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Challenges facing small, medium and micro enterprises servicing operational wind farms in the Eastern cape, South Africa

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Challenges facing small, medium and micro enterprises servicing operational wind farms in the Eastern cape, South Africa

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A research article submitted to the Faculty of Commerce, Law and Management, University of the Witwatersrand, in partial fulfilment of the requirements for the degree of Master of Business Administration

Protocol Number: WBS/BA0700696V/407

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Wits Business School

June 2023

DECLARATION

I, **Mahlatse Maraba**, declare that this research report is my work except as indicated in the references and acknowledgments. It is submitted in partial fulfilment of the requirements for the degree of Master of Business Administration at the University of the Witwatersrand, Johannesburg. It has not been submitted before for any degree or examination in this or any other university.

Name:**Mahlatse Maraba** Signature:

Signed at **Vanderbijlpark**

On the **22nd** day of **June 2023**

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First and foremost, glory be to the Almighty who has protected me to date. A big thank you to my parents for raising me in a family deeply rooted in education, love, and support. To my late father, thank you for being a pillar over the years. Most importantly, thanks to myself for the consistency, hard work, and always finding a solution in difficult times.

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"*On to the next one*"

SUPPLEMENTARY INFORMATION

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Abstract

Climate change has resulted in a review of how electricity is generated with the focus now being on renewable energy sources. In South Africa, this focus is facilitated by the Renewable Independent Power Producer Program (REIPPPP) which seeks to introduce an energy mix of solar, wind, biomass, and hydro into the traditional coal-dependent systems. REIPPPP promised economic benefits and some of the intended beneficiaries are Small Medium and Micro Enterprises (SMMEs). The purpose of this study is therefore to understand the challenges facing SMMEs in wind farms that are in the operational phase to understand if they are benefitting from REIPPPP.

A qualitative approach, using semi-structured interviews to obtain data from respondents offering various services to operational wind farms was employed. A sample size of 9 respondents was used to obtain this data. Applying thematic analysis to the collected data it was found that the challenges facing SMMEs are mainly due to lack of support, lack of finance, human capital, lack of policies and difficulty accessing the job market in the wind farms. All these challenges are as per Isenberg's domains of entrepreneurship framework (Isenberg, 2010). Further themes that emerged are unfair competition SMMEs face and non-compliance issues by both the SMMEs and the wind farms.

Given these challenges, SMMEs were negative towards REIPPPP. There is still a large potential for more renewable energy projects to be implemented in South Africa thus, these challenges must be well understood and addressed going forward for SMMEs to fully benefit. Some of the recommendations are for policies and regulations to be implemented by the government to ensure that SMMEs operate on a level playing field. It is foreseen that by addressing policies as a root cause, the remainder of the challenges can easily be addressed.

Keywords*: REIPPPP, SMME, Domains of Entrepreneurship Ecosystem*

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LIST OF ACRONYMS and ABBREVIATIONS

BEE – Black Economic Empowerment

CSP – Cascaded Solar Power

DBSA – Development Bank of South Africa

DOE – Department of Energy

EPC – Engineering Procurement and Construction

IPP - Independent Power Producer

IRP – Integrated Resource Plan

NDP – National Development Plan

NERSA – National Energy Regulator South Africa

NT - National Treasury

OECD - Organisation for Economic Co-operation and Development

PPA - Power Purchase Agreement

REIPPPP - Renewable Independent Power Producer Procurement Program

SBO – Single Buyer Office

SMME – Small Medium and Micro Enterprise

CHAPTER 1. INTRODUCTION

1.1. Background of the study

The challenges brought about by climate change have resulted in the adoption of renewable energy programs as a vehicle for transitioning to a low-carbon economy. The aim is to ensure a sustainable energy supply for the future. Through the Renewable Independent Power Producer Procurement Program (REIPPPP), South Africa is also introducing alternative energy sources such as solar and wind to fulfil a sustainable energy supply for the future. By the end of 2020, the REIPPPP program had introduced 5027 MW of renewable energy supply mix to the South African grid made up of concentrated solar power (CSP), solar, and wind (Calitz and Wright 2021) and it is currently in bid window 6 seeking to procure a further 2600 MW of renewable energy.

REIPPPP is expected to bring with it economic development opportunities to alleviate some of the unemployment challenges faced in the country and play a pivotal role in fulfilling the National Development Plan (NDP) agenda. REIPPPP assesses potential bidders on a 70% price factor and a 30% economic development factor (Nkoana 2018). However, studies have shown that the program has not been successful in addressing economic development and is faced with numerous challenges around communities (Lennon, Dunphy, and Sanvicente 2019; Nkoana 2018). Munday et al (2011) further note that the economic development impacts of wind generation projects on rural communities remain questionable.

Mkhwebane (2018) conducted an extensive study detailing the challenges Small Medium and Micro Enterprises (SMMEs) are faced with in participating in the REIPPPP value chain. Some of the challenges identified include lack of financial resources, lack of experience and track record, lack of enforcement of local content, and lack of equipment. Similarly, a qualitative review of literature by Gabriel (2016) showed that the challenges faced by SMMEs in the renewable energy sector are financial, technical, knowledge-based, and governance-based.

The value chain of renewable energy projects consists of manufacturing, professional services, logistics, construction, maintenance, and auxiliary services. Mkhwebane (2018) notes that SMMEs participate largely in auxiliary services as these do not require specialized skills. These services include catering, security services, vegetation control, and carcass searching. Literature on the challenges faced by SMMEs looks at the entire value chain of renewable energy projects lifecycle whilst this study seeks to specifically unpack the challenges faced by SMMEs in the wind farms during the operations phase of the project.

1.2. Research problem

Literature shows that REIPPPP has not been able to successfully implement the economic development functions it is mandated to. SMMEs, which should largely benefit from this program are faced with numerous challenges throughout the lifecycle of the renewable energy project. Literature on the challenges faced by SMMEs looks at the entire value chain of renewable energy projects which includes design, construction, operations, and decommissioning. There is a lack of focus on the challenges SMMEs face during the operations and maintenance phase of the projects. This focus is necessary because most of the life of renewable energy projects is spent in the operations and maintenance phase which is estimated to be a minimum of 20 years.

It is thus important to focus on the challenges faced by SMMEs specifically in the operations and maintenance phase of renewable energy projects to better understand the issues faced to suggest mitigation options. To achieve this, this study will focus on wind farms located in the Eastern Cape province of South Africa. The findings will add to the body of knowledge of existing studies that unpack challenges SMMEs face in general over the lifecycle of renewable energy projects.

1.3. Research questions

There is a lack of literature detailing the challenges that SMMEs face specifically during the operations and maintenance phase of renewable energy projects.

Based on this, the following primary research question is proposed to unpack the issues:

What are the challenges facing SMMEs servicing wind farms during their operational phase in the Eastern Cape province of South Africa?

To explore the research question further, the following secondary research question is proposed:

To what extent have these challenges shaped the perceived view that REIPPPP is benefitting SMMEs?

