition grant facility. However, it is always a challenge to get the two to be well aligned and our processes are too long”

On the other hand, Interviewee 2, Interviewee 10 and Interviewee 12 were of the opinion that debt financing is one of the common financing mechanisms for renewable energy projects. Interviewee 10 described that debt financing that is applied in renewable energy projects involves SMMEs borrowing loans from financial institutions and other third-party lenders with an obligation to repay with some interest. Interviewee 5, Interviewee 7 and Interviewee 9 were of the view that green bonds are also commonly used in renewable energy projects and support the participation of SMMEs in this sector. Interviewee 5 articulated that green bonds used are of fixed income nature and are designed to raise financial capital for projects that have positive environmental or climate benefits such as renewable energy projects. Interviewee 9 articulated the green bonds in details as follows;

“There are instruments such as green bonds. Green bonds are basically a fixed income or financial instrument for sustainable projects such as green energy projects. This facility is deliberately focused on raising capital for projects with substantial benefits for the environment or climate. The value of the support from the green bonds is depended on the green score and the higher your green score or environmental impact, the higher the green bonds can be. Green bonds provide a way for SMME to raise capital retail investors”

Interviewee 7 and Interviewee 9 were of the opinion that crowd funding is one of the common financing mechanisms that support the participation of SMMEs in renewable energy projects. Interviewee 7 was of the opinion that crowd funding is generally a new concept that is gaining popularity among small and medium sized businesses. He suggested that crowd funding raises capital by collecting small amounts from a large volume of people. Interviewee 7 was of the view that even though crowd funding is gaining popularity, it faces unique challenges such as high risk of failure, it exposes businesses to competitors as they are required to share their ideas, and it requires a sizable amounts to run crowd funding marketing campaigns.

Interviewee 6 and Interviewee 9 were of the view that providing grants is one of the financing instruments that are used to support the participation of SMMEs in renewable energy projects.

On the other hand, Interviewee 1 and Interviewee 2 suggested that mezzanine loans are accessible funding instruments that support the participation of SMMEs. Interviewee 2 elaborated that the mezzanine loans are a hybrid of debt and equity financing which offer flexible payment terms. he further expressed that such loans are not common in the South African market owing to their higher interest rates, higher complexity and high risk projects also shows

that partnering with financial institutions is one of the instruments that are used to support the participation of SMMEs in renewable energy projects. In fact, Interviewee 4 and Interviewee 7 submitted that partnering with financial institutions is one of the ways that is used to support the participation of SMMEs in renewable energy projects.

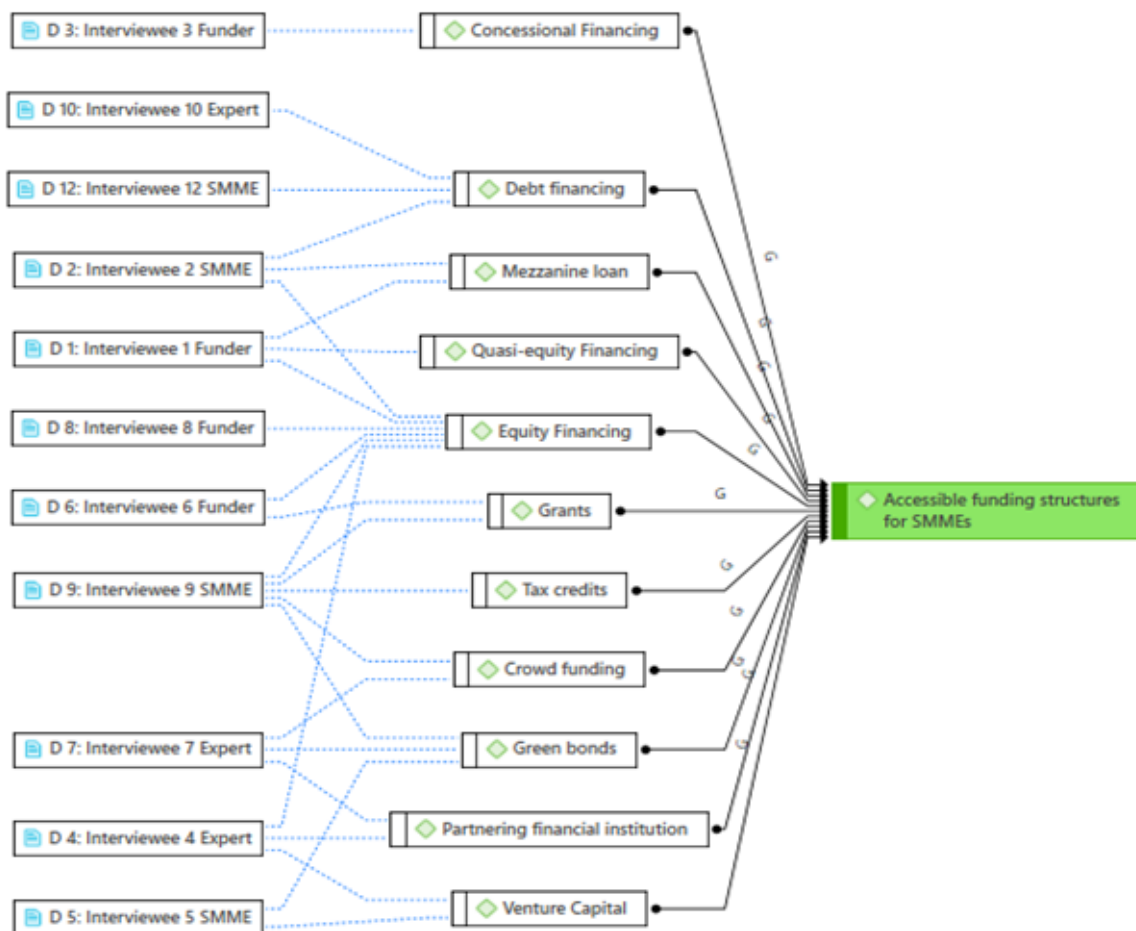


Figure 5.5: Accessible funding structures to support participation of SMMEs in green energy projects

RQ4: What are the key challenges in accessing funds for renewable energy projects and how do they impact SMME participation?

The responses of interviewees on key challenges in accessing funds for renewable energy projects are presented using a network diagram in **Figure 5.6**. There were several challenges in accessing funds for renewable energy that were identified by interviewees. High capital requirement for small businesses to operate in the green energy sector was the most common (with a high frequency of 6 compared to a possible total of 12) challenge that was identified by interviewees as affecting accessing funds for renewable energy projects. In fact, Interviewee 1, Interviewee 2, Interviewee 6, Interviewee 8, Interviewee 11 and Interviewee 12 were of the view that there are substantial financial resources that are needed for SMMEs to enter and operate

in the energy sector. They were of the view that these high capital requirements cover associated costs for the energy projects such as infrastructure costs, regulatory compliance, technological investment, operational and maintenance costs. Interviewee 6 was of the opinion that even though capital requirements to operate in energy projects are high and make it difficult for smaller businesses to compete with larger and more established companies in the energy sector, these are necessary. Interviewee 8 was particularly worried about the substantial amount of financial resources that are required for SMMEs to access funds and take part in the green energy sector. He provided details as follows;

“It is a big issue that SMMEs are required to have substantial amount of financial resources to take part in the green energy sector in South Africa. So even when there is a consortium of SMMEs trying to participate and cover the portion of the BBBEE, the requirements to obtain funding is still a long and tough process. There is still a need to do more work because if you go to your commercial banks, there need a lot of motivation and proof of experience, a strong and healthy balance sheet. However, most SMMEs are not able to meet the requirements to raise some the equity contribution from their side. So the idea of them participating in the green energy sector is always difficult especially given that they hardly have the capital required among other challenges that they face in this industry”

Closely associated with the capital requirements, a total of 4 interviewees (who included Interviewee 3, Interviewee 5, Interviewee 8 and Interviewee 10) revealed that the high upfront costs that are required to cover infrastructure costs and regulatory compliance prevent SMMEs from accessing funds to participate in green energy projects. On the other hand, Interviewee 3, Interviewee 6, Interviewee 10 and Interviewee 11 were of the view that lack of skills is one of the challenges that is causing a failure for SMMEs access funds and participate in renewable energy projects. Interviewee 10 submitted that the lack of skills required in green energy projects such as financial planning, technical understanding of green projects, regulatory compliance, and business management reduces the chance of SMMEs to access funds for renewable energy projects, as it weakens their credibility and increases the perceived risks for investors.

Interviewee 6, Interviewee 7 and Interviewee 12 were of the viewpoint that lack of knowledge is one of the challenges faced by SMMEs that is adversely affecting accessing funds for renewable energy projects. Interviewee 7 strongly suggested that the lack of knowledge on funding opportunities, financial products, regulations, market conditions, and investor

expectations can considerably constrain SMMEs' ability to secure the required funding for green energy projects. He suggested that this knowledge gap can make their projects appear riskier or less viable, discouraging potential financiers to provide the much needed resources for the project. Other challenges that were identified by the interviewees but were not so prominent included conflicted buyers, high interest rates associated with loans, complicated application process for funding and high competition as shown in **Figure 5.6**

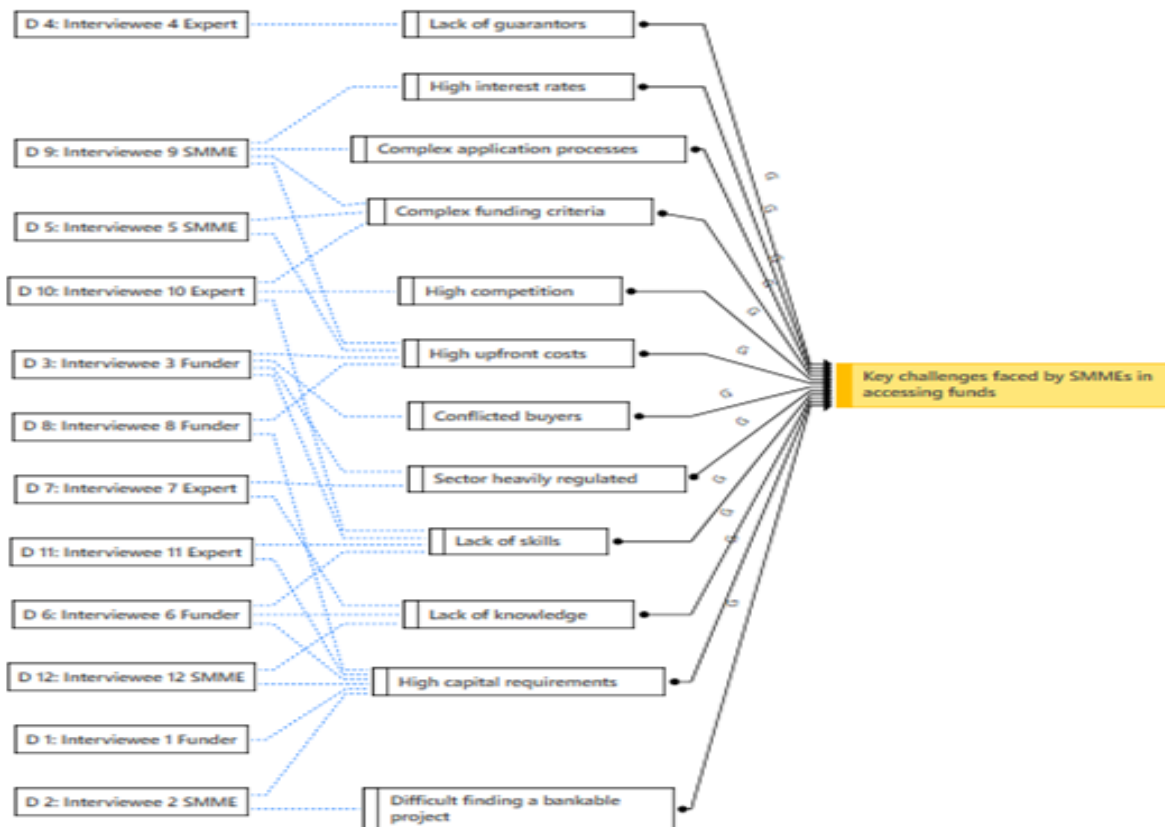


Figure 5.6: Key challenges faced by SMMEs in accessing funds for renewable energy projects

RQ5: What are the main barriers contributing to SMMEs' lack of participation in the renewable energy sector?

The responses of interviewees on main barriers contributing to SMMEs' lack of participation in the renewable energy sector are presented using a network diagram in **Figure 5.7**. There were several barriers contributing to SMMEs' lack of participation in the renewable energy sector that were identified by interviewees. Lack of access to finance was identified by interviewees as the main barrier contributing to SMMEs' lack of participation in the renewable energy sector. Lack of access to finance recorded the highest frequency of 7 out of a possible total of 12. In fact, Interviewee 1, Interviewee 4, Interviewee 5, Interviewee 8, Interviewee 9, Interviewee 11 and

Interviewee 12 were of the view that lack of access to finance was a barrier to SMMEs participation in green energy projects in South Africa. In support of the above point, Interviewee 9 expressed that renewable energy projects often require substantial upfront investments in infrastructure, equipment, and technology. He submitted that SMMEs in South Africa typically have limited financial resources and usually struggle to secure the necessary capital to participate in such projects. Interviewee 1 provided a detailed account of the lack of access to finance as one of the main barriers to SMMEs' lack of participation in renewable energy, as follows;

“The lack of access to finance is a significant barrier for Small, Medium, and Micro Enterprises participating in green energy projects. Furthermore, many SMMEs lack sufficient security to secure funding from traditional financial institutions. The financial challenges SMMEs face in entering the green energy sector limit their ability to contribute to environmental sustainability and benefit from the economic opportunities in renewable energy. While there are several financing options that are available in the market, most of these financing options are deliberately targeted toward larger companies with more established operations. SMMEs usually struggle to access to such financing options”

Interviewee 1, Interviewee 2, Interviewee 6 and Interviewee 11 submitted that lack of capacity is one of the barriers contributing to SMMEs' lack of participation in the renewable energy sector. Interviewee 6 explained that the lack of capacity in this case includes lack of capital to start the green projects as well as a lack of qualified and experienced people to run the renewable energy projects successfully. On the other hand, Interviewee 3, Interviewee 4, Interviewee 7 and Interviewee 9 were of the view that lack of knowledge is one of the barriers contributing to SMMEs' lack of participation in the renewable energy sector. Interviewee 4 articulated that the lack of knowledge in their context encompasses the lack of specialised technical knowledge, insufficient understanding of regulatory frameworks and limited awareness of opportunities such as knowledge about government incentives, grants, or loans that support green energy adoption as well as limited knowledge on potential markets.

Interviewee 3, Interviewee 5, Interviewee 9 and Interviewee 11 were of the view that complex regulations are one of the of the barriers contributing to SMMEs' lack of participation in the renewable energy sector. Interviewee 11 insinuated that many SMMEs lack the expertise to understand and comply with the complex legal and regulatory requirements governing renewable energy projects. This is dissimilar to large companies with dedicated legal and regulatory teams. Interviewee 11 indicated that many SMMEs have no access to specialists

who can help them navigate complex frameworks, leading to delays or non-compliance. Similarly, Interviewee 9 suggested that complex regulations are one of the barriers contributing to SMMEs' lack of participation in green energy projects. He reported in detail as follows;

“There are a lot of barriers to entry for SMMEs into the green energy industry. One of the main barriers to entry for SMMEs is the complex regulatory or policy framework. Regulatory framework for green energy projects usually involves stringent requirements, including environmental impact assessments, safety standards, permits, and licensing. For many SMMEs, navigating these regulations is very complex and is costly in terms of both time and money. This is one of the reasons why several small businesses are struggling to comply with the regulatory requirements”

Other barriers contributing to SMMEs' lack of participation in the renewable energy sector that were identified by interviewees included lack of skills, lack of large orders, long turnaround time and tense competitions as shown in **Figure 5.7**. The above mentioned barriers had low frequency of 1 with the exception of lack of skills which was contributed by two interviews (Interviewee 4 and Interviewee 10).

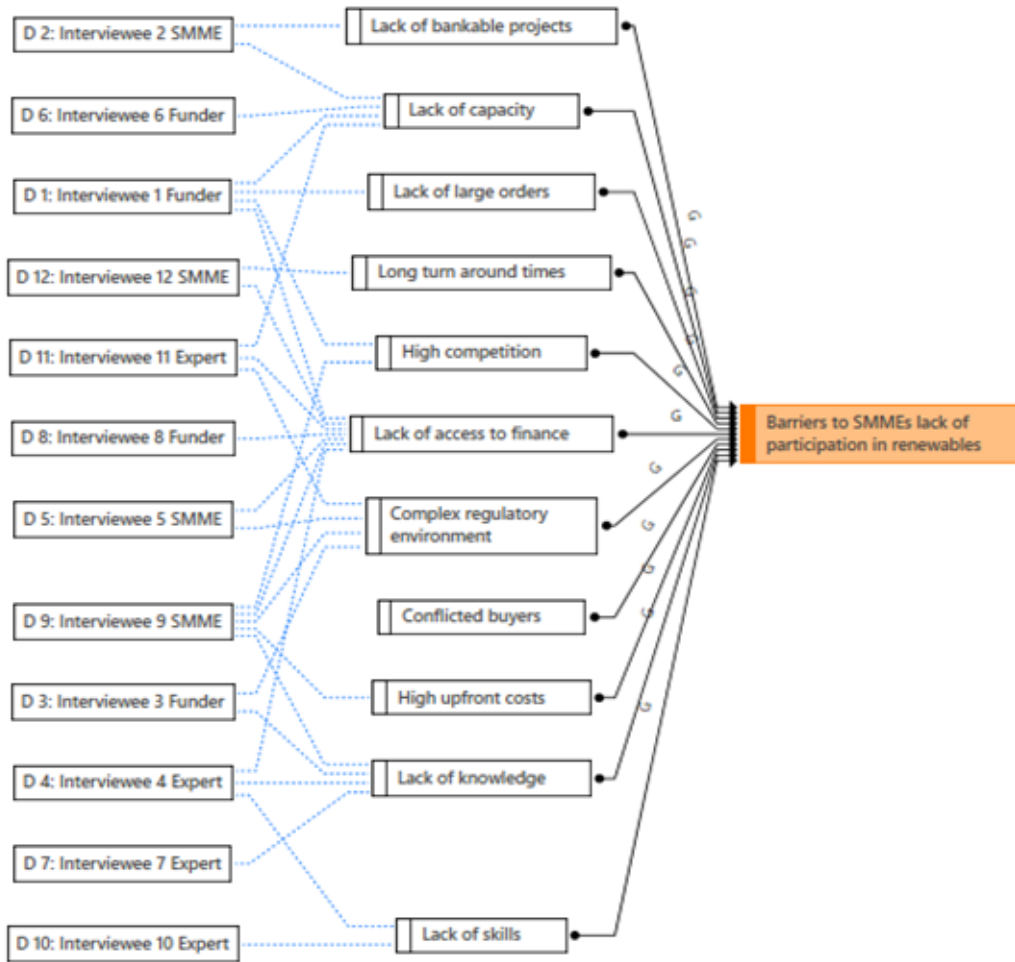


Figure 5.7: Main barriers contributing to SMMEs' lack of participation in the renewable energy

5.5.3. Theme 3: Main challenges and strategies to support SMMEs in renewable energy

This theme addresses the key challenges faced by SMMEs in renewable energy projects participation, and associated strategies to overcome them. The theme covered the following research question;

iv.RQ6: What are the key challenges faced by SMMEs in the renewable energy sector, and how can these challenges be overcome?