1.4. Research objectives

The main objective of this research is to unpack the challenges faced by SMMEs during the operations and maintenance phase of renewable energy wind projects in the Eastern Cape province of South Africa. The study will add greatly to the body of knowledge of the literature on the challenges faced by SMMEs in the renewable energy program in general. This will further assist in the development of mitigations to further address these challenges.

1.5. Significance of the research study

In line with the National Development Plan (NDP) vision of 2030 and the Integrated Resource Plan (IRP) vision of 2030 targets to have introduced approximately 17800 MW of renewable energy power, REIPPPP still has a larger role to play. It is therefore imperative to understand the challenges faced by SMMEs in the renewable energy projects that have been developed thus far to better understand how they can be addressed going forward. It is foreseen that this study will help policymakers and all relevant stakeholders in ensuring that the REIPPPP stands to benefit SMMEs in future projects to be developed.

1.6. Focus of the study and research scope

This study is delimited in terms of geography.

1.6.1. Geographical Delimitation

This study is confined to SMMEs servicing wind farms in the Eastern Cape. This province has seen an increase in the implementation of renewable energy wind projects since the inception of REIPPPP and geographically has the highest number of wind farms in South Africa (Luke, 2020) and is therefore a suitable location for this study to be located in. This is the main reason why the Eastern Cape province makes a good case study to undertake this investigation.

CHAPTER 2. LITERATURE REVIEW

2.1 Introduction

The purpose of the literature review is to gain insights and understanding into existing studies analysing and assessing challenges faced by SMMEs in the renewable energy industry. The insights and understanding will be formulated by a critical evaluation of various ideas, findings, and theoretical frameworks in literature to produce an understanding of the factors that are largely viewed as challenges being faced by SMMEs in the renewable energy sector.

Due to the many sectors SMMEs operate in, this section will begin by unpacking the concept of SMMEs specifically in renewable energy to set the context in which the definition of SMMEs will be used. Furthermore, a definition of concepts such as the REIPPPP, and the value chain of a renewable energy project will be provided to set the scene for this study.

2.2 SMMEs in the renewable energy sector

2.2.1 *Concept of SMMEs in Renewable Energy*

In developing countries, there is much emphasis placed on the role SMMEs play in alleviating unemployment challenges. This is evident as SMMEs are responsible for two-thirds of employment and contribute to 99% of all enterprises across the Organisation for Economic Co-operation and Development (OECD) (Usui & Martinez-Fernandez, 2011). There is a further emphasis placed on the role they can play in attaining the green low carbon agenda (Usui & Martinez-Fernandez, 2011). In the local context of South Africa, SMMEs have been responsible for contributing 36% to the GDP, resulting in workforce employment of 47%, and contributed 6% to corporate tax (S. E. Mkhwebane, 2019).

Mago & Toro(2013) posit that the definition of an SMME is not uniform and standard across all countries. Similarly, Yoshino & Taghizadeh Hesary (2016) agree with this and note that the definition varies from country to country. The characterization is based on a variety of factors such as employee headcount,

entrepreneurship, revenue, the size of the entity, ownership, and the formal economy (Mago & Toro, 2013; Yoshino & Taghizadeh Hesary, 2016). For most countries, the generally accepted definition is based on the number of employees, turnover, and total gross asset value. South Africa adopts the latter definition, and similar to the definition described by Marks & Hidden (2017) given in Table 1 below. A micro-enterprise has a maximum of five full-time employees with a total annual turnover of R0.15 million whilst a medium enterprise has less than 200 full-time employees with a total annual turnover of R40 million.

Table 1: SMME classification in the manufacturing sector

Size	**Total full-time equivalent of paid employees**	**Total annual turnover**	**Total gross asset value**
	less than:	less than:	less than:
Medium	200	R40m	R15m
Small	50	R10m	R3,75m
Very small	20	R4m	R1.5m
Micro	5	R0.15m	R0.1m

Source: (Marks & Hidden, 2017)

In the South African context, the definition is further entrenched through legislation via the National Small Business Act of 1996 and the associated Amendment Bill of 2003 (Mago & Toro, 2013). Similarly, the Czech Republic categorizes a small enterprise as an enterprise employing less than 50 people and an annual turnover not exceeding €10 million (Havlíček et al., 2012).

Olusegun (2012) highlights that many researchers make the mistake of using SMMEs and entrepreneurship interchangeably which can be confusing as findings in an SMME study might not be relevant to an entrepreneurship study. He further notes that both SMMEs and entrepreneurship are generally seen as a means to achieve economic development and eradicate unemployment but they differ because SMMEs are merely firms whilst entrepreneurship is the process of forming SMMEs (Olusegun, 2012). Due to the focus on climate change and the

rapid move in the adoption of renewable energy as an alternative energy source, there has been an emergence of renewable energy entrepreneurs (Gabriel, 2016).

For this study and by the amalgamation of the various definitions in the various sources, an SMME will refer to:

Any enterprise with fewer than 200 employees, with an annual turnover of less than R40 million, with a total gross asset value of less than R15 million, and the owner being a renewable energy entrepreneur who is directly involved in the management of the business.

Any business is governed by seven stages that make up its lifecycle (Peitsch, 2020). The typical stages in this lifecycle are outlined in Table 2 below. As this study will only be targeting SMMEs that are currently servicing wind farms, only SMMEs that are either in the growth, established or expansion stage will be considered.

Table 2: SMME Lifecycle

Stage	Description
Idea Stage	The initial stages of the business, currently in a concept phase
Start-Up Stage	Implementation phase is where the business is fine-tuning the specific service it will be offering
Growth Stage	The business has consistent revenue and is adding new customers
Established Stage	The business has matured with dedicated customers
Expansion Stage	The business enters new markets
Decline Stage	Business decreases, turnover no longer consistent
Exit Stages	Business shuts down due to not surviving the decline stage

Source: (Peitsch, 2020)

2.2.2 *Concept of REIPPPP*

REIPPPP was established by the Department of Energy (DOE), the National Treasury (NT), and the Development Bank of Southern Africa (DBSA). This program is implemented by the Independent Power Producer (IPP) office. The first step is the issuing of requests for proposals from potential bidders who would like to partake in the program. The bidders are expected to submit their proposals which should contain details on six areas which are environment land, commercial and legal, economic development, financial, and technical (Eberhard et al., 2014). Figure 1 shows all the stakeholders involved in the program.