Research question 6 above was split into challenges and measures developed to address the identified obstacles. Therefore, the first part deals with challenges while the second part addresses strategies or measures to resolve the challenges.

i.Key challenges faced by SMMEs to participate in the renewable energy sector

The responses of interviewees on key challenges faced by SMMEs in the renewable energy sector are presented in a network diagram in **Figure 5.8**. Based on the opinions of the interviewees, as shown in **Figure 5.5**, it is clearly illustrated that lack of financial capacity is the prevalent challenge that is faced by SMMEs in renewable energy projects. The challenge on the lack of financial capital recorded the highest frequency of 10 out of a possible total of 12. Furthermore, **Figure 5.8** demonstrates that all the interviewees except Interviewee 5 and Interviewee 10 contributed to the idea that lack of financial capacity is the prevalent challenge that is faced by SMMEs in renewable energy projects participation. Interviewee 11 provided some details on the ability of SMMEs to raise some financial capital and reported as follows;

“Green energy projects are capital intensive and most SMMEs have limited financial resources and hardly have good balance sheet. This makes it difficult for financial institutions and other interested funders to support participation of SMMEs in renewable energy projects. Thus, SMMEs often struggle to attract private investment due to perceived financial instability or the small scale of their operations. Limited financial resources make them less appealing to investors, perpetuating their exclusion from large-scale green projects. Therefore, the lack of financial capital severely hampers SMMEs’ ability to enter, scale up, and sustain participation in renewable energy projects, despite the growing opportunities in this sector”

On the other hand, Interviewee 4, Interviewee 6, Interviewee 9 and Interviewee 10 were of the opinion that complex regulatory framework is one of the key challenges that restricts SMMEs from participation in the renewable energy sector. Interviewee 9 articulated well the challenge that is posed by complexity of the regulatory framework. He reported on this as follows;

“The renewable energy sector is often governed by multiple layers of regulations, rules and guidelines that can be difficult to navigate. Most SMMEs lack the dedicated legal and regulatory teams with appropriate knowledge and experience. This makes it harder for them to handle complicated licensing, environmental permits, and compliance requirements. This generally can lead to delays in project approvals and increased costs associated with managing paperwork and administrative processes”

Interviewee 5, Interviewee 9 and Interviewee 11 were of the view that most SMMEs lack requisite skills such as technical, managerial, financial and legal skills to support their business to participate in the green energy sector. Interviewee 5 confirmed that the lack of essential skills can lead to poor project design, implementation, and management of green energy projects.

This ultimately affects the quality and sustainability of green energy projects, which can result in delays, cost overruns, and underperformance. Other challenges that were mentioned by interviewees included limited access to markets, high competition, high operational costs and lack of mentorship. The above mentioned challenges recorded groundedness of 2 (frequency of 2 out of a possible total of 12).

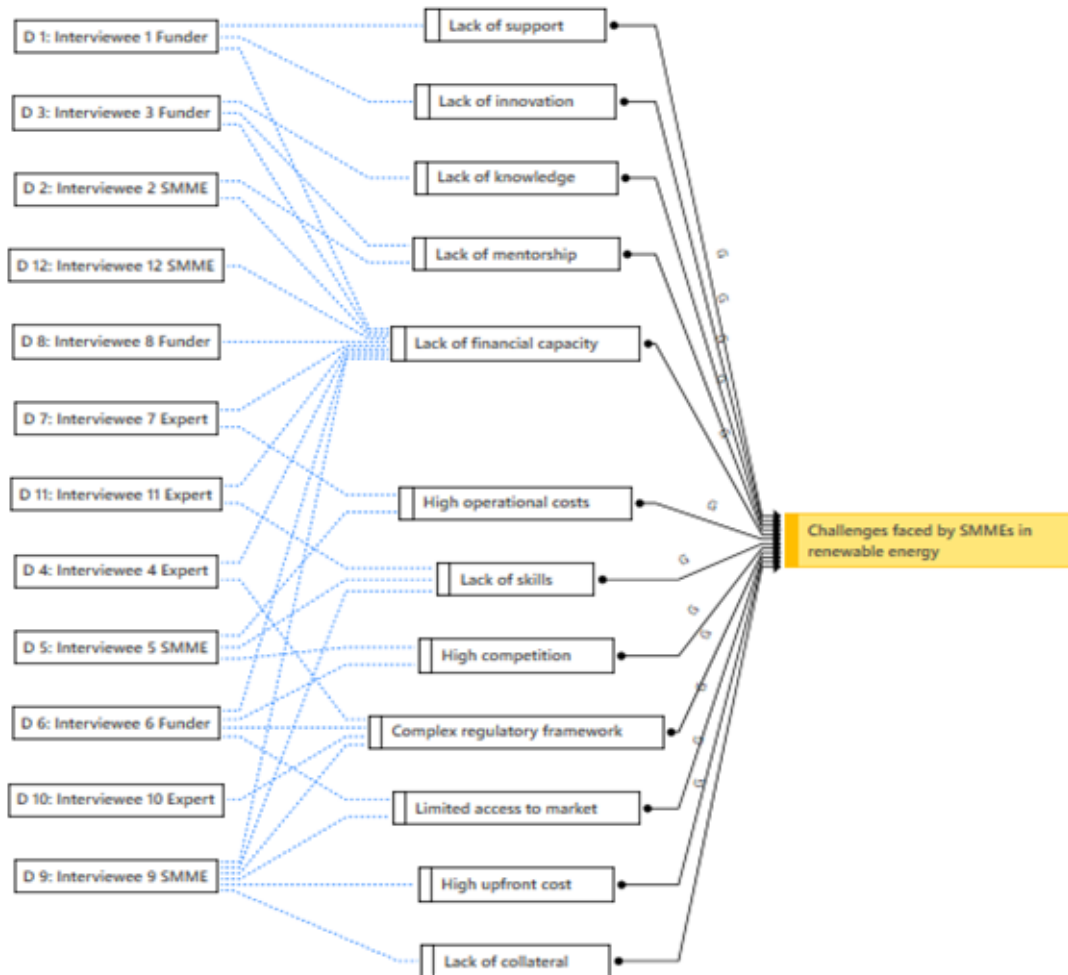


Figure 5.8: Key challenges faced by SMMEs to participate in the renewable energy sector

- **Measures to overcome challenges of SMMEs’ participation in green energy sector**

The responses of interviewees on the measures to overcome challenges of SMMEs’ participation in green energy sector are presented in a network diagram in **Figure 5.9**. Interviewee 4, Interviewee 6, Interviewee 9 and Interviewee 10 were of the view that the current legislation is a barrier contributing to SMMEs' lack of participation in the renewable energy sector. Therefore, they suggested that there is a need for a comprehensive review of the current

legislation which is a barrier for SMMEs to take part in the green energy sector. Further to this, Interviewee 6 was of the view that the policy makers need to propose realistic regulations, rules and guidelines that support the participation of SMMEs.

Interviewee 3, Interviewee 9 and Interviewee 11 were of the opinion that SMMEs need thorough training to develop or enhance technical skills in areas like energy generation, installation, maintenance, and system optimisation as well as in financial management and legal. In addition, Interviewee 11 was of the view that green energy projects often involve complex regulatory frameworks, such as environmental laws and energy policies. Training in these areas is also required in order to help SMMEs to ensure compliance with regulations and standards.

On the other hand, Interviewee 2 and Interviewee 3 were of the opinion that SMMEs need some mentorship as this plays important role in helping SMMEs to participate and succeed in the green energy sector. They suggested that mentors provide the necessary expertise, networks, and guidance for SMMEs. Therefore, mentorship is seen as an invaluable support that ensures that SMMEs easily navigate the complexities of the industry, from regulatory compliance to financial management and business growth perspectives. Interviewee 3 was of the view that through mentorship, SMMEs can enhance their chances of success through building the capacity needed to contribute to the green energy sector.

Other measures that were suggested by interviewees included getting financial support through crowd funding or SEDA, partnering with experienced Independent Power Producers and getting stakeholder support. The above measures recorded low frequency of 1.

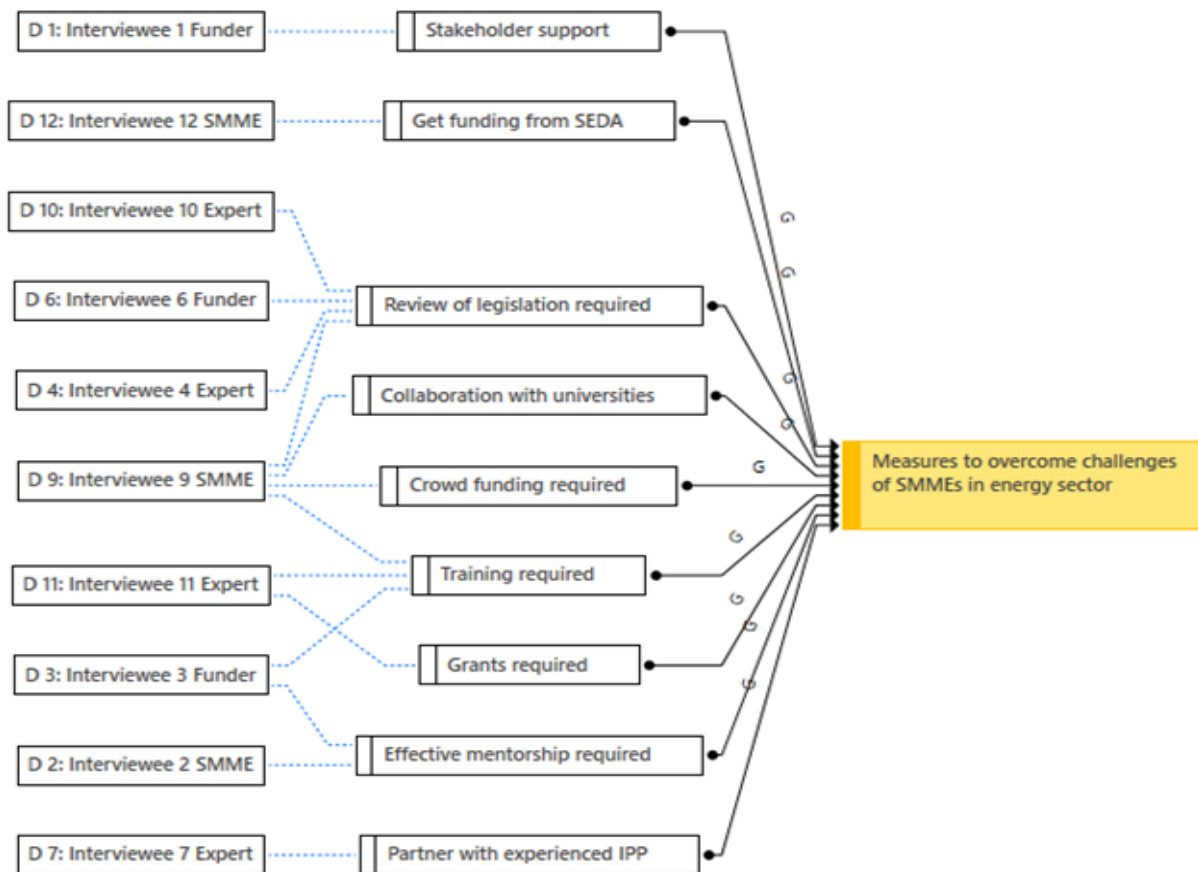


Figure 5.9: Measures to overcome challenges of SMMEs' participation in green energy sector

5.5.4. Theme 4: Contribution to value creation in the renewable energy

This theme addresses the green projects that have potential to contribute to value creation in the renewable energy sector. The theme covered the following research question;

v.RQ7: Which SMME green projects have the potential to contribute to value creation in the renewable energy sector?

The responses of interviewees on the green projects that have potential to contribute to value creation in the renewable energy sector are illustrated in **Figure 5.10**. Based on the opinions of the interviewees, as shown in **Figure 5.10** it is clearly demonstrated that solar projects are perceived to contribute to value creation in the renewable energy sector. It is observed that all the interviewees with the exception of Interviewee 1 and Interviewee 10 suggested that solar projects have the potential to create value in the renewable energy sector.

Closely related to this, a total of 4 interviewees (which included Interviewee 2, Interviewee 3, Interviewee 4, Interviewee 7 and Interviewee 8) were of the opinion that wind energy has the

potential to contribute to value creation in the renewable energy sector. However, only Interviewee 3 and Interviewee 10 suggested that green hydrogen projects have the potential to contribute to value creation in the renewable energy sector. It was also suggested that Agrivoltaic and Retrofits projects have the potential to contribute to value creation in the renewable energy sector. However, the above mentioned projects recorded the least frequency of 1 as shown in **Figure 5.10**.

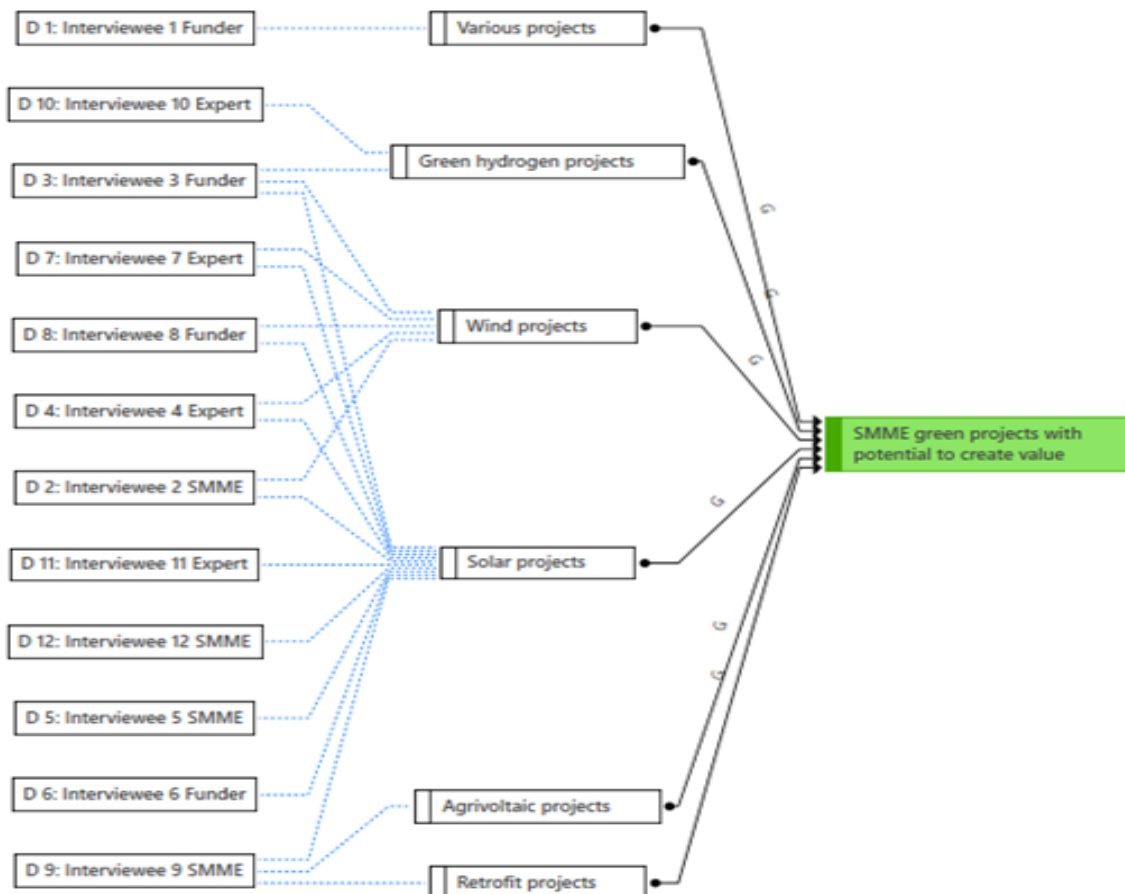


Figure 5.10: Green projects with potential to contribute to value creation in the renewable energy sector

5.5.5. Theme 5: Collaboration Initiatives

These themes were combined into one theme addresses the degree of implementation of contribution initiatives and collaboration initiatives that are associated with policies that facilitate SMMEs inclusion for industry growth. The themes covered the following research questions;

vi.RQ8: Are the current collaboration initiatives effectively implemented, and what are the policies facilitate collaboration for industry growth?

- **Degree of implementation of collaboration initiatives**

The responses of interviewees on degree of implementation of collaboration initiatives are presented in a network diagram in **Figure 5.11**. Based on the opinions of the interviewees, as shown in **Figure 5.11**, it is clearly illustrated that all the interviewees with the exception of Interviewee 3 and Interviewee 8 were of the view that collaboration initiatives have been effectively implemented to support SMMEs to participate in the green energy projects. Closely linked to this point, Interviewee 1 and Interviewee 9 were of the opinion that collaboration initiatives have been very effectively implemented to support SMMEs to participate in the green energy projects. Interviewee 9 stressed that effective implementation of collaboration initiatives are central in ensuring that SMMEs can contribute meaningfully to green energy projects, which supports inclusive economic growth and a successful energy transition.

On the other hand, Interviewee 3 and Interviewee 8 were of the opinion that collaboration initiatives have not been effectively implemented to support SMMEs to participate in the green energy projects. They emphasised that this leads to missed opportunities provide local content, and deliver services that are crucial to reducing reliance on imports and improving local economic resilience. Furthermore, Interviewee 8 emphasised on the need to involve SMMEs as they have close connections with the local communities and can help in driving grassroots adoption of renewable technologies.