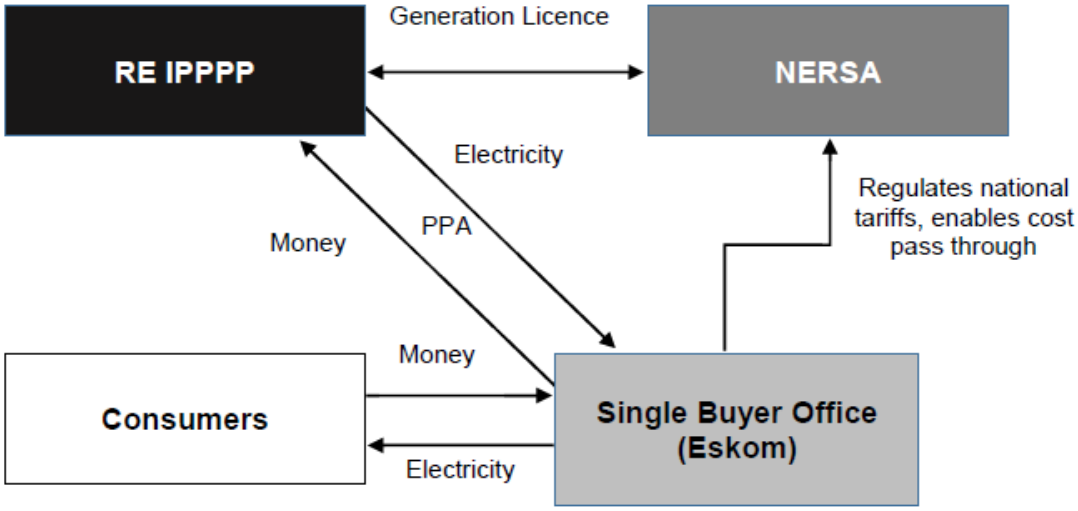


Figure 1: Interaction between stakeholders in the REIPPPP structure
(Papapetrou, 2014)

The DOE together with a team of consultants' assesses the various bids to determine the successful bidder who is publicly declared as the successful bidder (Forsyth, 2017). As Eskom is the sole buyer, a Power Purchase Agreement (PPA) is entered into between the successful bidder and Eskom as the Single Buyer Office (SBO). The National Energy Regulator of South Africa (NERSA) is accountable for regulating the nation's energy tariffs and for providing a generation license to the successful bidder.

It is after the successful closure of the bidding process that we can start looking at the role SMMEs play in this program. This can be achieved by having a look at the entire value chain of a renewable energy project and identifying the various

points in the chain in which SMMEs can play a role. For this study, only the value chain of a renewable energy wind project is reviewed.

2.2.3 *Renewable Energy Project Value Chain*

The value chain of a renewable wind project consists of the following steps: (1) Manufacturing, (2) Professional Services, (3) Transport and logistics, (4) Construction, (5) Maintenance, and (6) Auxiliary services (E. Mkhwebane & Ntuli, 2019; S. E. Mkhwebane, 2018). Elola et al (2013) define the value chain of a renewable energy wind project as a combination of two main value chains which are (1) the manufacturing chain comprising the manufacturing of all components and (2) the deployment chain which includes the distribution and utilization of energy.

The timeline from manufacturing to construction can take 2 years depending on the size of the project (Renewables First, 2015) and the operations phase can take a minimum of 20 to 25 years (Topham & McMillan, 2017). Table 3 gives an outline of the value chain of a typical renewable energy wind project.

Manufacturing – Mkhwebane (2018) highlights that the barrier of entry for SMMEs here is very high due to huge capital requirements. Original Equipment Manufacturers (OEMs) maintain power, and main components such as wind turbine towers, blades, and all the turbine internals are shipped into the country preassembled. A possibility of scope here includes manufacturing components such as tower internals and steel components. Similar opportunities are noted by Morries et al (2020). Table 4 below shows how well-established SMMEs in South Africa are when it comes to offering manufacturing services for wind energy projects.

Table 3: Renewable Energy Wind Project Value Chain adapted from

Manufacturing	Professional Services	Transport & Logistics	Construction	Maintenance	Auxiliary services
• Tower internals • Steel components • Cables • Transformers	• Design • Planning • Project Management • Health & Safety • Inspections • ESD consultancy	• Raw material transportation • Equipment transportation • Spares and tools transportation	• Civil works • Fencing • Roads • Equipment installation	• Electrical maintenance • Instrument maintenance • Lift inspections • Spare parts supply • Drones' inspections	• Supply tools • Waste management • Bird/bat monitoring • General transportation • Security services • IT services • Vegetation control
Planning, Design, and Construction (4 years)				Operations (20 years)	

Source: (S. E. Mkhwebane, 2018)

Table 4: Manufacturing services in South Africa for wind energy products

Activity	Technical Level	Status
Civils	Low/medium	Established
Ancillary structure – fencing, building materials for temporary/permanent buildings	Low	Established
Grid integration – cables, transformers, switchgear	Low/medium	Established
Towers - steel towers	Low	Established
Towers- precast concrete units	Low	Mostly disestablished
Tower internals – ladders, cabling, lighting	Low	Established
Blades	Medium	None
Nacelle Panels	Medium	None
Assembly of turbine	Medium	None

Source**:** (Morris et al., 2020)

Professional Services; Transport and Logistics; Construction – Opportunities here include design, project management, planning, health, and safety which small consulting firms have opportunities to provide services on (S. E. Mkhwebane, 2018). EPC companies can provide the scope for this phase

which includes: procuring the balance of plant, civil works for roads and tower foundations, building construction, and electrical works such as cabling and lighting (Morris et al., 2020, p. 10).

Maintenance and Auxiliary services – this phase accounts for the longest duration of the project life. For SMMEs to fully benefit from the renewable energy program, they must successfully play in this phase. Some of the activities in this phase include electrical and instrumentation maintenance, wind turbine tower cleaning, supply of spare parts, and drone inspections of the wind turbine blades. Auxiliary services include services such as waste management and security. Mkhwebane (2018) highlights that most SMMEs are active in the auxiliary services space as there are fewer requirements in terms of technical skills.

2.2.4 *Wind Energy in South Africa*

Wind farms can either be built onshore or offshore. The South African landscape currently has onshore wind farms which are mostly located in the Eastern Cape province. The first onshore wind farm to reach commercial operation was the Hope Wind Farm with a capacity of 66 MW situated in the Western Cape Province (Mott Mcdonald, 2022). As of 2019, there has been a total of 33 onshore wind farms reported to be under development in the country (Esi Africa, 2019). Most of these wind farms are currently in the operations and maintenance phase.

The operations and maintenance phase of a wind farm is made up of a combination of multidisciplinary tasks (Hahn et al., 2017). Figure 2 provides details of services required by wind farms during the operational phase. According to Hahn et al (2017), these services comprise three categories which are turbine maintenance, the balance of plant maintenance, and commercial operations. SMMEs providing services to wind farms in any of the services listed in Figure 2 are targeted for this study.