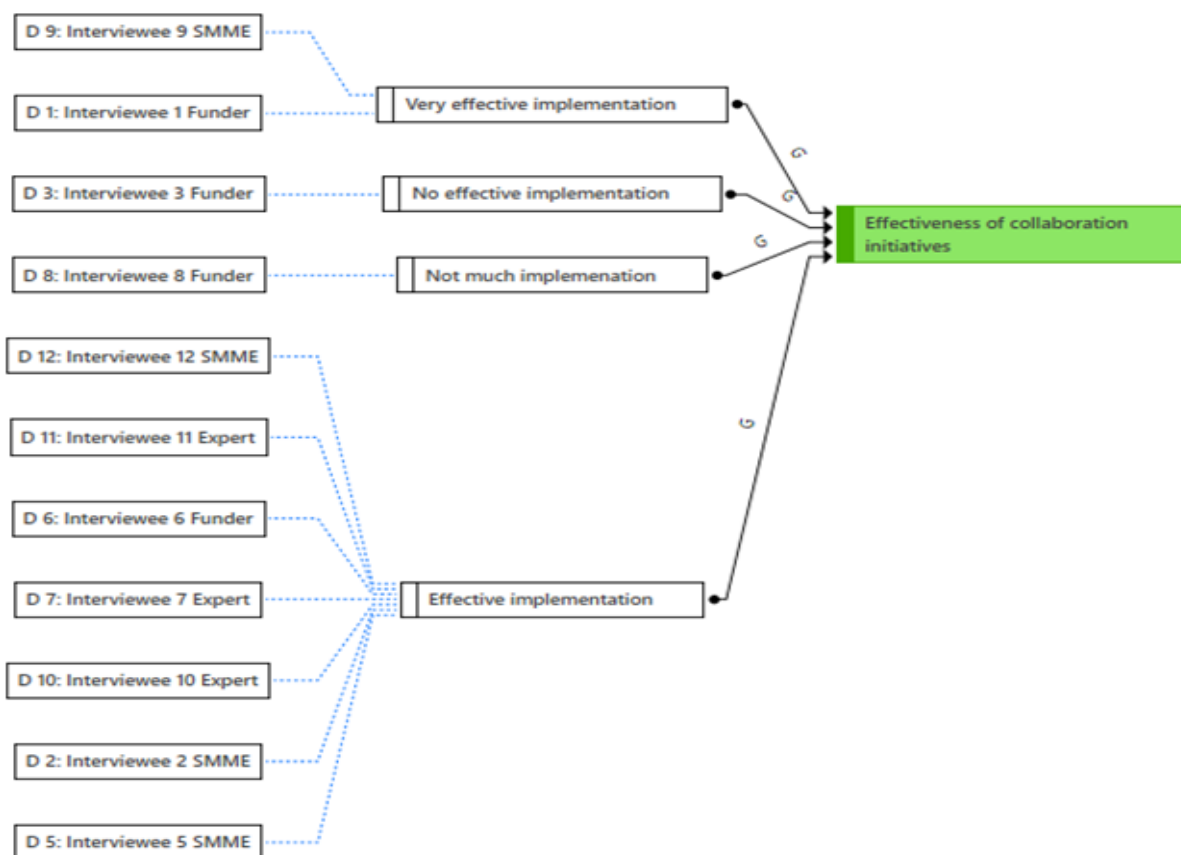


Figure 5.11: Degree of implementation of collaboration initiatives to support SMMEs to participate in green energy projects

i.Policies facilitating collaboration for industry growth

The responses of interviewees on policies facilitating collaboration for industry growth are presented in a network diagram in **Figure 5.12**. Interviewee 2, Interviewee 4 and Interviewee 11 were of the view that Renewable Energy Independent Power Producer Procurement (REIPPP) programmes facilitate collaboration for industry growth. Interviewee 4 clarified that these (REIPPP) are government-led initiatives that have been developed to encourage private sector investment in renewable energy projects. He further explained that REIPPP programmes create a platform for private companies, both local and international, to participate in the energy sector. The programmes often encourage partnerships between large energy companies and SMMEs, as well as local community involvement.

Other policies facilitating collaboration for industry growths that were not given much prominence included Small Enterprise Development, National Development Plan and Public Finance Management Act (PFMA). The above mentioned policies had low frequency of 1 as shown in **Figure 5.12**. This was an illustration that these policies were not adequately visible in facilitating collaboration for industry growth.

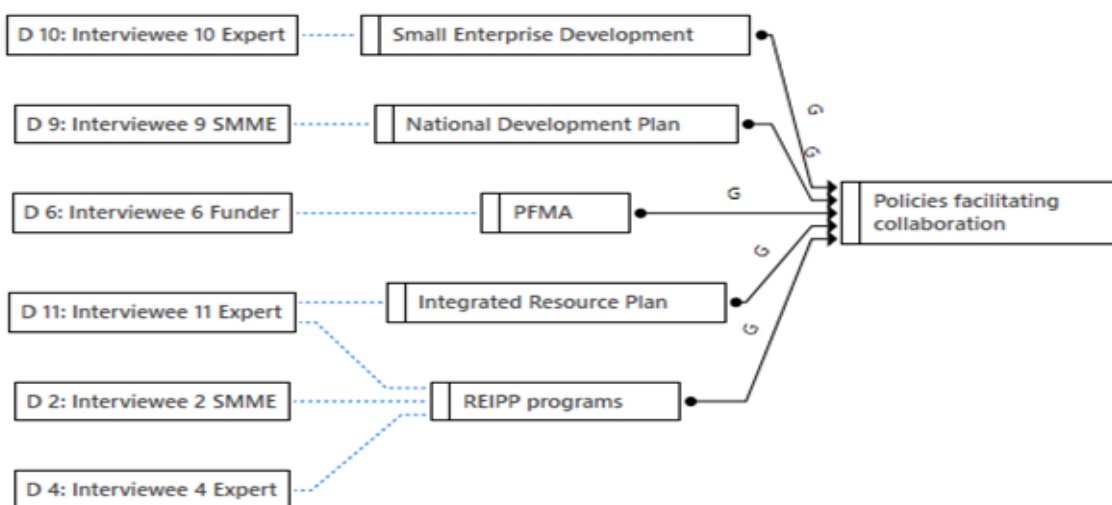


Figure 5.12: Policies facilitating collaboration for industry growth

5.5.6. Theme 6: Supporting Small Businesses

This theme addresses the ways collaborative efforts between industry stakeholders, policymakers, and financial institutions enable SMME participation in the renewable energy value chain. The theme covered the following research question;

vii.RQ9: How can collaborative efforts between industry stakeholders, policymakers, and financial institutions enable SMME participation in the renewable energy value chain?

Research question (9) above was split into degree of implementation of collaboration initiatives and policies that facilitate collaboration for industry growth, with research question RQ (10) omitted and the responses provide similar response, refer to RQ (08). The responses of interviewees on the ways collaborative efforts between industry stakeholders, policymakers, and financial institutions enable SMME participation in the renewable energy value chain are illustrated in **Figure 5.13**. Based on the opinions of the interviewees, providing financial support is one of the ways to enable SMME participation in the renewable energy value chain. This idea was supported by 6 interviewees that included Interviewee 2, Interviewee 3, Interviewee 6, Interviewee 9, Interviewee 11 and Interviewee 12. Interviewee 6 submitted that green energy projects often require high initial capital to cover costs for feasibility studies, equipment purchase, and construction. He stressed that more often than not, SMMEs do not have the necessary financial capital to cover these expenses on their own. This was supported by Interviewee 3 who reported in detail as follows;

“SMMEs need financial support from all those stakeholders that include financial institutions and from policymakers, so that they can cover all the required costs and comply with whatever regulatory policies or measures are in place. They need financial support from the DFIs as they do not always have the required funding, I am proposing that all of these stakeholders need to then come together and collectively support the SMMEs financially and otherwise. If you look at it, the more we can support as the SMMEs, the more green projects we will have to undertake. This will create more market opportunities and will be encouraging and stimulating SMMEs to grow from strength to strength”

Interviewee 1, Interviewee 8, Interviewee 9 and Interviewee 10 were of the view that there is a need to enforce Enterprise Supplier Development (ESD) to enable SMME to participate in the renewable energy value chain. ESD is a deliberate initiative focused at promoting the growth

and sustainability of small and medium-sized businesses by integrating them into the supply chains of larger businesses. The aim of ESD is to enable SMMEs to compete in the market while at the same time contributing to the broader economic development goals.

Interviewee 4, Interviewee 5 and Interviewee 9 were of the opinion that there is a need to build capacity of SMMEs to enable SMME to participate in the renewable energy value chain. Interviewee 5 clarified that building capacity for SMMEs to enable them to participate in green energy projects requires a multidimensional approach that involves financial support, skills development, access to technology and market. He claimed that these strategies can empower SMMEs and help them to contribute to the renewable energy transition through promoting innovation, and creating jobs in the green economy.

On the other hand, Interviewee 1 and Interviewee 7 were of the view that there is a need to provide markets for SMMEs to enable them to participate in the renewable energy value chain. Interviewee 7 suggested that SMMEs should be provided with access to market intelligence, networking platforms, and trade shows where they can meet potential clients, suppliers, and partners in the green energy sector. This helps SMMEs to be part of larger renewable energy supply chain network.

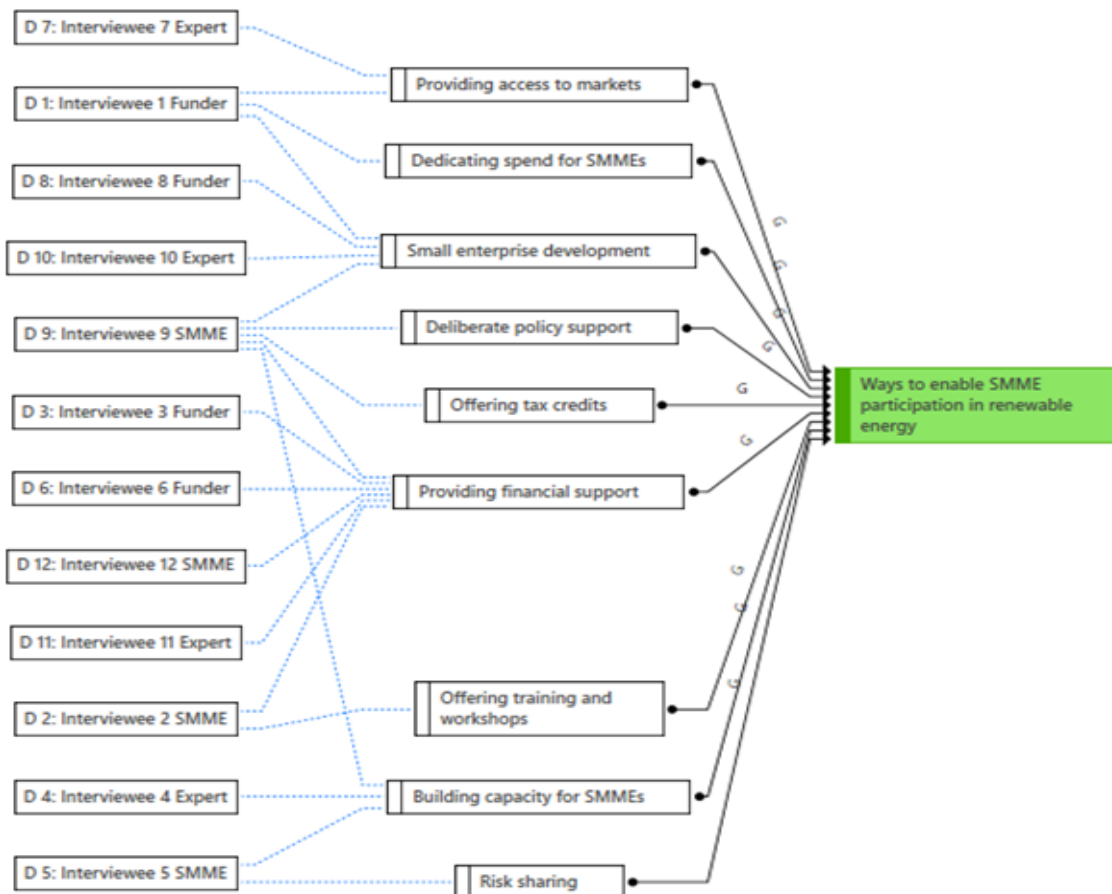


Figure 5.13: Ways to enable SMME participation in the renewable energy value chain

5.5.7. Theme 7: Resource requirements for SMMEs to participate in green energy

This theme addresses the resources that are required for SMMEs to fully participate in green energy projects. The theme covered the following research question;

viii.RQ 11: What specific skills and resources do SMMEs need to effectively participate in green energy projects?

The responses of interviewees on the resources that are required for SMMEs to fully participate in green energy projects are illustrated in **Figure 5.14**. It can be observed that all the interviewees with the exception of Interviewee 4 were of the view that engineering technical skills are required for SMMEs to effectively participate in green energy projects. Interviewee 8 was of the view that if SMMEs have to thrive in green energy projects they need to have a broad range of interdisciplinary engineering skills such as project management capabilities, understanding of sustainability practices, mechanical engineering for renewable energy,

innovation, power systems engineering, as well as energy efficiency and sustainability engineering.

Interviewee 2, Interviewee 3, Interviewee 4 and Interviewee 9 submitted that legal skills are required for SMMEs to fully participate in green energy projects. It was suggested by Interviewee 4 that since green energy projects involve complex regulatory, contractual, and compliance aspects, legal skills are indispensable and ensure that SMMEs operate within the confines of the law, protect the interests of the SMMEs and ensure that potential risks are managed well.

Interviewee 3, Interviewee 5, Interviewee 8 and Interviewee 9 were of the view that financial management skills are essential for SMMEs to fully participate in green energy projects. Interviewee 5 suggested that financial management skills are essential for SMMEs to fully participate in green energy as these projects need considerable amount of capital investment, long-term planning, and efficient allocation of resources. Therefore, without financial management skills, SMMEs can find it difficult to get the much needed funding, manage cash flow and make prudent financial decisions to take them to the next level in terms of opportunities and growth. Closely linked to this, Interviewee 4, Interviewee 6 and Interviewee 10 were of the view that SMMEs need substantial financial resources to cover essential costs such as capital costs (to procure equipment and infrastructure for green energy projects), operational and maintenance and other consumables.

Interviewee 2 and Interviewee 4 were of the view that SMMEs need environmental skills to fully participate in green energy projects. Interviewee 2 was of the view that environmental skills are essential as they help SMMEs comply with regulations, protect the environment as well as contribute to long-term sustainability of the business. He further suggested that without environmental skills, SMMEs face a lot of risks such as harming ecosystems and failure to comply with statutes which comes with financial penalties.

Other less prominent skills that were mentioned by interviewees that are required for SMMEs to fully participate in green energy projects included managerial skills, marketing skills, project management skills and commercial skills. Most of the above mentioned skills had low frequency of 1 as shown in **Figure 5.14**.

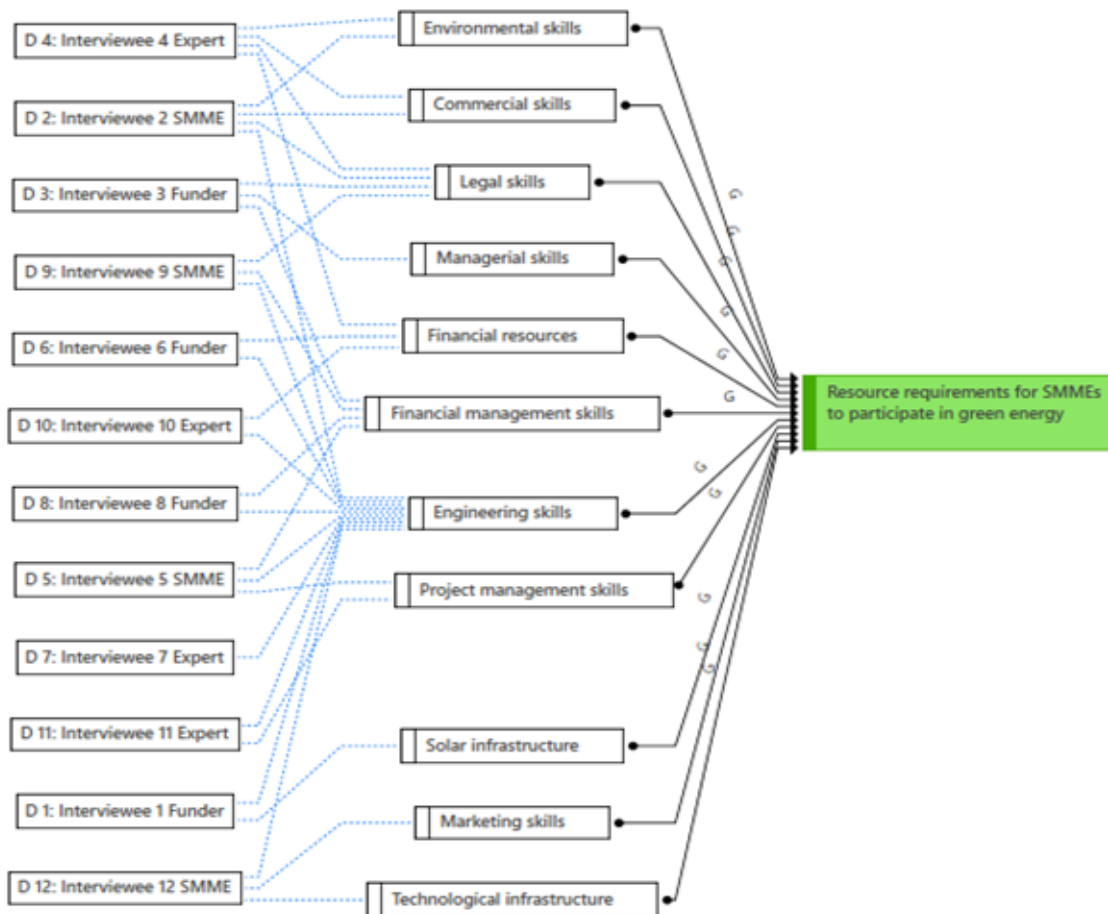


Figure 5.14: Skills and resources required for SMMEs need to effectively participate in green energy projects

5.5.8. Theme 8: Contribution of mentorship and skills development programmes

This theme addresses how mentorship and skills development programmes enhance SMME participation in the renewable energy sector. The theme covered the following research question;

ix.RQ 12: How can mentorship and skills development programmes enhance SMME participation in the renewable energy sector?

The responses of interviewees on the contribution of mentorship and skills development programmes to support SMME participation in the renewable energy value chain are illustrated in **Figure 5.15** a total of 6 interviewees which included Interviewee 1, Interviewee 2, Interviewee 3, Interviewee 7, Interviewee 8 and Interviewee 9 were of the view that mentorship as well as skills development programmes provide SMMEs with knowledge that is required in the renewable energy for marketing and networking. Interviewee 8 was of the opinion that skills programmes help SMMEs to build capacity and innovate which is essential for competitiveness

in this industry. On the other hand, Interviewee 8, Interviewee 10, Interviewee 11 and Interviewee 12 were of the view that mentorship and skills development programmes help SMMEs to boost their businesses as these help them to better understand their business and the marketplace. Similarly, Interviewee 2, Interviewee 3, Interviewee 4 and Interviewee 12 were of the opinion that mentorship and skills development programmes help SMMEs to access funding. Interviewee 3 explained that mentorship programmes provide guidance on financial literacy and management, help SMMEs to improve leadership skills which are essential in the energy projects.

Additionally, he stressed that skills development programmes teaches SMMEs financial literacy, relevant legal aspects as well as marketing skills that are essential in this business. Interviewee 4, Interviewee 5 and Interviewee 9 were of the view that mentorship and skills development programmes help SMMEs to understand the internal and external factors influencing the business including legal frameworks and policies. This helps SMMEs to navigate regulatory framework better and avoid risks associated with noncompliance. On the other hand, Interviewee 2, Interviewee 6, Interviewee 9 and Interviewee 11 were of the opinion that mentorship and skills development programmes help SMMEs to build technical expertise such as project management skills, engineering skills, legal and financial management skills to better understand and manage green energy projects.