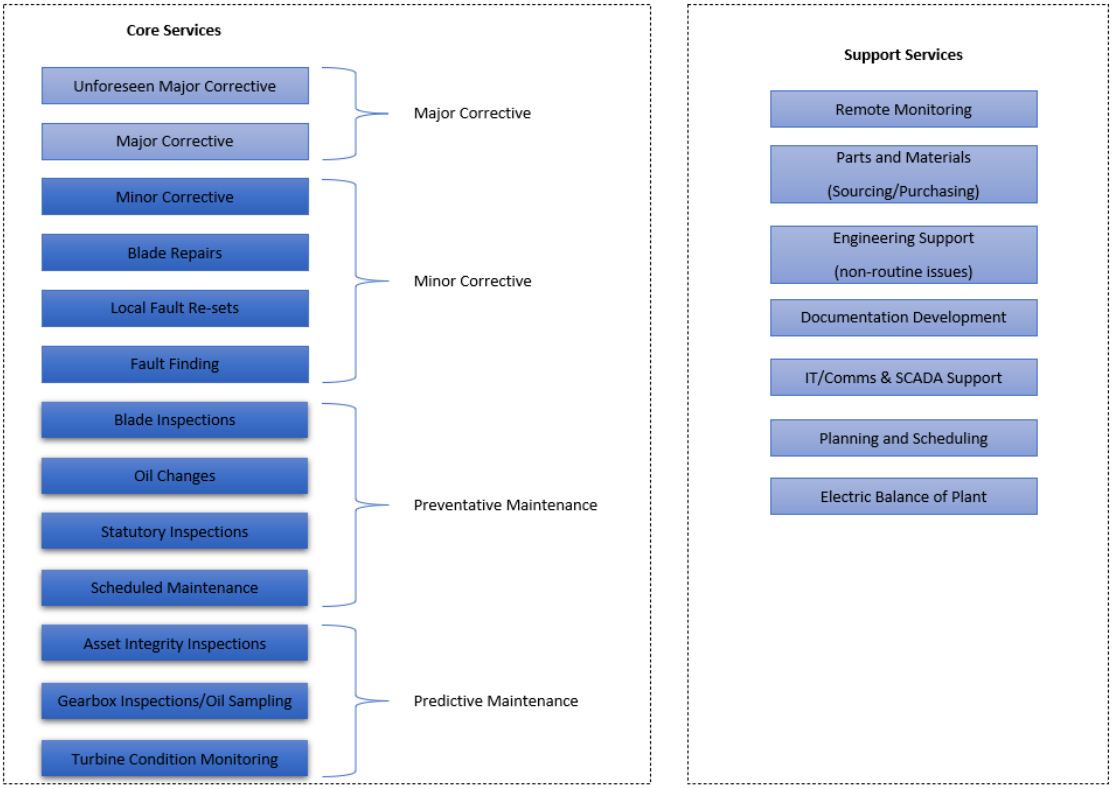


Figure 2: Wind farm services during the operational phase (author's own)

2.3 The SMME Ecosystem in Renewable Energy

Challenges faced by SMMEs is a subject that is generally well-researched internationally (Rahman & Mahbub, 2022; Yoshino & Taghizadeh Hesary, 2016) and also in the local context of South Africa (Agwa-Ejon & Mbohwa, 2015; Ngcobo & Sukdeo, 2015; Ramukumba, 2014). Since the emergence of renewable energy projects and the participation of SMMEs in this space, there has also been some work done both locally and internationally in identifying the challenges faced in the entire value chain of renewable energy projects (Forsyth, 2017; Gabriel, 2016; E. Mkhwebane & Ntuli, 2019; S. E. Mkhwebane, 2018).

In the local context, the study by Mkhwebane (2018) looked at the entire value chain of renewable energy projects and was not specific to the type of renewable energy technology. Furthermore, there was no geographical delimitation applied in terms of the province and the respondents were not SMMEs but IPPs, OEMs, and construction companies. Some of the findings by Mkhwebane (2018) are that SMMEs find it difficult to compete because the renewable industry is a monopoly.

Furthermore, there is a lack of transformation and the industry is riddled with fronting (S. E. Mkhwebane, 2018). The most prominent finding was that SMMEs do not offer specialized services, there is a lack of technical skills and they end up offering generic services (S. E. Mkhwebane, 2018).

The context of this study is different for the following reason:

- it is delimited by location, Eastern Cape has the most wind farms in South Africa,
- it also targets wind technology as it is the leading renewable technology type implemented in South Africa.

Adom et al (2018, p. 438) define a theoretical framework as the path the research follows, supporting it through a theoretical construct to ensure that the findings are more meaningful and acceptable. Theoretical frameworks used in identifying challenges faced by SMMEs, in general, can also be applied to SMMEs in the renewable industry to unpack their challenges.

2.3.1 *Structuralist and Finance Gap Theory*

There are various theoretical frameworks applied in the literature to understand the challenges facing SMMEs. In a study to understand the South African government's support to SMMEs, Mago and Toro (2013) applied the structuralist theory which prescribes that countries adapt by changing their institutional structures as traditional structures are not capable to provide financial and non-financial services to SMMEs. This theory further asserts that government must intervene in ensuring that SMMEs have access to financial means (Mago & Toro, 2013). Similarly, Chimucheka and Mandipaka (2015) apply the finance gap theory framework which posits that SMMEs have a lack of knowledge regarding the sources of finance options available to them.

2.3.2 *Resource-based Theory*

The resource-based theory is discussed in detail by Barney (1996) and seeks to evaluate how resources and capabilities can impact the survival of a firm. Resources of a firm include technical know-how, efficient systems, and even

finances which can all assist a firm in gaining a competitive advantage. Similarly, Chimucheka and Mandipaka (2015) discuss a resource dependency theory, which is a theory based on how much a firm depends on other stakeholders to conduct its business. Under this theory, firms seek to be less reliant on other stakeholders and internalize all their processes as much as possible. Given the power of OEMs in the renewable energy industry, it will be very difficult for SMMEs to operate independently as there is still a reliance on OEMs.

2.3.3 *Domains of SMME Framework*

The theoretical frameworks discussed thus far only deal with specific issues challenging SMMEs. To have a wider and more exhaustive view of the challenges faced by SMMEs, the domains of the entrepreneurship ecosystem by Isenberg (2010) is proposed to investigate the issue further. Figure 3 shows this framework. The finance gap and resource-based theory which have already been discussed can be seen as being encompassed in the domains of entrepreneurship framework as finance and human capital are already elements forming part of this framework. The domains of entrepreneurship ecosystem model is therefore adapted to the domains of the SMMEs ecosystem which is made up of the following 5 pillars: policy, finance, support, human capital, and markets. Challenges facing SMMEs in the renewable energy industry will be looked at using the mentioned pillars.

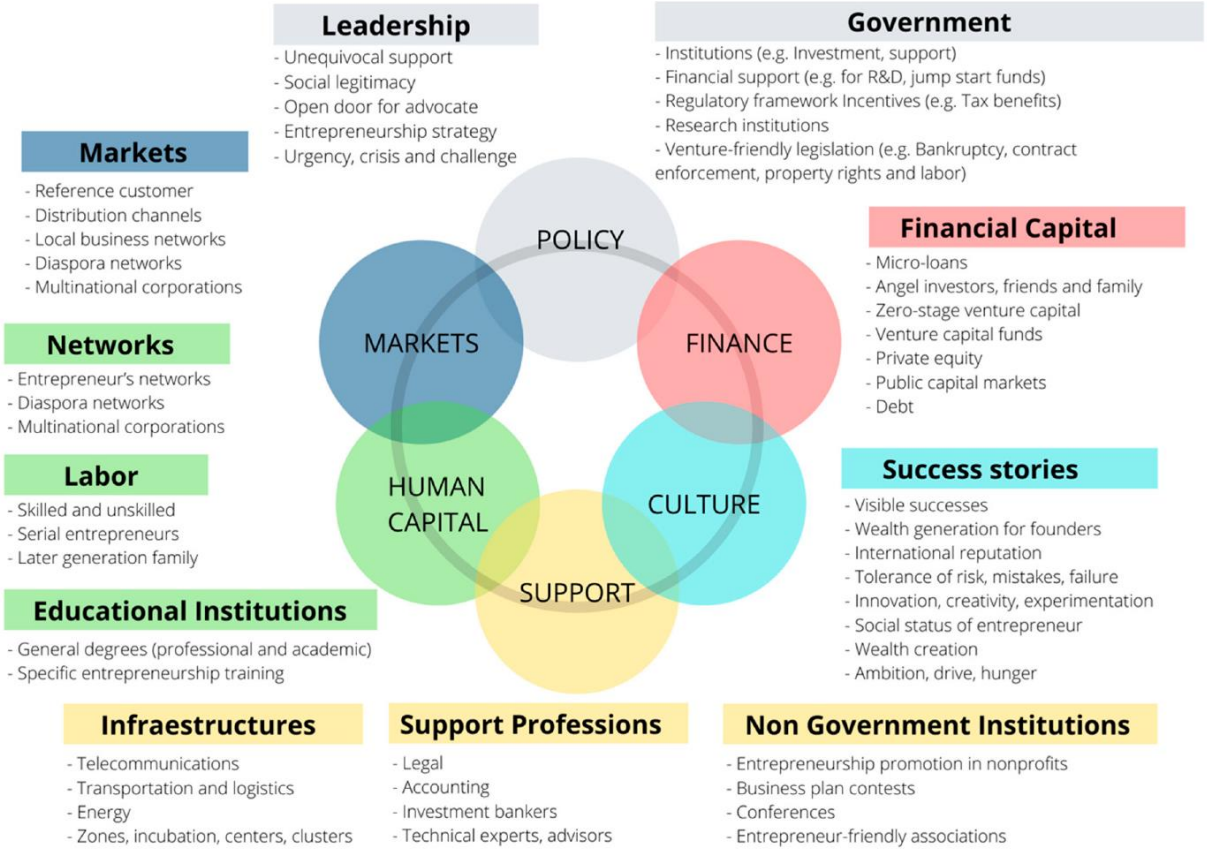


Figure 3: Domains of entrepreneurship ecosystem (Isenberg, 2010)

2.3.3.1 Policy

Policy refers to legislation from government and public bodies that create and regulate legislation to foster entrepreneurial activity (Morant-Martínez et al., 2019). There is a lot of criticism placed on the lack of support by the government for SMMEs in the renewable energy sector. Gabriel (2016) identified inadequate government policy support as part of the seven key constraints faced by renewable energy entrepreneurs in developing countries. This was part of a study to determine the constraints affecting renewable energy entrepreneurs in developing countries (Gabriel, 2016). In the local context of South Africa, this sentiment is shared by Mkhwebane (2018) who proposes that government has an opportunity to support SMMEs by establishing support programs that will assist SMMEs to partake in the renewable energy industry when projects are being built. These support programs can act as an incubation hub to offer technical support, financial support, and certification required in the industry (S. E. Mkhwebane, 2018). Similarly, Haldar (2021) identified that inconsistencies in the Ministry of New and Renewable Energy guidelines in the state of Gujarat in India, was one of the key challenges facing renewable energy entrepreneurs.

Policies such as the Green Economy Accord which South Africa subscribes to, have already unlocked the participation of SMMEs in renewable energy initiatives (S. E. Mkhwebane & Semelane, 2020). There is a need for further policies which must ensure that SMMEs fully benefit from the renewable energy program. Mkhwebane and Semelane (2020) highlighted that local content was not enforced resulting in some companies not willing to partner with SMMEs.

2.3.3.2 Finance

Gabriel (2016) identified that the lack of institutional finance for renewable energy entrepreneurs is threefold: (1) Financial institutions do not understand the renewable energy industry thus making it difficult for them to provide finance, (2) renewable energy entrepreneurs might not meet the local criteria required for financing and (3) risk averseness of financers and investors to renewable ventures in developing countries. In general, literature shows that access to institutional finance is challenging the success of SMMEs in South Africa (Booyens, 2011; Rogerson, 2008). Similarly, Mkhwebane and Semelane (2020)

highlighted that SMMEs in the renewable energy sector are faced with a lack of financial resources required for working capital which ultimately leads to lost opportunities.

2.3.3.3 Support

Support refers to all types of resources that can be provided to the SMMEs for their success. Xola and Mcmaster (2018) identified that some of the support interventions that can be provided to SMMEs in the renewable energy sector include: assistance with certification, technical training, and for incumbents such as the OEMs to partner with the SMMEs. Mkhwebane and Semelane (2020) identified that SMME development initiatives are generic and not focused on renewable energy businesses. The United Kingdom which is a leader in terms of installed capacity of offshore wind farms in the world (Danilova et al., 2008), has set up support systems for SMMEs servicing wind farms which include programs in the supply chain, innovation, finance, and skills (HM Government, 2013). In the local context of South Africa, support systems offered by municipalities for SMMEs servicing wind farms include general SMME information sessions, dedicated business support, and supplier days programs (Xola & Mcmaster, 2018).

2.3.3.4 Human Capital

Human capital refers to educational institutions, labour, and networks. Xola and Mcmaster (2018) identified the lack of experience as the top challenge facing SMMEs in the renewable energy program. This is supported by Gabriel (2016) who has identified that skills such as renewable energy technology installation, maintenance, and repair activities have the highest shortage. OEMs end up taking the bulk of this work. Mkhwebane and Semelane (2020) further highlight these issues and note that SMMEs in the renewable energy industry are generally not given opportunities due to the lack of technical and specialized skills. Furthermore, the lack of a track record is also cited as a key challenge as most OEMs prefer to work with experienced companies (S. E. Mkhwebane & Semelane, 2020).

2.3.3.5 Markets

Access to markets is key for any business to function and grow. Mkhwebane and Semelane (2020) identified that in the renewable energy industry, SMMEs are not alerted of available opportunities. Furthermore, opportunities are shared within closed intimate networks (S. E. Mkhwebane & Semelane, 2020) making it difficult for outsiders to participate.

2.4 Conclusion of Literature Review

The introductory section defined SMME and set the context in which it was going to be used in this study. Furthermore, a description of the REIPPPP was given, detailing the key processes of the lifecycle of a renewable energy wind project. The value chain of a renewable energy wind project was provided, detailing the key points where SMMEs stand to benefit. Challenges faced by SMMEs were looked into by using the Isenberg (2010) domains of the entrepreneurship ecosystem. The pillars of the domains of the entrepreneurship ecosystem are policy, finance, support, human capital, and markets which were used to unpack the SMME challenges in renewable energy from literature.

The preceding work thus provides a path the succeeding section will follow to provide a strategy and detailed research design that will be used to unpack this study further.

CHAPTER 3. RESEARCH METHODOLOGY

3.1 Introduction

This chapter outlines the research methodology employed to address the research question posed. Firstly, the research approach is provided detailing the research philosophy and the research design. Secondly, the data collection method is outlined followed by a description of the targeted population, which further includes a discussion on how the population was sampled and the limitations of the study in terms of the methods applied. Lastly, a discussion on the ethical considerations of this study is provided.