Figure 5.15: Contribution of mentorship and skills development programmes to support SMME participation in the renewable energy

5.6. CONCLUSION

The study was aimed at accessibility of finance for empowering SMMEs participation in the green energy sector in South Africa. A total of 12 people (who included SMMEs, Funders and Industry Experts) were interviewed. The qualitative data were analysed using thematic analysis. The findings indicated green energy projects are capital intensive and SMMEs often have limited funding to participate in this sector. Other challenges limiting SMMEs participation in the green energy sector that were identified included lack of skills, lack of knowledge, high upfront costs, complex regulatory framework and lack of access to markets.

Therefore, several suggestions were made to empower SMMEs to participate in green energy sector. It was advised that SMMEs should have access to affordable financial capital and crowd

funding, equity financing and green bonds which do not attract punitive interest rates when compared to debt financing were suggested as options. It was also suggested that large corporates should set aside fraction of their spend to SMMEs. Furthermore, SMMEs were advised to take part in effective training and mentorship in relevant areas such as engineering technical skills, financial management, legal, environmental aspects and project management.

6. CHAPTER 6: DISCUSSION OF RESULTS

6.1. INTRODUCTION

The study aimed to assess the accessibility of finance for empowering SMME participation in the green energy sector in South Africa. A total of 12 individuals, including SMME representatives, funders, and industry experts, were interviewed. The qualitative data were analysed using thematic analysis. Findings indicate that green energy projects are capital-intensive, and SMMEs often lack the necessary capital to participate in the sector. Other challenges identified included a lack of skills, insufficient knowledge, high upfront costs, a complex regulatory framework, and limited access to markets.

Several recommendations were made aimed at empowering SMMEs to participate more effectively. Interviewees suggested that SMMEs should have access to affordable financial capital, with options such as crowdfunding, equity financing, and green bonds being proposed as alternatives to debt financing. Challenges, and policy implications were discussed. The themes and research questions below provide a comprehensive discussion in relation to the literature and research problems identified.

The interviews provided insights into the various challenges that SMMEs encounter in business, detailing the financial landscape they navigate. Therefore, this study is timely and necessary, as it provides actionable insights that can inform policymakers, financial institutions, and industry stakeholders on how to enhance financial access for SMMEs in the renewable energy sector.

6.2. THEME 1: EMPOWERMENT OF SMMES TO PARTICIPATE IN GREEN ENERGY

The aim of Research Question 1 (RQ1) was to explore how project finance could enable SMMEs to participate in green energy projects. This forms part of a broader effort to understand how financial structures can promote sustainable development and economic growth within the renewable energy sector. Additionally, Research Question 2 (RQ2) aimed to identify and evaluate the measures used to assess the feasibility of current project finance investments that support and enable SMMEs to actively participate in green energy projects. Results are shown **Figure 6.1**

6.2.1 (RQ1): How does project finance empower SMMEs to participate effectively in green energy projects?

The findings highlighted the crucial need to provide access to capital for empowering SMMEs to participate in green energy projects. Interview results emphasised that project finance helps SMMEs offering necessary capital and financial structures, reducing risk, and enabling participation in capital-intensive green energy projects. Steffen, (2018) defined project finance as a funding method in which the lender primarily relies on the revenues generated by a single project for both repayment and security. In these transactions, the lender is typically repaid almost exclusively from the income produced through the project's output contracts, such as the electricity sold thru a power plant. The borrower establishes a special purpose vehicle (SPV) that is restricted to developing, owning, and operating the project, with payment obligations dependent on the projects cash flow and the collateral value of its assets.

Furthermore, Baker, (2015) defined the finance structure for renewable energy projects as typically following a split structure of 70:30 debt-to-equity ratio for covering the capital costs; in South Africa, this ratio can sometimes reach 80:20. Essentially, a higher proportion of debt reduces the average cost of funding, leading to lower tariffs and making the project more affordable. Lenders offer debt financing with fixed loan terms and are not responsible for any project losses, making risk minimisation their primary concern. While lenders receive the initial financial revenues generated in the project, equity investors or project sponsors depend more on the project's successful return generation. Consequently, equity investors bear a greater risk and, in turn, expect higher returns for their investment. The structure ensures that while debt financing lowers costs and tariffs, equity investors are incentivised to ensure the project's success due to their higher risk exposure (Baker, 2015; Elie et al., 2021).

Some of the participants in this study discussed reducing risk and setting aside a fraction of project budgets specifically for SMMEs as significant strategies. These methods ensure that SMMEs have financial stability and opportunities needed to engage in these projects. Reducing capital requirements and enforcing Enterprise Supplier Development were identified as supplementary methods. The latter involves government policies that mandate a certain percentage of spending on Black-owned SMMEs and encourage local hiring, ensuring fair and inclusive participation. Collectively, these strategies underscore the importance of financial support, risk mitigation, and inclusive policies in developing active participation of SMMEs in the green energy sector. The findings are corroborated in the literature as cited by (Andreoni & and Tregenna, (2020); Baker, (2015); Steffen, (2018); and Yadav et al., (2024), and highlight important role of financial access in enabling SMMEs to engage in sustainable practices.

Another finding was that enterprise supplier development through procurement was cited as a strategy involving the government allocating a percentage of spending to Black SMMEs. Enterprise Supplier Development (ESD) through procurement refers to the strategic process where larger companies support the growth and development of smaller suppliers within supply chain (Anas et al., 2023).

6.2.2 (RQ2): What measures are being taken to assess the feasibility of current project finance investments that support and enable small, medium, and micro enterprises to actively participate in green energy projects?

The responses provided insights into financial and non-financial returns, including community impact and economic development, to provide a comprehensive view of what makes green energy projects feasible for SMMEs. The findings revealed that several measures are used to assess the feasibility of project finance investments aimed at enabling SMMEs to participate in green energy projects. The most frequently mentioned measure was potential returns. Interviewees emphasised that green energy projects need to be economically viable and profitable, as well as beneficial to local communities through job creation and business support. Literature supports the measurement suggested; Alharbi et al. (2023) found that banks employ metrics such as bank assets, private sector credit to GDP, liquid liabilities to GDP, domestic credit to the private sector to GDP, market capitalisation to GDP, and R&D investment as part of the risk measurement. The analysis includes measurement at country-level economic and credit market development. Furthermore, the studies found that the impact of green finance on renewable energy is more pronounced in countries with higher levels of financial and credit market development (Lyke, 2024; Steffen, 2018).

Financial due diligence was also mentioned in this study as the process involves a thorough analysis of project viability, potential returns, and risks, aiding investors in making informed decisions. Additionally, standard feasibility measures, including pre-feasibility studies, technical and environmental assessments, and financial feasibility, were highlighted as essential for determining project bankability. Other measures such as assessing current financial status, cash flow analysis, due diligence and environmental impact were also mentioned, ensuring a comprehensive evaluation of project feasibility for SMMEs in green energy initiatives. The emphasis on financial due diligence corroborates the findings of Signori & and Vismara, (2018) who noted that thorough risk assessment and financial analysis are needed for investors to make informed decisions in the renewable energy sector. Furthermore, Andreoni & and Tregenna, (2020) suggest additional insights such as strengthened production chains, exports

through tax relief and trade remedies, anti-dumping measures, financing, and loan guarantees for exporters, particularly SMMEs. This plan includes short-term measures and systemic, long-term strategies like infrastructure development and demand-side interventions.

6.2.3 Theme 1: Conclusion:

The responses align with the role and measures of project finance that enable SMME participation in renewable energy. The congruences in the responses align with the research question leading to the identification of **Theme 1: Empowerment of SMMEs to Participate in Green Energy**.

Figure 6.1: Inclusive Framework for Growth (Enablers)

THEME 1: PROJECT FINANCE EMPOWERMENT	
<p>FINANCIAL:</p> <ul style="list-style-type: none"> • Access to Capital-(debt to equity, loans , grants, structured finance) <p>Measurements: Potential returns Cashflow Analysis Financial feasibility- liquidity ratios</p>	<p>NON-FINANCIAL:</p> <ul style="list-style-type: none"> • Risk Reduction • Enterprise supplier development <p>Measurements: Due Diligence (Bankability) Technical Feasibility (Financial and Environment) Risk Analysis</p>

6.3. THEME 2: ACCESSING FINANCE FOR RENEWABLE ENERGY PROJECTS

This theme focused on the financial aspects that support SMMEs in participating in green renewable energy projects. It encompasses three key research questions RQ3, RQ4, and RQ5: These research questions aim to explore and identify the financial mechanism and barriers that influence the involvement of SMMEs in renewable energy projects. RQ3 seeks to uncover the types of funding structures available and how they can be leveraged by SMMEs and entrepreneurs. RQ4 aims to identify the challenges SMMEs face in securing funds and the subsequent effects on their participation in renewable energy initiatives. RQ5 focuses on understanding the barriers that prevent SMMEs from engaging in the renewable energy sector.

Addressing these aspects, the research aimed to provide insights that can enhance the financial accessibility for SMMEs, ultimately contributing to their empowerment and participation in the renewable energy landscape. This effort is underscored through the growing global emphasis on renewable energy as a means to reduce climate change and promote sustainable development. As countries transition towards greener energy solutions, the involvement of

SMMEs becomes increasingly important. However, without adequate access to finance, many SMMEs are unable to participate in this transition, limiting their potential contributions to the renewable energy sector.

Moreover, the challenges and barriers identified in this theme highlight a significant gap in the current understanding of SMME participation in renewable energy projects. Addressing these issues is not only essential for the growth of SMMEs but also essential for achieving broader environmental and economic goals. The findings are illustrated in **Figure 6.2**.

6.3.1 (RQ3): What are the accessible funding structures existing for renewable energy that facilitates the participation of SMMEs and entrepreneurs?

The responses from interviewees indicated that equity financing is the predominant funding structure, with six out of twelve interviewees highlighting its importance. Interviewees emphasised that equity finance is the primary mechanism available to SMMEs in this sector. Literature confirms that equity financing has emerged as the most prominent and significant option due to its ability to provide necessary capital without incurring debt. In contrast, Coval and Thakor, (2005) argue in favour of debt over equity in financing projects. They propose that optimistic entrepreneurs seeking external financing projects often opt for rational and pessimistic investors; intermediaries are necessary to screen projects and secure the required capital. These intermediaries are incentivised through a contract that imposes risk, which is more efficiently managed through debt rather than equity. The above perspective is also supported in the literature as discussed below.

On the other hand, Debt financing was also noted as a common instrument that involves loans from financial institutions. Debt is preferred because it is priced based on the intermediary's more pessimistic beliefs, minimising risk for both intermediary and the investors.

Coval and Thakor, (2005) Coval and Thakor (2005) study found rational agents who are more optimistic about identifying viable projects compared to pessimists are better suited to act as intermediaries. This is particularly relevant in the context of debt financing and loans as common instruments. Rational intermediaries can offer debt contracts with lower expected payments, making the process more efficient. Providing these debt contracts, intermediaries help mitigate excessive risk, ensuring that investors are prioritised for repayment. Additionally, when there are sufficient rational agents to function as both intermediaries and investors, market prices reflect rational beliefs effectively excluding pessimists from the market. This dynamic enhances

the overall efficiency and stability of financial markets, as rational agents are able to screen and select projects more effectively thereby reducing the likelihood of default and ensuring a more stable return for investors (Coval & Thakor, 2005).

Sinha et al., (2023) further propose that green finance for SMMEs should be managed and facilitated utilising local government to help maintain the risk profile of these small firms businesses including their operational efficiency. Financial institutions should be used as intermediaries, introducing carbon footprint-linked interest rates that provide loans and advances to SMMEs to promote renewable energy solutions, while discouraging the use of fossil fuel energy at the business level (Coval & Thakor, 2005; Sinha et al., 2023). Additionally, equity financing involves raising capital through selling shares to investors, who in return receive ownership interests, voting rights, and potential dividends and capital gains.

Crowdfunding is also gaining popularity as mentioned by Signori and Vismara, (2018), although it faces challenges such as high failure risk and significant marketing costs. Conti et al., (2019) indicate that non-financial motives and physical or experiential rewards are not important drivers. The authors argue that crowdfunding shares are risky assets that promise high returns, and business plans often reflect optimistic projections. However, the Financial Conduct Authority (FCA) has expressed concerns that these projections may be misleading. Literature substantiates the findings of these diverse funding structures, highlighting the need for tailored financial solutions to effectively support SMMEs in the renewable energy sector.

Grants were identified as crucial for bridging initial capital gaps, while mezzanine loans, a hybrid of debt and equity financing, offer flexible terms but are less common due to higher interest rates and complexity. Additionally, partnerships with financial institutions were highlighted as essential for providing additional resources and expertise. Moreover, one of the funders further emphasised the importance of equity financing for SMMEs, such as the structures from the Department of Trade, Industry and Competition (DTIC) that include grants to assist SMMEs meet initial equity and capex requirements, covering up to 90% of the required capital through equity participation, particularly for majority black-owned companies; the remaining 10% is often covered through DTIC grants. This was also supported in the literature conducted (Andreoni & Tregenna, 2020).

Finally, green bonds, which raise capital for environmentally beneficial projects, were mentioned in several interviewees. According to Sinha et al., (2023), this finance structure is crucial for raising funds for green projects. It is widely used in both developed and developing countries to

finance low-carbon assets such as renewable energy facilities, green buildings, and transport vehicles powered using renewable energy.

6.3.2 (RQ4): What are the key challenges in accessing funds for renewable energy projects and how do they impact SMME participation?

The interviewees identified several key barriers that hinder SMMEs' participation in the renewable energy sector, as illustrated in **Figure 5.7**. The most frequently mentioned barrier as cited, 50% of interviewees, was the lack of access to finance. Interviewees note that SMMEs often struggle to secure the necessary capital for green energy projects due to their limited financial resources. Some explained that renewable energy projects require significant upfront investments in infrastructure, equipment, and technology, which SMMEs typically cannot afford. One other interviewee added that many SMMEs lack sufficient collateral to secure loans from traditional financial institutions, further restricting their access to finance. These findings are supported in literature. Cecere et al., (2020) argue that lack on internal funds and access to finance due to high transactional costs and high risks premiums are a challenge for small businesses that want to enter the sector.

Participants added that the available financing options are often designed for larger, more established companies, making it difficult for SMMEs to access these funds. These financial challenges limit SMMEs' ability to participate in the renewable energy sector and hinder their potential contributions to environmental sustainability and economic growth.

The findings further highlighted a lack of capacity, which includes insufficient capital to start projects and a shortage of qualified personnel. Interviewees pointed out that lack of knowledge, including technical expertise, understanding of regulations, and awareness of funding opportunities, is a significant barrier. Furthermore, Interviewees noted that complex regulations are another major obstacle, as SMMEs often lack the expertise to navigate these requirements, unlike larger companies with dedicated teams. Amalu et al., (2023) emphasised the need for competency; their study found that the energy sector requires diverse skills, especially in science, technology, engineering, and mathematics (STEM). Other barriers such as a lack of skills, large orders, long turnaround times, and intense competition were also mentioned as further hindering SMMEs' participation in the renewable energy sector.

6.3.3 (RQ5): What are the main barriers contributing to SMMEs' lack of participation in the renewable energy sector?

The interviewees identified several barriers that hinder Small, Medium, and Micro Enterprises (SMMEs) from participating in the renewable energy sector, with the primary obstacle being the lack of access to finance. This issue was highlighted by 58% of interviewees, who noted that SMMEs often struggle to secure the necessary capital due to limited financial resources and insufficient security to obtain funding from traditional financial institutions. Additionally, renewable energy projects require substantial upfront investments in infrastructure, equipment, and technology. This further exacerbates the financial challenges SMMEs face. It was underlined that renewable energy projects demand significant initial investments, which SMMEs typically cannot afford. Moreover, it was pointed out that while there are various financing options available, they are predominantly targeted at larger, more established companies, making it difficult for SMMEs to access these funds. Consequently, these financial constraints significantly limit SMMEs' ability to contribute to environmental sustainability and benefit from the economic opportunities in the renewable energy sector. Literature, also suggests that high upfront costs are a significant barrier, as noted in Baker et al., (2021). The author states that the initial investment required for renewable energy projects often exceeds the financial capacity of SMMEs, limiting their ability to compete effectively. Furthermore, the high capital requirements for funding were echoed in a study Cecere et al., (2020) that found that small innovative firms face significant financial constraints in developing eco-innovations compared to the average business (Cecere et al., 2020).

Additionally, 33% of the interviewees pointed out that a lack of capacity is a significant barrier, with Interviewee 6 elaborating that this lack of capacity includes both the capital needed to initiate green projects and the shortage of qualified and experienced personnel to manage these projects effectively.

A further 33% highlighted the lack of knowledge as another important barrier, with one participant explaining that this encompasses a lack of specialised technical knowledge, insufficient understanding of regulatory frameworks, and limited awareness of opportunities such as government incentives, grants, or loans that support green energy adoption, as well as limited knowledge of potential markets. The study affirms that insufficient technical expertise can hinder innovation and reduce competitiveness in the renewable energy market.

Complex regulations were noted as a barrier, as many SMMEs lack the expertise to understand and comply with the complex legal and regulatory requirements governing renewable energy projects. In contrast, larger companies have dedicated legal and regulatory teams to navigate these regulations. This gap often results in costly delays or non-compliance due to the time and

financial resources required. Other barriers mentioned were the lack of skills, lack of large orders, long turnaround times, and intense competition. However, these barriers were less frequently mentioned, with the exception of the lack of skills.

6.3.4 Theme 2: Conclusion

While the interviewees primarily focused on these barriers, Chapter 2 introduced the idea that supportive regulatory frameworks can facilitate SMME participation in providing incentives and reducing entry costs. This insight suggests that while barriers exist, there are also potential pathways for SMMEs to overcome these challenges through targeted policy, support interventions. Overall, the literature reinforces the interview findings while also offering new perspectives on how regulatory support could mitigate some of the identified barriers. Figure 6.2 illustrates the findings on access.

Figure 6.2: Inclusive Framework for Growth (Bridging Access)

THEME 2: FINANCE ACCESS FOR RENEWABLE ENERGY PROJECTS		
<p><u>AVAILABLE FINANCE:</u></p> <ul style="list-style-type: none"> • Equity • Debt • Hybrid debt to equity • Crowdfunding • Grants • Mezzanine loans • Green bonds 	<p><u>CHALLENGES:</u></p> <ul style="list-style-type: none"> • Lack of access to funds • High Upfront costs • Limited financial resources • Lack of Capacity • Lack of expertise (technical, financial, legal, etc.) • Complex regulations 	<p><u>MAIN BARRIERS:</u></p> <ul style="list-style-type: none"> • Struggle to secure capital • Limited financial resources • High Upfront (Infrastructure, equipment • Limited financial resources • Lack of Capacity • Lack of expertise (technical, financial, legal, etc.) • Complex regulations

6.4. THEME 3: MAIN CHALLENGES AND STRATEGIES TO SUPPORT SMMES IN RENEWABLE ENERGY

The theme focused on the key challenges SMMEs faced in participating in renewable energy projects and the strategies to overcome them. Research question (RQ06) aimed to identify and analyse the obstacles SMMEs encountered, such as financial constraints, lack of technical expertise, regulatory hurdles, and market competition. It also explored potential strategies and solutions to address these challenges, enhancing SMME participation in renewable energy projects.

6.4.1 (RQ6): What are the key challenges faced by SMMEs in the renewable energy sector, and how can these challenges be overcome?

The predominant challenge 83% respondents cited the lack of financial capacity. One interviewee elaborated noting that green energy projects are capital-intensive, and most SMMEs possess limited financial resources and weak balance sheets. Financial instability hinders their ability to attract private investment and support from financial institutions, thereby impeding their capacity to enter, scale up, and sustain participation in renewable energy projects.

Financial constraints were identified as a significant barrier, due to the complex regulatory framework governing the renewable energy sector. The sector is governed by multiple layers of regulations, rules, and guidelines, which can be challenging to navigate. Furthermore, 33% of participants highlighted the lack of requisite skills as a barrier, noting that many SMMEs lack the technical, managerial, financial, and legal skills necessary for effective participation in the green energy sector. It was further emphasised that the skills gap can lead to poor project design, implementation, and management, ultimately affecting the quality and sustainability of green energy projects that could lead to delays, cost overruns, and underperformance.

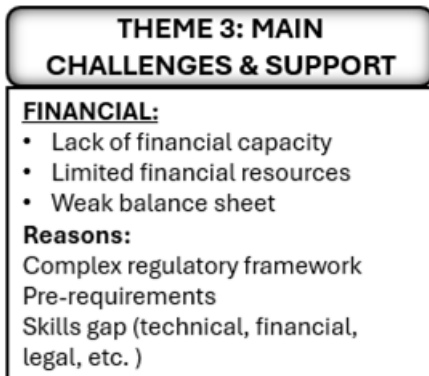
Amalu et al., (2023) corroborate the need for skill development, finding that a balanced mix of skills is effective in leading to project success and employability. Moreover, Moeuf et al., (2020) discussed strategies for onboarding customers to mitigate financial risks and viability of projects. These findings **Figure 6.8** align with the stringent project finance requirements that small companies face, which result in a lack of access to equity and loan financing at regional and national level. Administrative burdens further challenge SME participation. (Wellalage et al., 2019) identified corruption as one of the key institutional inefficiencies contributing to the lack of financial resources and SMME participation.

Other challenges the interviewees mentioned, include limited access to markets, high competition, high operational costs, and lack of mentorship, which were less frequently cited but still significant. These challenges resonate with the broader themes discussed in **Chapter 2**, which acknowledged that market dynamics and competitive pressures can further complicate SMMEs' efforts to participate in renewable energy projects (Alharbi et al., 2023; Van der Spuy & Antonites, 2022).

6.4.2 Theme 3: Conclusion

The interview findings underscored the multifaceted nature of the challenges SMMEs face, the findings stress the necessity for targeted strategies to address these barriers, thereby

enhancing their participation in renewable energy initiatives, The complexity of the regulatory framework and insufficient skills further impede their participation, however literature suggested solutions that could lead to success. These findings underscore the need for targeted capacity-building initiatives and simplified regulatory processes to empower SMMEs in navigating renewable energy. Figure illustrates the findings on main challenges and areas that require support.



6.5. THEME 4: CONTRIBUTION TO VALUE CREATION IN THE RENEWABLE ENERGY SECTOR

This theme focused on identifying SMME green projects that could significantly boost value creation in the renewable energy sector. Research Question 7 (RQ7) aimed to explore and analyse specific green projects that could enhance value creation. The goal was to understand how these projects tackled key challenges and leveraged opportunities to drive economic, environmental, and social benefits. The contribution findings are illustrated in **Figure 6.8** below.

6.5.1 RQ7: Which SMME green projects have the potential to contribute to value creation in the renewable energy sector?

The study provided insights into various green projects that could potentially contribute to value creation in the renewable energy sector. A significant majority (80%) identified solar projects as having significant potential for value creation, which is corroborated in literature. Fotio et al., (2022) found that solar energy is one of the most abundant sources of renewable energy, yet only 5% of its potential is currently being utilised, with less than 13% of energy investments directed towards renewable energy sources. Moreover, these technologies require suitable geographical locations, well-established grid infrastructure, and supportive legislation for the successful implementation.

Additionally, 15% highlighted wind energy projects as another promising avenue for value creation, indicating strong recognition of wind energy's potential to contribute to the renewable energy landscape. Agoundedemba et al., (2023), note that whilst wind provides clean energy, it also helps meet the growing global energy demands and ensures a secure energy supply, particularly in dry or cold regions. Wind energy offers a sustainable solution and is highly suitable for deployment in both rural villages and urban areas.

In contrast, only 4% mentioned green hydrogen projects as having potential for value creation. This suggests that while green hydrogen is acknowledged, it is not yet widely perceived as a primary contributor compared to solar and wind energy projects. Despite increasing policy support, the investment climate for low-emissions hydrogen remains unstable due to uncertainties about future demand and the price consumers are willing to pay for green hydrogen (IEA, 2024).

Some participants suggested that agrivoltaics and retrofit projects could also contribute to value creation in the renewable energy sector. However, these projects were mentioned less frequently, indicating that they are seen as less impactful compared to solar and wind energy initiatives. Zamani, (2022) corroborates this finding, utilising an integrated framework that highlights the importance of technology adoption for improved knowledge, and behaviours that influence the environment for SMMEs.

6.5.2 Theme 4: Conclusion

The findings highlight a clear preference for solar and wind energy projects among SMMEs, reflecting their perceived potential to drive value creation in the renewable energy sector. The analysis provides valuable insights for industry stakeholders aiming to support and promote effective green projects within the SMME sector. Figure 6.4 illustrates the findings on value creation through renewable energy technology projects.

Figure 6.3: Inclusive Framework for Growth (Technology Access)

THEME 4: SMME VALUE CHAIN CONTRIBUTION

Renewable energy technology

projects:

- Solar (Photovoltaic_PV)= Mini-grids, Rooftop, Manufacturing of components
- Wind (Wind Turbine Generator)
- Green Hydrogen
- Agrivoltaics

6.6. THEME 5: COLLABORATION INITIATIVES

This theme examined the degree of implementation of contribution and collaboration initiatives associated with policies that facilitate the inclusion of SMMEs for industry growth. The research aimed to identify specific policies that facilitate collaboration. Analysing how these policies addressed the unique challenges SMMEs face, such as limited access to funding, technical expertise, and regulatory compliance, the goal was to understand whether the policies in place are adequately tailored to support SMMEs and to suggest improvements where necessary.

6.6.1 (RQ8): Are the current collaboration initiatives effectively implemented, and what policies facilitate collaboration for industry growth?

The research question was divided into two parts: the degree of implementation of collaboration initiatives and the policies that facilitate collaboration for industry growth. The analysis revealed that the effectiveness of current collaboration initiatives varied significantly, limiting their impact.

6.6.1.1 Degree of Implementation of Collaboration Initiatives

The majority of respondents believed that collaboration initiatives had been effectively implemented to support SMMEs in participating in green energy projects. They emphasised that these initiatives were very effectively implemented. One respondent highlighted that the effective implementation of collaboration initiatives is crucial for ensuring that SMMEs can contribute meaningfully to green energy projects, thereby supporting inclusive economic growth and a successful energy transition.

Eberhard and Naude, (2016) discussed the regulatory methods and current solutions implemented, measuring the REIPPPP's success in attracting both local and international investors. Their findings show the effectiveness of allowing significant foreign shareholding and encouragement of local-foreign partnerships, a strategy that has increased investor confidence,

resulting in repeat contributions from participants. International companies like Enel and IPPs such as Biotherm and Scatec Solar have established local offices, enhancing project implementation and knowledge transfer. Eberhard and Naude, (2016) supported the findings that stringent RFP and lender requirements limit local IPPs' participation, forcing them to sell projects or partner with multinationals.

Although these partnerships have been successful, leading to recurring equity collaborations and enhanced local development capacity, two respondents argued that collaboration initiatives had not been effectively implemented. They pointed out that this inefficiency results in missed opportunities to incorporate local content in delivery services, and manufacturing of components which is essential for reducing reliance on imports and enhancing local economic resilience.

The importance of involving SMMEs near local communities was highlighted as a way to drive grassroots adoption of renewable technologies. Andreoni & Tregenna, (2020) investigated the middle-income technology trap, examining the Manufacturing Competitiveness Enhancement Programme (MCEP). The findings noted challenges within the programme that lead to a cycle of dependency, where firms are dependent on external funding instead of developing sustainable financial practices.

6.6.1.2 Policies Facilitating Collaboration for Industry Growth

The analysis revealed that while numerous policies such as the Renewable Energy Independent Power Producer Programme (REIPPP), Integrated Resource Plan (IRP), Public Finance Management Plan (PFMA), National Development Plan (NDP) as well as Small Enterprise Development Agency (SEDA), are aimed at promoting collaboration and supporting businesses, the practical implementation often fell short. Interviewees noted that many initiatives lacked the necessary support structures and resources for effectiveness. For instance, frameworks designed to encourage partnerships between SMMEs, and larger firms were not always accessible or well-publicised, limiting their impact.

Moreover, the research found that policies facilitating collaboration often did not adequately address the specific needs of SMMEs. The participants noted these policies were too generic and did not consider the unique challenges faced by smaller enterprises, such as limited access to funding and technical expertise. This gap in policy design and implementation hinders the potential for meaningful collaboration and industry growth.

Van der Spuy & Antonites, (2022) found that there are accessible finance programmes for the sector and small businesses that provide financial support. This study confirms that these programmes are not well communicated or easily accessible to SMMEs, which is supported by (Bianchi et al., (2021). The study confirms the importance of implementing effective governance structures to address complex issues in service delivery. Literature suggested solutions through the application of the theoretical model, Triple Helix, to enhance innovation within SMMEs which can be done through collaborative engagements with academic institutions to enable SMMEs to gain access to cutting-edge research and technological advancements, to develop innovative energy solutions. Collaboration could lead to cost savings and improved operational efficiency (Leydesdorff, 2000).

6.6.2 Theme 5: Conclusion

The findings suggested that while there are existing efforts to promote collaboration, the effectiveness of these initiatives is inconsistent. This underscores the need for more targeted and well-supported policies that address the specific needs of SMMEs to adopt meaningful collaboration and drive industry growth **Figure 6.4** illustrates the findings on collaborative initiatives, programmes, policies and financial sources.

Figure 6.4: Inclusive Framework for Growth (Enact Business Models)



6.7. THEME 6: SUPPORTING SMALL BUSINESSES

This theme aimed to explore and identify effective strategies and collaborative efforts that can enhance the participation of Small, Medium, and Micro Enterprises (SMMEs) in the renewable energy value chain. It focuses on understanding the role of various stakeholders, including industry players, policymakers, and financial institutions, in creating an enabling environment for SMMEs. The goal is to uncover the avenues through which these entities can work together to provide the necessary support, resources, and opportunities for SMMEs to thrive in the renewable energy sector.

6.7.1 (RQ9): How can collaborative efforts between industry stakeholders, policymakers, and financial institutions enable SMME participation in the renewable energy value chain?

The interview findings on how collaborative efforts between industry stakeholders, policymakers, and financial institutions can enable SMME participation in the renewable energy value chain are summarised as follows:

6.7.1. Financial Support

The interviews highlight the significant role of collaboration in enabling SMME participation in the renewable energy sector. Financial support emerged as a crucial factor for SMMEs to engage effectively in the renewable energy value chain. Several interviewees emphasised that green energy projects often require substantial initial capital to cover costs associated with feasibility studies, equipment procurement, and construction.

One interviewee pointed out that SMMEs typically lack the financial resources to independently cover expenses. Another interviewee elaborated that financial support from various stakeholders, including financial institutions and policymakers, is essential for SMMEs to meet these costs and comply with regulatory requirements. He suggested that collective financial support from all stakeholders would empower SMMEs to undertake more green projects, thereby creating market opportunities and stimulating growth.

This collective approach to financial support underscores the importance of a collaborative effort in encouraging a conducive environment for SMMEs in the renewable energy sector. Addressing the financial barriers, stakeholders can significantly enhance the participation and success of SMMEs, contributing to the broader goals of sustainable development and economic growth. Uzuegbunam, (2024) recommends developing a culture of collaboration through public-

private partnerships and community-based trust funds. These partnerships can leverage local knowledge and resources, creating a supportive environment for private investment in green finance.

6.7.2. Enterprise Supplier Development (ESD)

The interviews underscore the importance of enforcing Enterprise Supplier Development (ESD) to facilitate SMME participation in the renewable energy value chain. Several interviewees emphasised that ESD initiatives are crucial for promoting the growth and sustainability of small and medium-sized businesses by integrating them into the supply chains of larger enterprises.

One interviewee highlighted that integrating SMMEs into the supply chains of larger businesses can provide them with the necessary support and resources to thrive. Another interviewee noted that ESD initiatives help SMMEs gain access to new markets and opportunities, which are essential for their growth and sustainability. Additionally, literature suggests that integrating SMMEs into the supply chain at various stages of project development can enhance their capabilities and competitiveness (Shibin et al., 2020). Integrating and enforcing ESD initiatives allows stakeholders to create a more inclusive and supportive environment for SMMEs in the renewable energy sector. This approach not only helps SMMEs grow and succeed but also contributes to the overall development of the renewable energy industry and the economy at large. The integration of SMMEs into supply chains at different stages of project development ensures that they are well-positioned to contribute to and benefit from the growth of the renewable energy sector (Alharbi et al., 2023; Amalu et al., 2023).

6.7.3. Capacity Building

The findings, further highlight the importance of building the capacity of SMMEs to enable their effective participation in the renewable energy value chain. Several interviewees emphasised that capacity building is essential for empowering SMMEs to contribute to the renewable energy transition. One interviewee clarified that capacity building requires a multi-dimensional approach, which includes financial support, skills development, and access to technology and markets. Literature supports the notion that capacity building is crucial for the success of SMMEs in the renewable energy sector; building capacity in finance, regulation, and private could boost manufacturing and businesses (Opeyemi et al., 2019). Integrating SMMEs into various stages of project development can enhance their capabilities and competitiveness, ultimately contributing to the overall growth and sustainability of renewable energy (Anas et al., 2023).

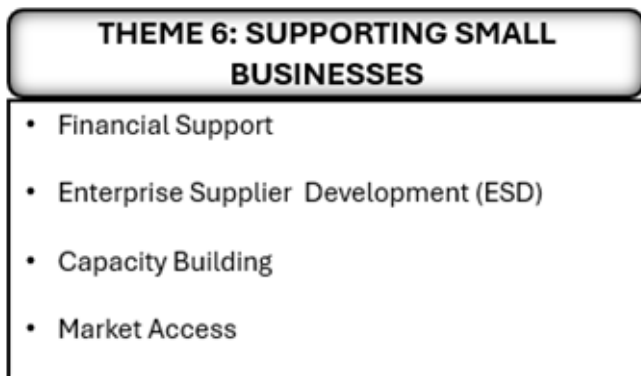
6.7.1.4 Market Access

Findings from the interviews highlight the need to provide market access for SMMEs to enable their participation in the renewable energy value chain. Interviewees expressed that SMMEs should have access to market intelligence, networking platforms, and trade shows which can facilitate connection with potential clients, suppliers, and partners in the green energy sector, integrating them into a larger renewable energy supply chain network. Facilitating market access helps SMMEs become more competitive and sustainable, ultimately contributing to the growth and development of the renewable energy industry. This approach aligns with the broader goal of promoting innovation and economic growth in the green economy. This notion is supported in literature, indicating that new entrants to a market face challenges from established companies seeking to protect their market share and keep out competitors. These large, dominant firms can use various tactics to exclude new competitors and maintain their control over the market (Bhorat et al., 2018).

6.7.2 Theme 6: Conclusion

Supporting SMME businesses, findings suggest that whilst efforts to promote collaboration exist, their effectiveness is inconsistent. The research underscored the need for more targeted and well-supported policies that address the specific needs of SMMEs to adopt meaningful collaboration and drive industry growth. Linking these findings with previous sections, it is evident that addressing financial constraints, regulatory challenges, and skill gaps is crucial. The adoption of ESD in the sector enables SMMEs to compete effectively in the market while contributing to broader economic development goals. Moreover, addressing financial, educational, and technological needs, stakeholders can create a supportive environment that enable innovation and economic growth in the green economy. **Figure 6.5** illustrates the findings on business support areas.

Figure 6.5: Inclusive Framework for Growth (Enact Business Models)



6.8. THEME 7: RESOURCE REQUIREMENTS FOR SMMEs TO PARTICIPATE IN GREEN ENERGY

The research aimed to provide a detailed understanding of the various types of resources—financial, technical, and human—that are important for small, medium, and micro enterprises (SMMEs). The study sought to highlight the existing gaps in these resources and propose strategies to bridge collaboration through partnerships.

6.8.1 (RQ11): What specific skills and resources do SMMEs need to effectively participate in green energy projects?

The majority of respondents emphasised the necessity of engineering technical skills for SMMEs to succeed in green energy projects. However, it was highlighted that thriving in this sector requires a broad range of interdisciplinary engineering skills, including project management capabilities, understanding of sustainability practices, mechanical engineering for renewable energy, innovation, power systems engineering, and energy efficiency and sustainability engineering. This finding is supported in literature as Amalu et al., (2023) found diverse skills in science, technology, and mathematics (STEM). Most of the respondents stressed the importance of legal skills. The findings support the literature, confirming that green energy projects involve complex regulatory, contractual, and compliance aspects, making legal skills indispensable. These skills ensure that SMMEs operate within legal boundaries, protect their interests, and manage potential risks effectively.

Financial management skills were deemed essential, as supported in literature, which points out that green energy projects require significant capital investment, long-term planning, and efficient resource allocation. Without financial management skills, SMMEs struggle to secure

necessary funding, manage cash flow, and make prudent financial decisions, all of which are crucial for growth and seizing opportunities. Moreover, there is a need for substantial financial resources to cover capital costs, operational and maintenance expenses, and other consumables.

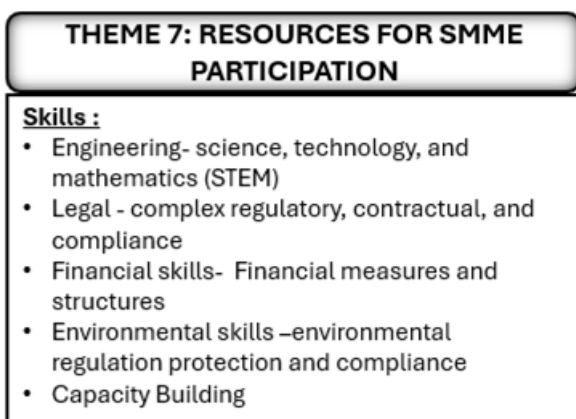
Environmental skills were also mentioned, as these skills help SMMEs comply with regulations, protect the environment, and contribute to the long-term sustainability of their business. Without environmental skills, SMMEs risk harming ecosystems and facing financial penalties for non-compliance.

Other skills mentioned, though less frequently, included managerial skills, marketing skills, project management skills, and commercial skills. These skills, while not as prominently discussed, are still important for the effective participation of SMMEs in green energy projects. These findings are supported in literature encourages SMMEs to bridge the skills gap (Amalu et al., 2023; Bhorat et al., 2018).