Figure 4 below provides an overall map of the research methodology landscape with the specific tools highlighted in red and discussed in detail in the following sections.

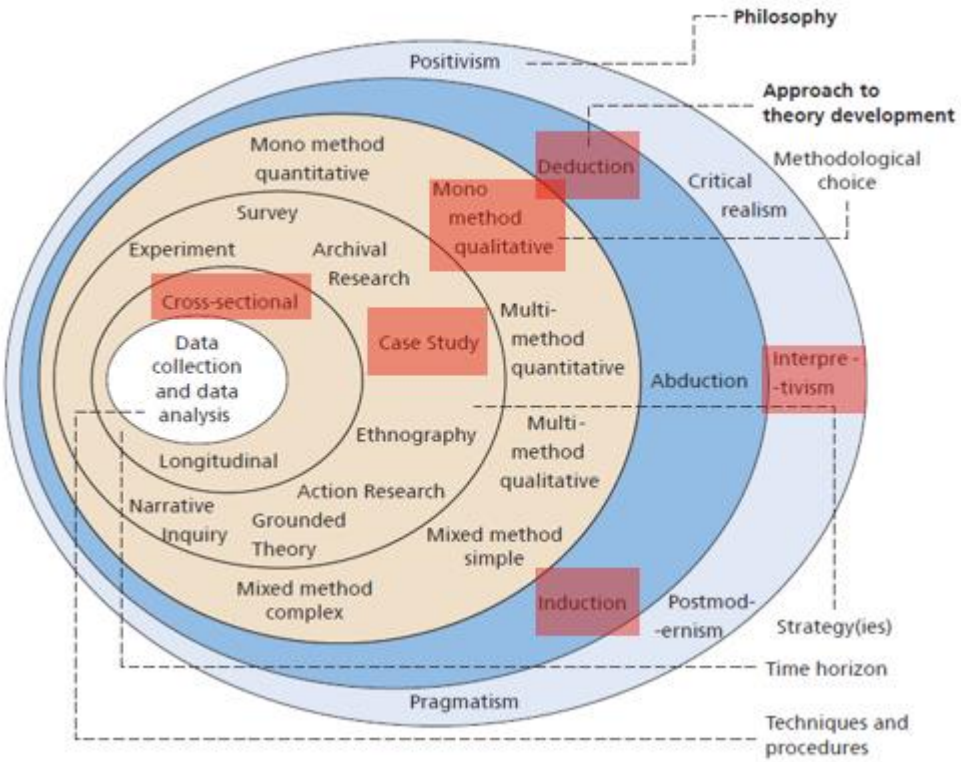


Figure 4: Summary of the adopted research methodology, highlighted in red (Saunders et al., 2012)

3.2 Research Paradigm

A research paradigm provides a framework that guides a research process (Rehman & Alharthi, 2016, p. 51). It is the underpinning basic belief system made up of the components: ontology, epistemology, methodology, and methods (Rehman & Alharthi, 2016, p. 51). Ontology refers to the nature of our belief of what we perceive as reality whilst epistemology refers to the nature of knowledge and how it is acquired and verified (Rehman & Alharthi, 2016, p. 51,52). Methodology refers to the strategy which defines how a particular research will be carried out whilst methods refer to the specific means of collecting and processing the data. The interpretivism paradigm was adopted as a philosophy through which this study was conducted.

3.2.1 *Interpretivism Philosophy*

The interpretivism philosophy is mostly used in qualitative type of studies and mainly emphasizes the social, cultural, and structural contexts that shape an individual's experiences (Clarke et al., 2015, p. 2). Furthermore, it allows for the development of knowledge through the interaction of the researcher and research participants (Kiger & Varpio, 2020, p. 2).

In the context of this study, the interpretivism philosophy was adopted and used in the following ways:

- One-on-One interviews: the researcher conducted one on one interviews and played an active role in the interpretation of collected data.
- Collaboration: the researcher actively collaborated with the participants throughout the interview as an active participant
- Interpretation process: the researcher asked questions, determined connections between the various parts of the data, and reflected on the implications of the data for the research question asked. The researcher used his own experiences and understanding to interpret the data.

3.2.2 *Approach to theory development*

The theory development process in a qualitative study begins before a study is conducted and proceeds throughout the data collection and analysis phase. It is the process of identifying themes in the collected data and creating a framework that explains the collected data. A multistage approach of deduction and induction was adopted. The first stage which formed the largest part of the analysis was to determine the codes and themes via deduction. This approach allows the researcher to use existing studies to formulate a framework through which data is analyzed. The second stage was to go through the data again and determine codes and themes via induction. The inductive methodology is the most common methodology for analysing qualitative data and it allows for findings and themes captured in raw data to evolve (Thomas, 2003).

3.2.3 *Research methodology and design*

The researcher employed a qualitative method as the research methodology. Smith and Brown (2010) describe a qualitative research methodology as means to look deeply into a problem. For this reason, this methodology was chosen to look deeper into the challenges SMMEs face in wind farms during the operational phase. The researcher employed semi-structured interviews as the primary means of collecting data. This allowed the researcher to ask probing questions to capture the independent thoughts of the respondents (Newcomer et al., 2015). The time horizon for the data collection was cross-sectional meaning that the information gathered only represents what is going on at only one point in time (Olsen & St George, 2004).

3.3 Population and sample

3.3.1 *Targeted population*

The research targeted SMMEs servicing operational wind farms in the Eastern Cape province of South Africa. This province was targeted as it currently has the most operational wind farms in the country (Daniels, 2020) and it is an attractive location for the development of new wind farms given its high wind resource. The

targeted SMMEs are those providing any of the services listed in Figure 2 to wind farms in the Eastern Cape province. Additionally, the SMMEs were either in the start-up, growth or established stage of their lifecycle. These stages were selected because renewable energy is an emerging technology in South Africa and most SMMEs servicing wind farms are likely to be in any of these stages.

3.3.2 *Sample and sampling method*

Sampling is generally performed in two methods which are probability and non-probability sampling (Maruster, 2013). In probability sampling, samples are chosen at random and have known probability whilst in non-probability sampling samples are selected to deliberately reflect particular features (Maruster, 2013). Non-probability sampling is generally the accepted method of sampling in qualitative studies (Maruster, 2013). Typical non-probability sampling methods include snowball sampling, quota sampling, and purposeful sampling (Mack, 2005).

The snowball sampling method allows for the identification of potential respondents through contact that has already been established with respondents that have already been interviewed. Finding potential respondents became difficult, as such the snowball sampling method became advantageous as it exploited networks that participants already had to find potential respondents for this study.

3.4 The research instrument

The research employed semi-structured interviews to collect data. This method allows the researcher to ask open-ended questions, probe the responses further and gain more insight from the respondents. To ease the logistical challenges of setting up in-person interviews and due to the busy schedule of some of the respondents, the interviews were conducted online.

The domains of the entrepreneurship ecosystem framework and the literature review provided a framework through which the interview questions were compiled. The framework has five pillars which are policy, finance, support,

human capital, and markets through which challenges facing SMMEs in wind farms were investigated. The interview schedule is given in Appendix A.