6.8.2 Theme 7: Conclusion

Overall, the findings underscore the multifaceted skill set and resources required for SMMEs to thrive in the renewable energy sector, highlighting the importance of technical, legal, financial, and environmental competencies. **Figure 6.6** illustrates the resources needed to enable participation.

Figure 6.6: Inclusive Framework for Growth (Enablers)



6.9. THEME 8: CONTRIBUTION OF MENTORSHIP AND SKILLS DEVELOPMENT PROGRAMMES

The research aimed to highlight the importance of mentorship and skills development in equipping SMMEs with the knowledge, expertise, and confidence needed to navigate the complexities of the renewable energy sector in building capacity. The study sought to demonstrate how targeted training and guidance could address skill gaps, improve project implementation, and promote innovation among SMMEs.

6.9.1 (RQ12): How can mentorship and skills development programmes enhance SMME participation in the renewable energy sector?

A total of 60% confirmed mentorship and skills development programmes are essential to enable SMMEs participation in the value chain, with an emphasis on business marketing, and networking within the renewable energy sector. These programmes help build capacity and encourage innovation, which is crucial for competitiveness in the industry. Literature validates the need for networks as essential for growth (Sharafizad & Brown, 2020).

Additionally, 20% noted mentorship and skills development programmes boost SMMEs' business understanding and market awareness, highlighting that these programmes facilitate access to funding. It was explained that mentorship programmes enhance knowledge in financial literacy, management, and improving leadership skills essential for energy projects. Skills development programmes teach business, relevant legal aspects, and marketing skills necessary for businesses. Zarei et al.'s, (2022) study highlight the importance of mentorship, business incubators, and accelerator programmes noting that mentorships should be intensive to increase the value of new entrants.

It was also pointed out that these programmes help SMMEs understand internal and external factors influencing their business (business acumen), including legal frameworks and policies. Mentorship and skills development programmes build technical expertise, such as project management, engineering, legal, and financial management skills, enabling SMMEs to better understand and manage green energy projects.

6.8.2 Theme 8: Conclusion

Overall, the findings underscore the multifaceted benefits of mentorship and skills development programmes in enhancing SMME participation in the renewable energy sector, addressing both

business acumen and technical expertise. Figure 6.8 illustrates the findings on collaboration efforts through systems to enable skills development participation.

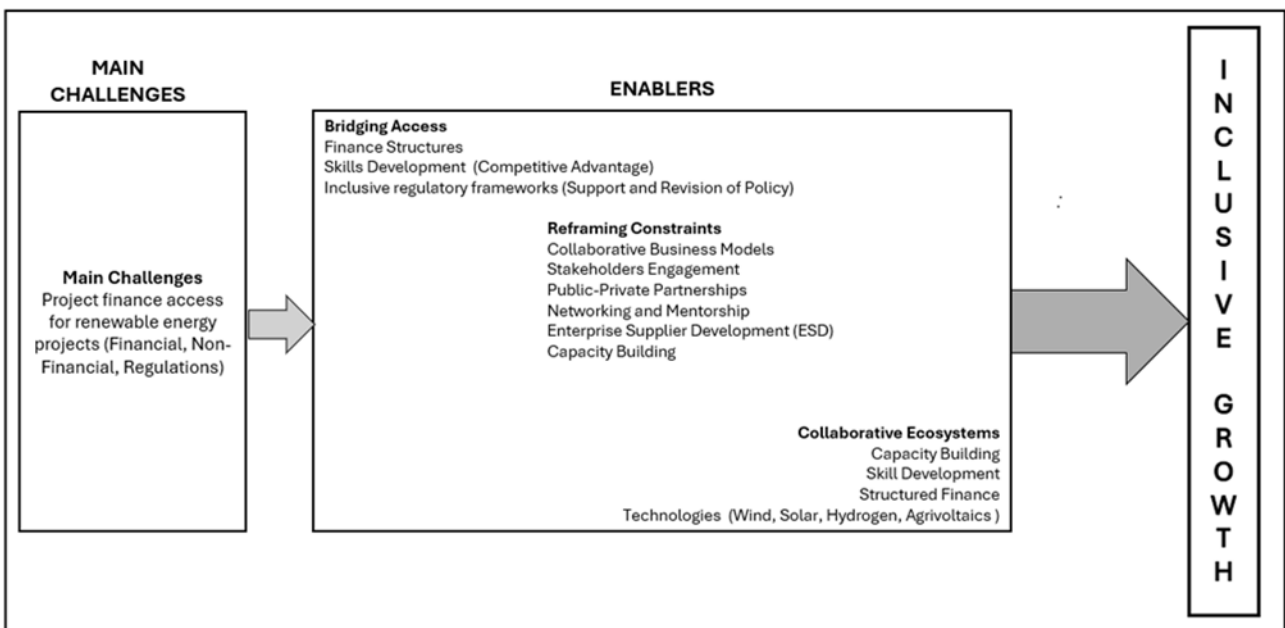
Figure 6.7: Inclusive Framework for Growth (Collaborative Ecosystem)



6.10. CONCLUSION

Chapter 6 presents a thorough analysis of the findings concerning the role of project finance in empowering Small, Medium, and Micro Enterprises (SMMEs) within the renewable energy sector. The chapter identifies significant barriers that SMMEs face, including high capital requirements, limited access to tailored financing options, skills deficiencies, and a complex regulatory landscape that complicates project implementation as illustrated in the **Figure 6.8**, Conceptual framework for Inclusive Framework for Growth. It underscores the role of project finance as a mechanism that can mitigate the challenges through provision of structured financial solutions specifically designed for renewable energy initiatives. Furthermore, the chapter highlights the necessity for collaborative efforts among industry stakeholders, policymakers, and financial institutions to create a supportive ecosystem that leverages project finance effectively. Tackling these barriers and enhancing access to project finance, SMMEs can be better positioned to participate in renewable energy projects, ultimately contributing to sustainable development and economic growth. The insights derived from this discussion not only align with the research questions and aim of this study but also provided actionable recommendations for optimising project finance to facilitate greater SMME engagement in the renewable energy value chain.

Figure 6.8: Conceptual findings for Inclusive Framework for Growth



7. CHAPTER 7: CONCLUSIONS AND RECOMMENDATIONS

7.1. INTRODUCTION

This section highlights the essential findings of our study on the urgent need for accessible renewable energy financing for small, medium, and micro enterprises (SMMEs) in South Africa. It underscores the significant insights gathered from the research and directly responds to the questions in Chapter 3. Additionally, Chapter 7 offers practical suggestions aimed at boosting SMME involvement in the renewable energy sector to enable economic growth and environmental protection.

7.2. FINDINGS

The Innovation Inclusive Model Growth was chosen for this study based on theoretical evidence and qualitative research that delved into the experiences of SMMEs and industry experts' perspectives. This framework emerged from a comprehensive literature review, incorporating proposed models and key themes identified through interviewees offered valuable insights into project finance role in renewable energy. The research revealed that while project finance enables SMME participation, many businesses struggle to access financial resources. The study found that the financial and technical criteria used to evaluate project finance investment feasibility were insufficient, as they primarily considered financial capacity, such as available funds, and emphasised risk mitigation. This approach resulted in high financing costs and limited participation due to substantial upfront capital requirements.

A crucial factor driving the performance of SMMEs is their capacity to implement innovative strategies and formal structures. Terziovski, (2010) proposes that manufacturing SMMEs could improve their performance through adoption of innovative methods. The inclusive growth framework developed by George et al., (2012) is applicable to this research as it tackles the primary obstacles in obtaining financing for renewable energy. The study determined that project finance is instrumental in equipping SMMEs with the required capital and mitigating financial risks linked to renewable energy initiatives.

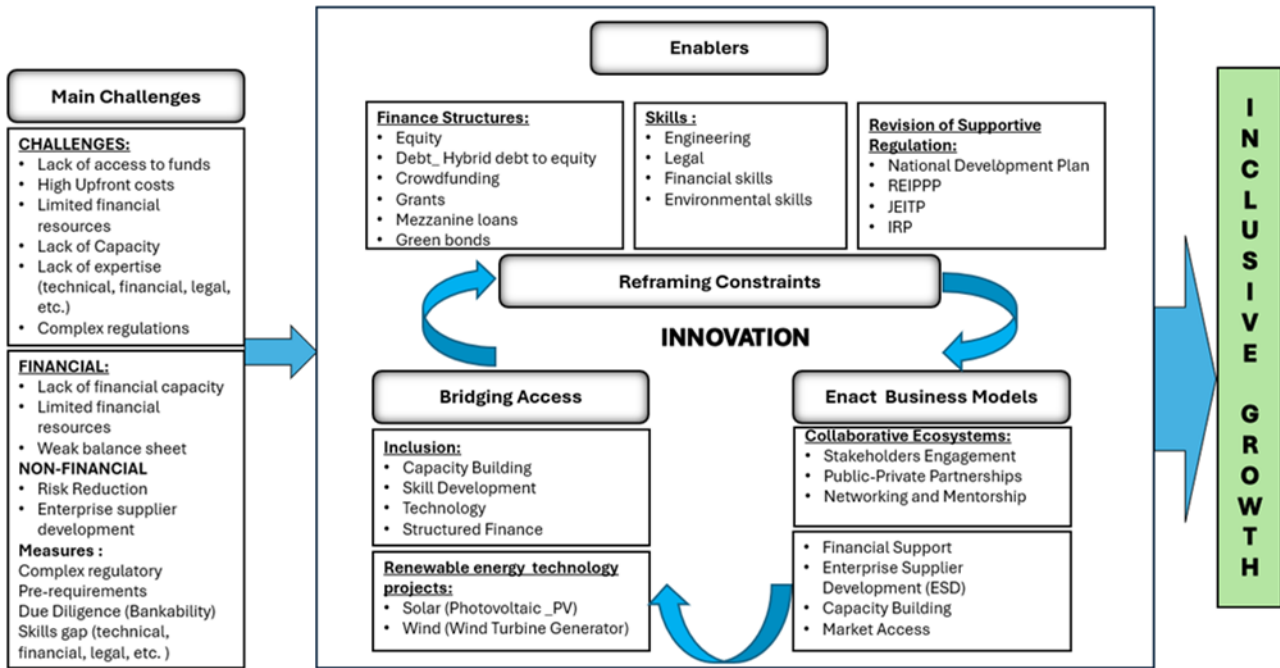


Figure 7.1: SMMEs Inclusive Innovation Growth Model
(Source: Researcher)

7.2.1. Inclusive Innovation Growth Model

The model showcases three interconnected processes that can positively impact innovation and tackle key challenges, as depicted in **Figure 7.1**. This integrated model incorporates literature findings and research outcomes, both financial and non-financial. Conventional project finance frameworks (financial models) are insufficient to address the numerous obstacles SMMEs face, necessitating a more comprehensive model that looks into the whole ecosystem. The model raises awareness on all process, examining aspects across the industry value chain to enable growth, reframe limitations, enact business models, and bridge access to a more inclusive growth model for SMMEs and stakeholders (George et al., 2012).

7.2.1.1. Reframing Constraints

The main problem identified for SMMEs was the lack of flexible financial options. Solutions include new funding models such as blended finance, which combines concessional funds with private investment to lower investors' risks, and crowdfunding, which allows SMMEs to reach more potential investors. Finance models can greatly improve access to capital, helping SMMEs invest in necessary resources and technologies (Cecere et al., 2020).

The development of specific skills in identified areas such as engineering, legal expertise, financial skills for managing funds, and environmental skills for assessing project sustainability, is essential for addressing SMMEs challenges. Improvement of skills could enable SMMEs to operate better and strengthen their position in the renewable energy market.

Moreover, having varied financing options is important for assessing the specific project finance needs for both short- and long-term financing. Equity, debt, hybrid debt-to-equity models, grants, mezzanine loans, and green bonds each offer unique benefits that could meet the specific needs of innovative growth. Additionally, there is a recognised need to revise supportive regulations, including the Renewable Energy Independent Power Producer Procurement Programme (REIPPPP), the Just Energy Innovation and Transition Programme (JEITP), and the Integrated Resource Plan (IRP), to better support SMMEs. Aligning these regulations with the needs of SMMEs could improve access to funding and resources, promoting inclusive growth in the renewable energy sector.

7.2.1.2. Enact Business Models

Developing collaborative ecosystems is fundamental to improving the participation of SMMEs in the sector (Bianchi et al., 2021). Ecosystems facilitate the interaction between various stakeholders, including government entities, financial institutions, and private-sector players. Content et al., (2020) affirm that collaborative ecosystems can significantly enhance innovation and competitiveness, enabling SMMEs to leverage collective strengths to overcome barriers to entry.

Effective stakeholder engagement is essential for implementing inclusive business models, as it ensures the needs and perspectives of local communities, industry experts, and policymakers are considered. Participatory approaches are crucial for encouraging collaboration and sustaining innovation initiatives. Uzuegbunam, (2024) emphasised that public-private partnerships (PPPs) are important in resources and expertise to support SMMEs in the renewable energy sector, combining the strengths of both sectors; PPPs facilitate access to funding, technology, and market opportunities, improving government support mechanisms like subsidies, tax breaks, and loan guarantees. Networking and mentorship platforms are key for scaling SMME operations, helping them build relationships with industry players, access new markets, and share knowledge (Sharafizad & Brown, 2020). Mentorship programmes provide the guidance and support needed to navigate the renewable energy sector, significantly improving SMMEs' capabilities and equipping them with the necessary skills to succeed.

Robust financial support is key for SMMEs in the renewable energy sector, including funding through grants, loans, and innovative financing models such as blended finance and green bonds. Government loan guarantees can further enhance access to capital, facilitating market entry. Furthermore, Enterprise Supplier Development (ESD) initiatives are essential for integrating SMMEs into the renewable energy value chain, providing necessary resources, training, and market access. Local content policies significantly boost SMME participation and contribute to local economic development (Sharafizad & Brown, 2020). Additionally, facilitating market access through government initiatives that promote local procurement and support SMMEs in navigating market complexities is vital. This approach leads to increased investment, innovation, and economic growth, underscoring the importance of inclusive business models.

7.2.1.3. Bridge Access

Bridging access for SMMEs in the renewable energy sector involves improving their contributions across the value chain and addressing gaps in finance, resources, and capabilities. The renewable energy value chain includes stages such as research and development, manufacturing, construction, installation, and maintenance. Therefore, capacity building is central to equipping SMMEs with the necessary skills and knowledge (Opeyemi et al., 2019). This includes training programmes focused on technical skills, business management, and regulatory compliance. Targeted capacity-building initiatives can significantly enhance the operational capabilities of SMMEs and enable value chain participation.

A comprehensive resource assessment is essential to identify gaps in financial capital, human capital, technological capacity, and physical infrastructure; this assessment provides insights into the specific needs of SMMEs, enabling targeted interventions. Capacity-building programmes that provide technical training in renewable energy technologies, including solar, wind, and green hydrogen, can significantly enhance the capabilities of small, medium, and micro enterprises (SMMEs).

7.2.1.4. Conclusions

The research has effectively addressed the pressing need for enhanced financial accessibility and support mechanisms for SMMEs, providing a comprehensive analysis of the barriers SMMEs face and the opportunities that exist for their active participation in the renewable energy landscape. Furthermore, the overall analysis of the Inclusive Innovation Growth Model illustrates this comprehensive approach aligned with the study's aim to investigate and improve

the accessibility of renewable energy finance for SMMEs, ultimately contributing to their active participation in the energy sector and promoting economic development.

7.3. VALUE OF THE STUDY BUSINESS

The study provides significant value through evidence that uncovers the important role of project finance in enabling SMME participation in renewable energy projects. Key challenges extend beyond financial issues such as high finance costs and substantial upfront capital demands, often worsened by inadequate financial assessment measures such as non-financial challenges such as skills, capacity building, and regulatory hurdles. The Inclusive Innovation for Growth framework allows for a holistic view of ecosystems and provides an opportunity to reframe constraints through structured finance, effective stakeholder engagement, and targeted support for SMMEs aligned with economic growth objectives.

7.3.1. Business Contribution

The findings of this research provide significant contributions to businesses, particularly SMMEs operating within the renewable energy sector, identifying the barriers that hinder SMME participation, such as limited access to finance, high operational costs, and regulatory complexities, the study offers a clear understanding of the challenges that businesses face. Insights found play an important role for practitioners, as it helps them devise focused strategies to tackle challenges effectively. The research also underlines the value of innovation and teamwork among various stakeholders, such as industry partners, policymakers, and financial institutions. Creating an environment that nurtures innovation allows businesses to boost their competitiveness and adaptability in the quickly changing renewable energy sector. The study offers practical suggestions, including the need for training programs and easier regulatory procedures, which can help businesses improve their operational efficiency and market presence.

7.3.2. Business Recommendations

Based on the findings, several recommendations for businesses aiming to enhance their participation in renewable energy projects include SMMEs pursuing collaborative partnerships with larger corporations, academic institutions, and government bodies to access resources, knowledge, and networks that increase the feasibility and impact of their initiatives.

Businesses should invest in skill development and training programmes to address the skills gap identified in the research. Equipping SMMEs and their workforce with the necessary competencies can improve project design, implementation, and management, leading to better project outcomes and sustainability.

Furthermore, they should advocate for policy changes that promote a more favourable regulatory environment for renewable energy projects engagement with policymakers to streamline processes and reduce administrative burdens can significantly enhance SMME participation in the sector.

7.4. THEORETICAL CONTRIBUTIONS

George et al., (2012) evaluate several management theories to support SMME participation in the renewable energy sector, addressing challenges in project finance. Their study highlights the necessity of modifying existing theories to account for context-specific characteristics and the equitable distribution of benefits. Key theoretical lenses include innovation for resource assembly, social networks, governance, transaction costs, competition, stakeholder engagement, and innovation adoption.

These lenses collectively form the basis for a comprehensive SMMEs Inclusive Innovation Growth Model framework, aimed at understanding and supporting SMMEs. This framework underscores the importance of collaboration among stakeholders to overcome high finance costs and substantial upfront capital demands. Underlining the role of innovation as a driver of growth, the study expands the existing body of knowledge beyond traditional resource-based and institutional theories. It highlights how developing an innovative ecosystem can empower SMMEs to overcome barriers and enhance their competitiveness in the renewable energy sector

Additionally, this study provides empirical evidence that supports the need for collaboration among various stakeholders. The findings align with and build upon previous studies that highlights the importance of partnerships in driving sustainable development through addressing the research gap related to SMME participation in renewable energy (Sibiya, 2019; Leydesdorff, 2000; Content et al., 2020; Sjödin et al., 2020; Uzuegbunam, 2024)., This study lays the groundwork for future theoretical explorations.

7.5. FUTURE RESEARCH

This research highlights important insights into the challenges and opportunities faced by small, medium, and micro enterprises (SMMEs) in the renewable energy sector. However, there are still areas that need more attention. The study found challenges as described in Chapter 5, in accessing finance. There is a need for innovative funding structures, the importance of building skills, and the value of collaboration among different stakeholders. However, investigations still need to explore how these factors connect and affect SMMEs involvement in this sector. More detailed studies are needed to understand these interactions better:

- Future studies could focus on longitudinal analyses to assess the long-term impacts of collaborative initiatives on SMME success in renewable energy projects.
- Research could explore the role of emerging technologies such as digital platforms and data analytics, in enhancing SMME participation and operational efficiency, including the use of artificial intelligence in the sector.
- Comparative studies across different African regions could provide insights into how contextual factors influence SMME engagement in renewable energy.
- Future studies should focus on conducting longitudinal research to evaluate the long-term effects of different financial frameworks on the growth and sustainability of small, medium, and micro-enterprises (SMMEs) in the sector.
- Future research should conduct empirical evaluations of existing policies and initiatives aimed at supporting SMMEs in renewable energy, which could identify best practices and areas for improvement, ultimately informing more effective policy development.

7.6. RECOMMENDATIONS FOR SECTOR AND PRACTICE

To enhance SMME participation in renewable energy projects it is key to improve access to funding through structured finance solutions such as crowdfunding, green bonds, and impact investing. Additionally, strengthening capacity-building programmes through investing in skill development and training will equip SMMEs with the necessary competencies for better project outcomes. Moreover, promoting collaboration and networking with larger firms, academic institutions, and government agencies can provide valuable resources, knowledge, and market insights, ultimately improving the viability of renewable energy initiatives.

7.6.1. Sector Recommendations

Implementing the following recommendations can help create a more supportive environment for SMMEs in the renewable energy sector, which will ultimately benefit both economic growth and environmental sustainability:

- Financial institutions should develop tailored financial products that cater to unique needs including offering lower interest rates, longer repayment periods, and flexible policies for funding approval processes.
- Innovative financing models such as green bonds, crowdfunding, and public-private partnerships should be explored to provide the necessary capital for SMMEs to engage in renewable energy projects.
- Encouraging partnerships between SMMEs, larger corporations, academic institutions, and government agencies can facilitate knowledge sharing, resource pooling, and access to markets.
- Creating industry networks or associations for SMMEs in the renewable energy sector can provide a platform for knowledge sharing, experiences, and resources.

7.6.2. Industry Practice Recommendations

Financial institutions should develop funding options specifically for SMMEs, such as lower interest rates and longer repayment terms. Additionally, alternative financing methods that include green bonds, crowdfunding, and partnerships between the public and private sectors can provide the necessary funding for renewable energy projects. Promoting partnerships between SMMEs, larger corporations, academic institutions, and government agencies is essential for knowledge sharing, resource pooling, and market access. Establishing industry networks for SMMEs can strengthen their collective voice in policy discussions.

Governments and industry bodies should invest in skills development including capacity-building initiatives to equip SMMEs with the skills needed to navigate the renewable energy landscape. Partnerships with research institutions can encourage innovation and develop technologies that improve efficiency and reduce costs. Embracing digital tools can streamline operations, improve project management, and enhance customer engagement. Promoting eco-innovative practices can boost environmental sustainability and market competitiveness. Implementing systems to measure and report environmental impact can attract investors and customers who prioritise sustainability. These steps will create a supportive environment for

SMMEs, contributing to economic growth and environmental sustainability with stakeholders assisting and creating collaborative environment for SMMEs to succeed which will contribute towards economic growth and environmental sustainability.

7.7. RESEARCH LIMITATIONS

The study on renewable energy finance accessibility for SMMEs' participation in the energy sector has several limitations namely:

- Qualitative nature of the research provided in-depth insights that could have introduced subjectivity and bias. The study's findings are based on participants' perceptions and experiences, which may not capture the full complexity of the challenges SMMEs in accessing renewable energy finance.
- Some participants may have been hesitant to openly discuss their financial difficulties due to concerns about confidentiality, including financial sector participants who may not have fully disclosed their measures or assessment processes due to industry confidentiality. Limited disclosure could be attributed to the confidentiality clauses prevalent in the financial sector, meaning no explicit process details were provided regarding accessing finance.
- The researcher's background and perspectives may have inadvertently influenced the data collection and analysis process. Efforts were made to minimise bias, but the potential for subjectivity remains a limitation in qualitative research. This was mitigated through third party quality control checks.
- The renewable energy field is changing fast, with new technologies and ideas constantly emerging, the findings can become outdated as new advancements, policies, and market conditions develop, therefore it is important up-to-date with the industry changes.
- The study primarily concentrated on financial challenges, potentially overlooking other significant factors that may affect SMMEs' participation in renewable energy projects, such as regulatory challenges, market dynamics, and technological constraints.
- Building trust with participants was challenging, particularly for those meeting the researcher for the first time. This may have impacted the depth and honesty of the responses, limiting the richness of the qualitative data collected.

These limitations suggest that while the study provides valuable insights into the accessibility of renewable energy finance for SMMEs, further research with a larger and more diverse sample.

7.8. RESEARCH CONCLUSION

The study employed qualitative research to explore the experiences of SMMEs, funders, and experts renewable field, the results shed light on the practical implications of overcoming barriers small businesses face. The findings provide insights into how SMMEs can navigate the complexities of the renewable energy market, offering a roadmap for future research and practice Moreover, the study serves as a resource for scholars through provision of a comprehensive overview of the theoretical and methodological models utilised in this research. This guidance is essential for those looking to explore the challenges and the complexities of renewable energy in emerging markets, equipping them with the necessary tools to contribute meaningfully to the field.

The implications of this research extend to industry practitioners, offering practical recommendations for enhanced SMME contribution in the renewable energy value chain. Highlighting the importance of collaboration among industry stakeholders, policymakers, and financial institutions, this study underlines the need for a supportive ecosystem that enables financial structures that address barriers SMMEs face financial and non-financial at organisational level. Findings echo literature discussing the role of collaborative efforts in driving sustainable development. Addressing the research gap the study did not only identify the challenges SMMEs to participate it also proposes a better actionable model that mitigate against challenges. Linking theoretical insights with practical applications, the research contributes to a more nuanced understanding of how to empower SMMEs and drive sustainable growth in the renewable energy sector.

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APPENDIX A: INTERVIEW QUESTIONS

	
Theme 1: Project Finance	RQ1: How does project finance empower SMMEs to participate effectively in green energy projects?
	RQ2: What measures are being taken to assess the feasibility of current project finance investments that support and enable small, medium, and micro enterprises to actively participate in green energy projects?
Theme 2: Funding Structures	RQ3: What are the accessible funding structures existing for renewable energy that facilitates the participation of SMMEs and entrepreneurs?
	RQ4: What are the key challenges in accessing funds for renewable energy projects and how do they impact SMME participation?
Theme 3: Barriers	RQ5: What are the main barriers contributing to SMMEs' lack of participation in the renewable energy sector?
	RQ6: What are the key challenges faced by SMMEs in the renewable energy sector, and how can these challenges be overcome?
Theme4: Contribution	RQ7: Which SMME green projects have the potential to contribute to value creation in the renewable energy sector?
	RQ8: Are the current contributions initiatives effectively implemented, and what are the policies facilitate contribution for industry growth?
Theme 5: Collaboration	RQ09: How can collaborative efforts between industry stakeholders, policymakers, and financial institutions enable SMME participation in the renewable energy value chain?
	RQ10: Are the current collaboration initiatives effectively implemented, and what policies facilitate collaboration for industry growth?
Theme 6: Skills Development	RQ11: What specific skills and resources do SMMEs need to effectively participate in green energy projects?
	RQ12: How can mentorship and skills development programs enhance SMME participation in the renewable energy sector?

APPENDIX B: PARTICIPANT CONSENT FORM



Dear Sir/Madam

I am currently enrolled at the University of Pretoria – Gordon Institute on Business Science (GIBS) and completing my research for an MBA. I am researching Renewable Energy Finance accessibility for empowering SMME's participation in the Energy Sector.

The research aims to give insights into the area and provide insights into the accessibility of renewable energy finance for Small, Medium, and Micro Enterprises (SMMEs) in the Energy Sector., South Africa. The focus is on the role of project finance for green projects to empower SMMEs, and to determine the barriers that hinder their participation in the renewable energy sector. Your participation will be voluntary, and you may withdraw at any time without penalty. All data collected will be kept confidential, and no names of the interviewees will be mentioned in this study.

Interviews will be in English as the business language of South Africa. The interview will be 45 minutes in duration. All data collected will be kept confidential and identities will be anonymous. **12 Questions** will be posed as per the attached interview questions.

For any queries, please feel free to contact me or my supervisor on the following contact details:

	Researcher	Supervisor
Name and Surname	Ms Noluvuyo Spani	Dr Sherin Ramparsad
Mobile number	079 111 6833	064 908 0043
Email address	14414393@mygibs.co.za	ramparsad@gmail.com

Participant's Signature:

Date: _____

Researchers Signature:

Date: _____

APPENDIX C: PARTICIPANT CONSENT FORM



To whom it may concern, _____ (Company South Africa)

I am currently enrolled at the University of Pretoria – Gordon Institute on Business Science (GIBS) and completing my research for an MBA. I am researching Renewable Energy Finance accessibility for empowering SMME's participation in the Energy Sector.

The research aims to give insights into the area and provide insights into the accessibility of renewable energy finance for Small, Medium, and Micro Enterprises (SMMEs) in the Energy Sector., South Africa. The focus is on the role of project finance for green projects to empower SMMEs, and to determine the barriers that hinder their participation in the renewable energy sector.

Interviews will be in English as the business language of South Africa. The interview will be 45 minutes in duration. All data collected will be kept confidential and identities will be anonymous. **12 Questions** will be posed as per the attached interview questions.

I will be interviewing employees from your company. I will contact participants directly and schedule interviews as their schedules permit. However, I need your company's permission to participate in this study. Please sign the consent form below on behalf of your company.

If you have any concerns, please contact my supervisor or me. Our details are provided below.

	Researcher :	Supervisor :
Name and Surname	Ms Noluvuyo Spani	Dr Sherin Ramparsad
Mobile number	079 111 6833	064 908 0043
Email address	14414393@mygibs.co.za	ramparsad@gmail.com

Name and signature of the Executive
on behalf of (Company):

Researchers Signature:

Date: _____

Date: _____

APPENDIX_D: ETHICAL CLEARANCE LETTER

**Gordon Institute
of Business Science**
University of Pretoria

**Ethical Clearance
Approved**

Dear Noluvuyo Spani,

Please be advised that your application for Ethical Clearance has been approved.

You are therefore allowed to continue collecting your data.

We wish you everything of the best for the rest of the project.

[Ethical Clearance Form](#)

Kind Regards

This email has been sent from an unmonitored email account. If you have any comments or concerns, please contact the GIBS Research Admin team.

APPENDIX_ E: CONSISTENCY MATRIX

Appendix_ E: Consistency Matrix Literature Review							
	Research Question:	Literature Articles	Authors	Year	Research Outcome	Data Collection tool	Analysis
Theme 1: Project Finance	<p>RQ1: How does project finance empower SMMEs to participate effectively in green energy projects?</p> <p>RQ2:What measures are being taken to assess the feasibility of current project finance investments that support and enable small, medium, and micro enterprises to actively participate in green energy projects?</p>	The importance of project finance for renewable energy projects	Bjarne Steffen	2017	<p>The study on project finance investigates the role of project finance in enabling the expansion of renewable energy projects in risk environments and reveals that:</p> <p>Hypotheses</p> <ol style="list-style-type: none"> 1. Larger Projects with Higher Financial Risk: Project finance is more frequently utilised for larger projects that carry higher financial risk. This is expected if contamination risk and/or information asymmetry between sponsors and lenders are key factors in choosing project finance. 2. Project finance is more commonly used for projects with lower financial risk that are undertaken by entities with high financing costs, such as distressed utilities. This holds if securitisation by distressed utilities is a decisive factor. 3. Project finance is more often employed by projects developed by project developers or citizen owners. This is expected if debt overhang or the independence of projects are significant reasons. 4. Project finance is frequently used for projects realized as joint ventures by two or more energy utilities. This holds if the allowance for horizontal joint ventures is a decisive factor. 5. Project finance is more commonly used for projects with a high capital expenditure (CAPEX) to operating expenditure (OPEX) ratio. This is expected if agency conflicts between owners and managers, are a key reason. 	Quantitative	Descriptive analysis
		Economic preferences for risk-taking and financing costs	Manthos D. Delis, Iftekhar Hasan, Maria Iosifidi, Chris Tsoumas.	2023	The study finds that economic risk-taking acts as an endowment influencing firms' financing costs, which correlates with lower investments and returns. It highlights that credit costs have deep-rooted determinants, and novel datasets on economic preferences are crucial for understanding this heterogeneity. The study suggests two avenues for future research: examining firms' capital structures and the cost of raising equity capital and exploring the causal effects of economic patience and trust on corporate finance decisions. Additionally, future research could investigate the role of regional risk-taking in relation to managers' abilities and their impact on corporate finance.	Quantitative	Empirical Analysis
		Climate change, energy security risk, and clean energy investment	Bernard Njindan Iyke	2023	The study finds that climate change and energy security risk are closely related, with climate change significantly amplifying energy security risks. The study concentrated on the impact of clean energy investments, investigating other innovative strategies, such as energy storage solutions or hybrid energy systems, could provide a more comprehensive understanding of how to mitigate the impact of climate change on energy security risk: Suggested future research to investigate the nuanced regional and contextual factors that affect the	Quantitative (Data sources)	Empirical Analysis

					success of clean energy initiatives, including cultural norms, political environments, and technological progress.		
		Green finance and renewable energy: A worldwide evidence	Samar S. Alharbi, Md Al Mamun, Sabri Boubaker, Syed Kumail Abbas Rizvi	2023	The study employs a robust methodology to examine the impact of green finance on renewable energy production across 44 countries. Key findings indicate that green finance significantly boosts both biomass and non-biomass renewable energy production in both the short and long term. The results remain consistent even when accounting for various factors such as emissions per capita, trade openness, GDP per capita, GDP growth, population size, fossil fuel energy, oil rent, and the development of equity and credit markets. The findings are also validated using alternative definitions of renewable energy and different estimation methods.	Quantitative	Descriptive analysis
		Renewable energy, trade performance and the conditional role of finance and institutional capacity in sub-Sahara African countries	Opeyemi, A., Uchenna, E., Simplice, A., & Evans, O.	2019	The study by Opeyemi Akinyemi, Uchenna Efobi, Simplice Asongu, and Evans Osabuohien investigates the dynamic relationship between renewable energy usage and trade performance in sub-Saharan Africa (SSA), considering the roles of finance and institutional capacity.	Quantitative (Data Sources)	Dynamic relationship between renewable energy usage and trade performance
		The evolving role of finance in South Africa's renewable energy sector.	Lucy Baker	2015	The research examined the renewable energy sector in SA, coal dominated by a coal-fired monopoly utility. It maps the landscape and ownership dynamics facilitated by the Renewable Energy Independent Power Producer Procurement Programme (RE IPPPP) and analyses the role of different types of capital in shaping the sector. These findings highlight the transformative potential of the RE IPPPP while also raising questions about ownership concentration, financialisation, and the long-term sustainability of the renewable energy sector	Qualitative	Thematic analysis
Theme 2: Funding Structures	RQ3:What are the accessible funding structures existing for renewable energy that facilitates the participation of SMMEs and entrepreneurs?? RQ4. What are the key challenges in accessing funds for renewable energy projects and how do they impact SMME participation?	Venture capital investment strategies under financing constraints: Evidence from the 2008 financial crisis	Annamaria Contia, Nishant Dassb, Francesco Di Lorenzoc, Stuart J.H. Grahamb	2019	The study examines how venture capitalists (VCs) adjusted their investment strategies during the 2008 financial crisis, a period marked by a significant liquidity supply shock. Key findings: VCs tended to allocate more resources to startups operating in their core sectors, rather than diversifying into new areas. VCs reduced their aggregate investments during the crisis. Startups that received funding during the crisis, especially those in core sectors of experienced VCs, showed superior performance post-crisis.	Quantitative (Data sources)	Empirical Analysis
		Does success bring success? The post-offering lives of equity-crowdfunded firms☆	Andrea Signori Silvio Vismara	2018	The study concludes that a significant number of companies that successfully raise funds through equity crowdfunding go on to secure additional capital, indicating the potential for investor returns despite an 18% risk of firm failure shortly after the offering. It further discusses the measurement tools used for assessment.	Quantitative Analysis	Comparative Analysis

Theme 3: Barriers	<p>RQ5: What are the main barriers contributing to SMMEs' lack of participation in the renewable energy sector?</p> <p>RQ6: What are the key challenges faced by SMMEs in the renewable energy sector, and how can these challenges be overcome?</p>	Renewable entry costs, project finance and the role of revenue quality in Australia's National Electricity Market	Gohdes, N., Simshauser, P., & Wilson, C. (2022)	2022	The cost of capital is a crucial factor in determining the feasibility of renewable energy projects, with higher credit quality of Power Purchase Agreement (PPA) counterparties leading to higher gearing and lower expected returns to equity, resulting in a lower overall cost of capital; the quality of revenue, defined by the extent of PPA coverage and the counterparty's credit rating, significantly affects the cost of capital, and projects with high-quality PPAs have lower entry costs, highlighting the importance of stable and predictable policy environments to attract investment, especially as investment in variable renewable energy (VRE) projects is driven by falling technology costs and a shift away from carbon-emitting technologies.	Quantitative Analysis	Scenario Analysis
		Escaping the middle-income technology trap: A comparative analysis of industrial policies in China, Brazil and South Africa	Antonio Andreoni, Fiona Tregenna	2020	The study introduces the concept of a middle-income technology trap, highlighting structural and institutional barriers that hinder domestic value addition and sustained industrial and technological advancement in middle-income economies. This trap involves three main challenges: integrating into the global economy, connecting with global value chains while maintaining local production links, and keeping up with technological changes. Through case studies of industrial policy interventions in China, Brazil, and South Africa, the study examines different approaches to overcoming these challenges.	Quantitative (Data sources)	Comparative analysis
		Driving forces and barriers of Industry 4.0: Do multinational and small and medium-sized companies have equal opportunities.	Horváth, D., & Szabó, R. Z.	2019	The Fourth Industrial Revolution poses significant challenges to manufacturing companies from the technological, organizational and management points of view. This paper aims to explore how top executives interpret the concept of Industry 4.0, the driving forces for introducing new technologies and the main barriers to Industry 4.0. The authors applied a qualitative case study design involving 26 semi-structured interviews with leading members of firms, including chief digital officers and chief executive officers. Company websites and annual reports were also examined to increase the reliability and validity of the results. The authors found that management desire to increase control and enable real-time performance measurement is a significant driving force behind Industry 4.0, alongside production factors. Organizational resistance at both employee and middle management levels can significantly hinder the introduction of Industry 4.0 technologies, though these technologies can also transform management functions. Multinational enterprises have higher driving forces and lower barriers to industry 4.0 than small and medium-sized companies, but these smaller companies have good opportunities, too.	Qualitative Case Study Design	Thematic analysis
		Estimating the cost of capital for renewable energy projects.	Steffen, B.	2020	Many models in energy economics assess the cost of alternative power generation technologies. As an input, the models require well-calibrated assumptions for the cost of capital or discount rates to be used, especially for renewable energy for which the cost of capital differs widely across countries and technologies. In this article, we review the spectrum of estimation methods for the private cost of capital for renewable energy projects and discuss appropriate use of the methods to yield unbiased results. We then evaluate the empirical evidence from 46 countries for the period 2009–2017. We find a globally consistent rank order among technologies, with the cost of capital increasing from solar PV to onshore wind to offshore wind power. On average, the cost of capital in developing countries is significantly higher than in industrialized countries, with large	Quantitative (Data sources)	Comparative analysis