3.5 Data analysis

Thematic analysis is the most common technique for analysing qualitative data (Clarke et al., 2015; Gavin, 2008). This research employed thematic qualitative data analysis. The study applied thematic analysis by following the steps described in Figure 5 below.

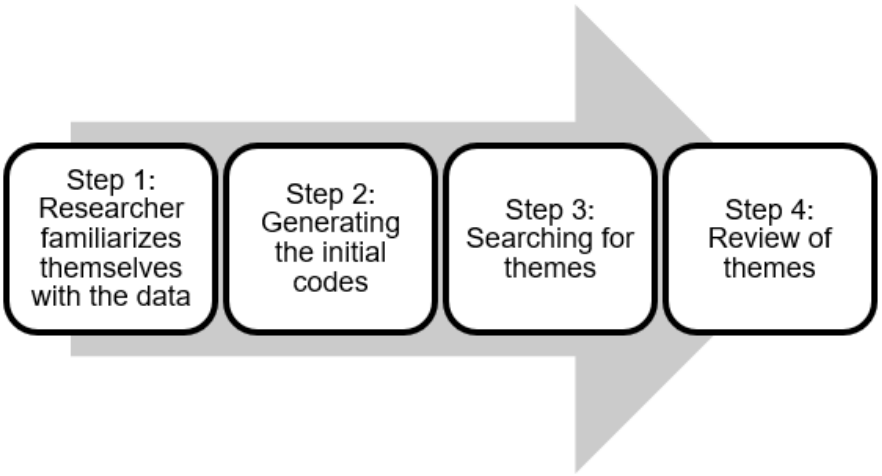


Figure 5: Data analysis steps (author's own)

Step 1: The researcher familiarising themselves with the collected data

This process involved transcribing the interviews and reading through the transcripts for the researcher to familiarise themselves with the data. The transcription was done using the Otter.ai software combined with the researcher replaying the interview and going through the transcripts to ensure that the transcription of the interview data was performed properly. This was an iterative process that allowed the researcher to familiarise themselves with the data.

Step 2: Generating initial codes

According to Clarke et al (2015, p. 5), coding is a process that helps organize data in its simplest form so that it can be assessed in a meaningful way. This step involved going through each of the interview transcripts and applying a code to

any idea that captures any form of information that seeks to answer the research question. The initial set of codes was predetermined from literature and refined iteratively by adding new codes emerging from the interview transcripts. This iterative approach resulted in a set of final codes applied to the research data.

Step 3: Searching for themes

This step involved analysing the codes and categorizing them into specific themes. Determination of the themes was done by a combination of a method of deduction from previous literature. This looked at applying the pillars of the domains of entrepreneurship framework as themes. In addition to this, the researcher identified emerging themes in the interview data and categorized them accordingly.

Step 4: Reviewing themes

This step involved sorting data in the themes to ensure that it coherently captures the theme thereby ensuring that each theme is distinct and captures a specific idea.

3.6 Limitations of the study

This study had the following limitations which the researcher tried to minimize as much as possible:

- Sample size: this research has a small sample size of 9 respondents and the researcher was cognisant of not making broad generalizations while analyzing the data because of this the researcher is aware that this study might not be suitable to be generalized across the whole renewable wind farm energy industry
- Researcher's bias: qualitative studies generally allow for the researcher to actively participate during the interview process. This usually results in inherent researcher biases when analysing the data. The researcher was fully aware of this and exercised caution during data analysis to ensure that biases are kept minimal

- Time constraints: the researcher was constrained with time, and this resulted in the smaller sample size

3.7 Ethical considerations

For each interview conducted, the respondents were provided an information sheet providing a brief introduction to the study to be conducted. The respondents were required to sign a consent form indicating that they are willing to participate in this study and that the study may be recorded. To ensure that the study was conducted ethically the following steps were undertaken:

- Ethical clearance: an ethical clearance certificate was obtained from the school granting the researcher permission to proceed with conducting this study. The clearance certificate is provided in Appendix B.
- Debriefing: participants were informed of the purpose of this study via the participant's information sheet that was sent out before the interview was conducted. This gave participants a background of the study and allowed them to decide if they would like to proceed with the study or not.
- Informed consent: following the debrief an informed consent form was shared with the participants for the participants to accept the terms of the study, that is, it will be recorded.

CHAPTER 4. RESULTS

4.1 Introduction

The purpose of this study is to determine the challenges facing SMMEs servicing renewable wind energy projects in their operation phase in the Eastern Cape province of South Africa. Additionally, the study seeks to determine to what extent these challenges have shaped the views of SMMEs toward the renewable energy program in the country.

The study employed a qualitative approach where data was collected from participants via interviews. Thematic analysis was used to capture the ideas of what the participants perceived as challenges. Themes were predetermined through a method of deduction, whereby the domains of the entrepreneurship framework were used to capture the themes. Furthermore, through the analysis of the data, the researcher captured emerging themes. The following sections will detail the research findings.

4.2 Respondents' Scope of Service

Table 5 provides a general overview of the services provided by the various SMMEs that formed part of this study. Only two participants come from the same SMMEs, the remainder of the participants come from different SMMES. Therefore a total of 9 participants coming from 8 SMMEs were interviewed. The most common services provided by the various SMMEs are operations and maintenance of the electrical balance of plant and operations and maintenance of the wind turbines.

Table 5: Services provided by SMMEs to wind farms

Respondent	SMME	Scope
A	SMME 1	Service and maintenance of wind turbines, Civil works (buildings, installation of cattle grids, bund walls)
B	SMME 2	Operations and Maintenance of Electrical Balance of Plant Commissioning of Electrical Balance of Plant
C	SMME 2	Operations and Maintenance of Electrical Balance of Plant (plant monitoring day and night)
D	SMME 3	asset management the monitoring of the wind farm, installation and commission under construction, operations and maintenance
E	SMME 4	Operations and Maintenance of Electrical Balance of Plant
F	SMME 5	Met mast maintenance Working at heights specialist
G	SMME 6	Wind turbines maintenance subcontractor to OEMs (troubleshooting, retrofits, and main components exchange
H	SMME 7	Wind turbines maintenance
I	SMME 8	Wind turbines maintenance

Source: (Authors own)

4.3 Discussion of themes

A discussion of predetermined themes and themes that emerged during the analysis of the interview data is provided in this section.

4.3.1 *Predetermined Themes*

The domains of entrepreneurship framework served as a guide for analysing the themes present in the interview data. The findings of the analysis are presented below:

4.3.1.1 Support

The lack of support structures, both from the government and wind farms, was a prominent theme among participants. The renewable energy program is new in South Africa, and it would make sense that support structures be offered to SMMEs to help them become self-sufficient. Table 6 highlights the challenges that arise due to the lack of support.

Table 6: Challenges due to lack of support, where x – is the total number of mentions of the theme, Frequency – is the number of times a code is mentioned and y – is the number of participants mentioning the code.