					heterogeneity also within the groups of industrialized or developing countries.		
		Financial constraints and public funding of eco-innovation: empirical evidence from European SMEs	Cecere G, Corrocher N, Mancusi M	2020	The study investigated how financial constraints and public funding impact eco-innovation in European small and medium-sized enterprises (SMEs). It found a lack of internal finance is a major barrier to developing eco-innovations, while external finance is less of an issue. Access to public funds and tax incentives is crucial for promoting eco-innovation, especially when combined with other external finance sources. Larger firms, those investing more in eco-innovation, and those expecting higher energy prices are more likely to innovate. Additionally, firms with strong business networks and easy access to knowledge and technology are more likely to engage in eco-innovation.	Quantitative	Emperical Analysis
		SMMEs in South Africa : understanding the constraints on growth and performance	Bhorat H, Asmal Z, Lilenstein K	2018	The study looks at the challenges faced by Small, Medium, and Micro Enterprises (SMMEs) in South Africa. It finds that internal issues like lack of financial resources and skilled workers, as well as external factors such as competition from established companies, historical disadvantages, poor governance, and an unfriendly policy environment, all hinder the growth of these businesses. The study also points out that informal SMMEs face unique problems compared to formal ones. To help these businesses grow, the study recommends policies that address both internal and external challenges.	Qualitative	Thematic analysis
		Economic preferences for risk-taking and financing costs	Manthos D. Delis, Iftekhhar Hasan, Maria Iosifidi, Chris Tsoumas,	2023	The study by Manthos Delis, Iftekhhar Hasan, and Chris Tsoumas looks at how regional preferences for taking risks affect the cost of financing for firms. It finds that companies in areas where people are more willing to take risks face higher financing costs, including increased loan and bond spreads. A one-standard-deviation increase in regional risk-taking preferences can raise loan spreads by about 5 basis points, adding around \$0.54 million in interest expenses for average-sized loans, with an even greater impact on bond spreads. These higher costs are mainly driven by firms with more local shareholders, showing that in risk-tolerant regions, companies are willing to pay more for financing because they expect higher returns from riskier investments.	Quantitative	Global Preferences Survey:
Theme 4:Contribution	RQ7: Which SMME green projects have the potential to contribute to value creation in the renewable energy sector? RQ8: Are the current contributions initiatives effectively implemented, and what are the policies facilitate	Tensions in the transition: The politics of electricity distribution in South Africa	Baker L, Phillips J	2019	The study highlights significant political and economic challenges in reconfiguring electricity distribution in South Africa, rooted in socio-economic and racial inequalities and a heavy reliance on coal-fired power. It underscores the potential of small-scale embedded generation (SSEG), such as rooftop solar photovoltaics, to provide affordable, decentralized, low-carbon energy, though the disruption to the coal-powered grid and Eskom's monopoly has been minimal. The introduction of SSEG creates tensions between achieving equitable and low-carbon energy transitions and maintaining revenue from wealthy consumers that subsidizes electricity services for the poor.	Qualitative	Contextual Analysis (Document)

	contribution for industry growth?				The paper also questions the democratic potential of decentralized governance in South Africa's electricity distribution. The authors contributed to this understanding through qualitative methods, including document analysis of policy and regulatory documents, and 18 semi-structured interviews with industry members, NGOs, and local government representatives.		
		Power struggles: Governing renewable electricity in a time of technological disruption	Lucy Baker , Andrew Hook, Benjamin K. Sovacool	2021	The study highlights significant governance challenges arising from the rapid pace of technological innovation in renewable energy, such as the need for regulatory adaptation, market integration, and equitable access to new technologies. It underscores how technological disruptions are reshaping the electricity sector, particularly in Germany and South Africa, by influencing policy decisions and market dynamics. The paper emphasizes the importance of flexible and adaptive governance frameworks that can accommodate technological advancements while promoting sustainability and equity.	Qualitative	Thematic Analysis
		Politicizing energy justice and energy system transitions: Fossil fuel divestment and a "just transition."	Healy, N., & Barry, J.	2017	The study broadens the energy justice framework to encompass the entire lifecycle of energy systems, from extraction to final use, underscoring the injustices present at each stage. It highlights the significant role of the fossil fuel divestment movement in redirecting policy focus upstream to tackle supply-side climate policies and their associated injustices. Additionally, the paper advocates for a more structured approach to the concept of a just transition, emphasizing the need to consider the distributional impacts on labour and communities affected by the shift to low-carbon energy systems.	Qualitative	Thematic Analysis
		Incubator management experiences engaging with public SMME financiers at national and provincial levels in South Africa	Van der Spuy S, Antonites A	2022	The study examines the experiences of incubator managers dealing with public SMME financiers at both national and provincial levels in South Africa. It reveals several challenges, including lengthy application processes, complex requirements, strict funding criteria, ineffective financing, and unhelpful staff. However, it also notes that being linked to a business incubator boosts the credibility of applicants and improves their chances of securing funding. The study recommends that public funding agencies should standardize their funding requirements, enhance communication with incubators, and improve staff competencies to better support SMMEs.	Qualitative	Thematic Analysis
Theme 5: Collaborations	RQ09: How can collaborative efforts between industry stakeholders, policymakers, and financial institutions enable SMME participation in the renewable energy value chain?	The way to induce private participation in green finance and investment	Taghizadeh-Hesary F, Yoshino N	2019	The study proposes two main frameworks to reduce the risks and increase the returns of green energy projects, thereby attracting private investment. Firstly, it suggests the establishment of green credit guarantee schemes (GCGSs) to mitigate financial risks by having the government absorb part of the risk. Secondly, it recommends returning a portion of the tax revenue generated from the spillover effects of green energy projects to investors, enhancing the rate of return.	Quantitative	Theoretical Models

<p>RQ10: Are the current collaboration initiatives effectively implemented, and what policies facilitate collaboration for industry growth?</p>	<p>Modelling coal rent, economic growth and CO2 emissions: Does regulatory quality matter in BRICS economies?</p>	<p>Adedoyin FF , Gumede MI, Bekun FV, Etokakpan MU, Balsalobre-Lorente</p>	<p>2020</p>	<p>The study reveals that in BRICS countries, higher coal rents, which reflect the economic value from coal production, actually have a significant but negative impact on CO2 emissions, suggesting that increased coal rents do not necessarily lead to higher emissions. However, it also finds that regulatory measures on coal rents, such as carbon damage costs, have a significant but positive impact on CO2 emissions, indicating that these regulations may not be effectively reducing emissions. The research highlights the need for better collaboration among BRICS countries to develop more effective regulatory frameworks that can truly mitigate emissions while considering economic growth</p>	<p>Quantitative</p>	<p>Regression Analysis</p>
	<p>Value Creation and Value Capture Alignment in Business Model Innovation: A Process View on Outcome-Based Business Models</p>	<p>David Sjödin , Vinit Parida, Marin Jovanovic , and Ivanka Visnjic</p>	<p>2020</p>	<p>The study explores the transition to outcome-based services, where manufacturers ensure the performance outcomes of their products and services. It identifies three essential phases for successful business model innovation: defining the value proposition, designing the value provision, and delivering value-in-use. Aligning value creation and value capture activities in each phase is key to success. This involves identifying opportunities for value creation and agreeing on value distribution during the value proposition phase, designing the value offering and determining the profit formula in the value provision phase, and refining value creation processes and regulating incentive structures in the value-in-use delivery phase. Collaboration between manufacturers and stakeholders is crucial throughout these phases to ensure alignment and success.</p>	<p>Qualitative</p>	<p>Thematic Analysis</p>
	<p>Entrepreneurial ecosystems, entrepreneurial activity and economic growth: new evidence from European regions</p>	<p>Jeroen Content*, Niels Bosma, Jacob Jordaan, Mark Sanders</p>	<p>2020</p>	<p>The study finds that the quality of entrepreneurial ecosystems (EEs) plays a crucial role in this relationship. Regions with high-quality EEs see more productive entrepreneurship, which significantly boosts economic growth. In contrast, regions with lower-quality EEs experience less productive entrepreneurial activity and weaker growth impacts. The research highlights the need for tailored policy interventions to improve the quality of EEs, as a uniform approach is unlikely to be effective to enable entrepreneurship and economic growth across different regions.</p>	<p>Quantitative</p>	<p>Modelling interactions and Evaluation of Outcome</p>
	<p>Sowing the seeds of change: Policy feedback and ratcheting up in South African energy policy</p>	<p>Schmid N, Lumsden C</p>	<p>2023</p>	<p>The study examines two crucial energy policy instruments in South Africa: the Renewable Energy Independent Power Procurement Program (REIPPP) and the Integrated Resource Plan (IRP). It finds that positive policy feedback from the REIPPP, through interpretive and resource feedback mechanisms, has made more ambitious renewable energy planning in the IRP politically feasible. This feedback has facilitated a pro-change constituencies and facilitated policy learning, showing that the strategic sequencing of policy instruments can dynamically enhance energy policy frameworks. The impact of these policies has been significant in advancing South Africa's renewable energy agenda.</p>	<p>Qualitative</p>	<p>Thematic Contextual Analysis</p>
	<p>Culture and investment in green public-private partnerships</p>	<p>Uzuegbunam I</p>	<p>2024</p>	<p>The study reveals that individualistic cultural values tend to reduce the size of financial investments in renewable energy public-private partnership (PPP) projects. This effect is even stronger in societies with strict social norms, known as culturally tight societies. However, the research also indicates that support from multilateral development banks can help counteract the negative impact of cultural tightness on green PPP investments. These findings underscore the importance of considering cultural factors and encouraging partnerships in the</p>	<p>Quantitative</p>	<p>Statistical Analysis</p>

					renewable energy sector when designing policies to attract private investment.		
		Regional small businesses' personal and inter-firm networks	Sharafizad J, Brown K	2020	The study shows that small business owners in regional areas depend significantly on their personal networks for business activities. These networks often transform into informal inter-firm networks, although the weaker ties within these networks seldom become close personal connections. The research also points out a strong preference for regional interactions, with frequent collaboration among local business competitors. Despite using social media to manage business through personal networks, there is a noticeable lack of awareness about the advantages of forming inter-firm networks with businesses outside their local region.	Qualitative (Thematic Coding)	Contextual Analysis
		The role of government in promoting innovation-led entrepreneurial ecosystems	Nel-Sanders D, Thomas P	2022	The study highlights several challenges to the growth and sustainability of entrepreneurship in South Africa, such as readiness for the Fourth Industrial Revolution (4IR), effective policy implementation, and the impact of the COVID-19 pandemic. It underscores the essential role of government in crafting policies that nurture innovation-led entrepreneurial ecosystems. The findings recommend that governments should prioritize creating an enabling environment through robust policy implementation, investing in research and development, and developing collaborations between the public and private sectors to support innovation and entrepreneurship.	Qualitative (Thematic)	Comparative Analysis
Theme 6:Skills Development	RQ11: What specific skills and resources do SMMEs need to effectively participate in green energy projects? RQ12:How can mentorship and skills development programs enhance SMME participation in the renewable energy sector?	Critical skills needs and challenges for STEM/STEAM graduates increased employability and entrepreneurship in the solar energy sector	Amalu, E. H., Short, M., Chong, P. L., Hughes, D. J., Adebayo, D. S., Tchuenbou-Magaia, F., Lähde, P., Kukka, M., Polyzou, O., Oikonomou, T. I., Karytsas, C., Gebremedhin, A., Ossian, C., & Ekere, N. N. (2023).	2023	The study identifies a mismatch between the skills needed and those possessed by STEM/STEAM graduates in the solar energy sector. It emphasises the importance of academic, industrial, and entrepreneurial skills for graduates to secure employment and succeed in the sector	Qualitative (Thematic Coding)	Comparative Analysis

		A Game Theoretic Approach to the Selection, Mentorship, and Investment Decisions of Start-Up Accelerators	Zarei H, Rasti-Barzoki M, Moon	2022	The study highlights that the most crucial role of an accelerator is its screening services, which are essential for identifying the potential success of start-ups. Given the limited resources available, accelerators need to prioritise their services, with screening, mentorship, and seed investment ranked as the top three priorities. The effectiveness of accelerators varies by region, being more pronounced in less developed areas compared to more developed regions. Additionally, while institutional reforms aimed at mentoring or entrepreneurial communities can sometimes reduce the effectiveness of accelerators, they may also increase the willingness of start-ups to participate.	Quantitative	Modelling interactions and Evaluation of Outcome
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APPENDIX_F: LIST OF CODES

Number	Open codes	Axial codes level 1	Selective - Theme
Theme 1: Ways to empower SMMEs to participate			
1	○ Helping to reduce capital requirements		Ways to empower SMMEs to participate in green energy projects
2	○ Offering incentive support	Financial support	
3	○ Providing access to capital		
4	○ Setting aside fraction of spend to SMMEs		
5	○ Offering various financing models		
7	○ Enforcing black ownership targets		
8	○ Enforcing Enterprise and Supplier Development	Empowerment	
9	○ Helping to meet project needs		
10	○ Prioritising black communities support		
11	○ Helping to reduce risk	Operational support	
12	○ Offering grid capacity allocation guarantee		
Theme 2: Measures to assess feasibility of current project finance investments			
13	○ Cash flow analysis		Measures to assess feasibility of current project finance investments
14	○ Current financial status		
15	○ Potential returns	Financial feasibility measures	
16	○ Financial due diligence		
17	○ Environmental impact assessments		
18	○ Risk assessments		
19	○ Sustainability factor	Non-financial feasibility measures	
20	○ Standard measures		
21	○ Market-based approach		

22	○ Pre-feasibility studies		
23	○ Technical feasibility studies		
Theme 2: Accessing finance for renewable energy projects			
Number	Open codes	Axial codes level 1	Selective - Themes
24	○ Debt financing		Accessible funding structures to support participation of SMMEs in green energy projects
25	○ Equity Financing	Debt-equity financing	
26	○ Quasi-equity Financing		
27	○ Mezzanine loan		
28	○ Financial institutions		
29	○ Grants		
30	○ Green bonds		
31	○ Industrial Development Centre		
32	○ Tax credits	Institutional financing	
33	○ Partnering financial institution		
34	○ Venture Capital		
35	○ Crowd funding		
36	○ Concessional Financing		
Number	Open codes	Axial codes level 1	Selective - Theme
37	○ Difficult finding a bankable project		Key challenges faced by SMMEs in accessing funds for renewable energy projects
38	○ High capital requirements	Financial related challenges	
39	○ High interest rates		
40	○ High upfront costs		
41	○ Lack of skills		
42	○ Lack of knowledge	Knowledge and skills related challenges	
43	○ Conflicted buyers		
44	○ Lack of guarantors	People related challenges	

45	○ Complex application processes		
46	○ Complex criteria to access funds		
47	○ Sector heavily regulated	Policy and process related challenges	
48	○ Lots of competition		
Number	Open codes	Axial codes level 1	Selective - Theme
49	○ Complex regulatory environment		Main barriers contributing to SMMEs' lack of participation in the renewable energy
50	○ High compliance risks	Policies and market barriers	
51	○ High competition		
52	○ High upfront costs		
53	○ Lack of access to finance	Financial barriers	
54	○ Lack of bankable projects		
55	○ Large project size		
56	○ Long turn around times	Logistics barriers	
57	○ Lack of large orders		
58	○ Lack of skills		
59	○ Lack of training		
60	○ Conflicted buyers	People barriers	
61	○ Lack of knowledge		
62	○ Lack of capacity		
Theme 3: Main challenges and strategies to support SMMEs in renewable			
Number	Open codes	Axial codes level 1	Selective - Theme
63	○ Complex regulatory framework		Key challenges faced by SMMEs to participate in the renewable energy sector
64	○ Limited access to market	Policies and market related challenges	
65	○ High competition		
66	○ High operational costs		
67	○ High upfront cost		

68	o Lack of access to finance	Financial related challenges	
69	o Lack of collateral		
70	o Lack of capital		
71	o Lack of innovation		
72	o Lack of support	Support and innovation related challenges	
73	o Lack of capacity		
74	o Lack of knowledge		
75	o Lack of mentorship		
76	o Lack of skills		
Number	Open codes	Axial codes level 1	Selective - Theme
77	o Collaboration with universities		Measures to overcome challenges of SMMEs' participation in green energy
78	o Partner with experienced IPP	Collaboration and partnership	
79	o Crowd funding required		
80	o Get funding from SEDA	Financing	
81	o Grants required		
82	o Review of legislation	Legislation	
83	o Effective mentorship required		
84	o Training required	Capacity building	
85	o Stakeholder support		
Theme 4: Contribution to value creation in renewable energy			
Number	Open codes	Axial codes level 1	Selective - Theme
86	o Agrivoltaic projects		Green projects with potential to contribute to value
87	o Green hydrogen projects		
88	o Retrofit projects	Green projects	
89	o Solar projects		

90	○ Various projects		creation in the renewable energy sector
91	○ Wind projects		
Theme 5: Collaboration Initiatives			
Number	Open codes	Axial codes level 1	Selective - Theme
92	○Very effective implementation		Degree of implementation of collaboration initiatives
93	○No effective implementation	Effectiveness	
94	○Not much implementation		
95	○Effective Implementation		
			Policies facilitating collaboration for industry growth
96	○ Small enterprise development		
97	○ National development plan		
98	○ PFMA	Available policies	
99	○ Integrated Resource Plan		
100	○ REIPPP programs		
Theme 6: Supporting Small Businesses			
Number	Open codes	Axial codes level 1	Selective-Themes
95	○ Building capacity for SMMEs		Ways to enable SMME participation in the renewable energy value chain
96	○ Small enterprise development	Capacity building	
97	○ Offering training and workshops		
97	○ Providing access to markets		
98	○ Deliberate policy support	Policy and markets	
99	○ Risk sharing		
100	○ Providing financial support		
101	○ Offering tax credits	Financial support	
102	○ Dedicating spend for SMMEs		
Theme 7: Resource requirements for SMMEs to participate in green energy			

Number	Open codes	Axial codes level 1	Selective-Themes
103	○ Engineering skills		Skills and resources required for SMMEs need to effectively participate in green energy projects
104	○ Project management	Technical skills for projects	
105	○ Environmental skills		
106	○ Financial management skills		
107	○ Legal skills		
108	○ Managerial skills	Auxiliary skills	
109	○ Marketing skills		
110	○ Commercial skills		
Theme 8: Contribution of mentorship and skills development programs			
Number	Open codes	Axial codes level 1	Selective - Themes
111	○ Enhance access to funding		Contribution of mentorship and skills development programs to support SMME participation in the renewable energy
112	○ Enhance market and networking opportunities	Funding and markets	
113	○ Help boost employment		
114	○ Help boost innovation		
115	○ Help build Technical Expertise	People support and innovation	
116	○ Help navigate regulatory frameworks		
117	○ Help boost business		
118	○ Better understanding of industry		