Theme (x)	User Definition	Annotation	Codes	Frequency (y)
Support (53)	support structures to alleviate the stress on SMMEs offerred by either government or wind farms	most particapnts stressed lack of support from both governmet and wind farms. Support structures that exist are only for a selected few	lack of government support	16 (8)
			lack of support from the wind farms	9 (7)
			process to obtain jobs	4 (2)
			support from government	3 (3)
			unclear process of obtaining support from government	3 (2)
			lack of support for local SMMEs	3 (2)
			process for government support	3 (2)
			support from the wind farms is not standardized	2 (2)
			unclear process of obtaining support from wind farms	2 (2)
			support from wind farms	2 (1)
			process to support from windfarms	2 (1)
			database for opportunities	1 (1)
			lack of support structures from windfarms	1 (1)
			supplier development	1 (1)
			support offered via community liason officer	1 (1)

Source: (Author's own)

Some of the views of the participants regarding the lack of support from the government:

Respondent A: "There is no support at all offered by the government because the government doesn't step in, in, in anything."

Respondent F: "We've had nothing, we've heard nothing from the government to date"

Respondent H: "Currently, I don't think there is enough support from the government. However, I give the government the benefit of the doubt. I'm not sure if the government is aware of this sector"

Respondents A and F lament outright that there is no support at all from the government. Respondent H commented that he is not sure that the government is aware of this sector. Furthermore, there is a view from Respondent E that government only pays attention during the construction phase of the wind farms and as soon as that is completed, there is just no focus on the operations phase, the respondent shared this view:

Respondent E: "Why is the government not paying attention to these projects after they've been concluded? Or the construction has been, it's been concluded, why are they now taking a backseat and letting the OEMs and the owners of these plants be the ones that dictate what happens on the plant"

SMMEs in the renewable industry were not spared of the dire impacts the COVID pandemic had on business. Respondent B alluded to the following detailing the lack of support from the government during COVID:

Respondent B: "During COVID. We were busy with commissioning work on the renewables as well, then everything had to stop because of COVID, right, but a lot of companies applied for that COVID Relief Fund, and they got it. We applied; but we didn't get anything. So, I can't say they are supporting us"

Respondent B: "There was never a 20 cent from the government helping us to develop something."

Respondent C lamented on the government not following up on promises that once the wind farms are constructed, and are in the operational state, they will benefit immensely:

Respondent C: "During the bidding stage of these projects, the government would say that, you know, during operations, you need to hire so many South Africans and stuff like that. But in terms of employment, there is nothing in terms of the

supply chain that is being monitored and measured, from the government point of view and that's what that's why I'm saying that there's no real support from government in that space."

On the lack of support from the wind farms, respondents A and D provided the following views indicating there is just no support at all:

Respondent A: "Let's say you are doing road maintenance; they want someone who's going to do the job. So, that's where the wind farms are failing, because wind farms are expecting a small company to come out there, bring the equipment, then pay those people at the end of the month. Now, that means it's only well-developed companies who can actually take advantage of such spaces because they have the equipment to do the work."

Respondent D: "There is no support at all when it comes to assisting the SMMEs. We went through almost all the IPPs, but we came with zero."

One respondent indicated that there is a level of support offered by the wind farms although minimal. Respondent provided this view:

Respondent E: "priority of the owners is not to help the South African small business to grow further, but for them to be able to repay the lenders, and for them to be profitable so the support that we get from the OEMs, or the owners is not that much."

Overall, the common frustration shared by most participants is the lack of support from both government institutions and wind farms.

4.3.1.2 Impact of Access to Markets

Every market is plagued with challenges of how opportunities can fairly be made available and distributed to prospective businesses. This theme relates to how easy it is for SMMEs to access opportunities in wind farms. Furthermore, if these opportunities are accessible to prospective SMMEs fairly. Table 7 provides a summary of coded extracts making up this theme.

Table 7: Challenges due to access to Markets

Theme (x)	User Definition	Annotation	Codes	Frequency (y)
Market (40)	how easy it is for SMMEs to access job opportunities in wind farms	participants commented on work opportunities depending on "who you know" and this emerges a lot as they mention they have to network	advertisement of the available opportunities is not standardized	24 (8)
			networking	11 (7)
			procurement method	2 (1)
			unfair procurement of services	1 (1)
			work opportunities depend on who you know	1 (1)
			non core value chain jobs given to local SMMEs	1 (1)

Source: (Author's own)

There is a strong indication from the participants that job opportunities from the wind farms depend on "who you know" hence there was a lot of mention of networking. Moreover, the advertisement of opportunities follows no process and is unstandardised. Participants shared these views:

Respondent A: "The work opportunities, I have to go out there myself and present myself to the client"

Respondent B: "So basically, I can't say it's like an open market. It's not really an open market. It's not well communicated."

Respondent C: "Present yourself, and then find if there are some challenges that the wind farm might be facing, and then you look into if you can also help on these solutions to solve the problems."

Respondent D: "Seemingly everyone is using their contacts to get their jobs"

Respondent E: "The wind space is a private space. It's not like, you know, the municipality stuff or government stuff that gets advertised in the newspapers, where you can see all these tenders that are out or work that is coming up in the next month. So, this one is private, it's mainly by invitation only. So, if you don't get invited, or if you're not out there in the market, people don't know you"

Respondent E: "Mainly, it's all about networking, you need to network, you need to be in touch with your customers, mainly to be in touch with your potential customers. So, by being in touch, I mean that you need to constantly be calling the relevant people to find out what is happening, what is coming up in the market if any opportunities are coming up in the next year or the next month.

Respondent G: "Most of it is word of mouth, I think, because we've been in the industry for a long time. We know these guys, it's the same guys that we started with in the beginning in the first rounds, we were working together, and they know us. So we then get emails from them saying there are such and such services needed by the wind farm and whatever if you are interested yeah. So, a large chunk of it is who you know, word of mouth."

Respondent H: "I don't think they are well communicated by the OEMs. However, what we do from our side we then go deeper to approach those companies."

All these responses capture a common message, that opportunities in wind farms largely depend on who you know and that there are no standardised methods of applying for jobs.

4.3.1.3 Finance

Access to financial systems is very important for the daily running of any business, especially small businesses. This theme captures how easy it is for SMMEs in the wind industry to gain access to financial support either through banks, government, or non-government entities and the impact payment terms have on their operation. According to the respondents, access to financial assistance through banks is nearly impossible and cash flow impacts them severely. The financial burden they face is mostly due to unfavourable payment terms. Table 8 provides a summary of codes that make up the financial challenges themes.

Table 8: Challenges due to Finance

Theme (x)	User Definition	Annotation	Codes	Frequency (y)
Finance (36)	financial tools, funding, loans	whats common is payment terms being a problem resulting in SMMes lacking cashflow and not being able to service their obligations	payment terms	11 (7)
			inadequate access to institutional finance	9 (6)
			lack of funding structures	8 (6)
			cashflow challenges	4 (3)
			invoices take longer to be paid	1 (1)
			stringent requirements to obtain funding	1 (1)
			negotiate payment terms	1 (1)
			lack of financial resources for upfront compliance	1 (1)

Source: (Author's own)

On the challenges related to payment terms, respondents provided the following views:

Respondent A: "Because what is currently happening now is that wind farms don't pay upfront, you will only get compensated once the job is done, they have to be happy with the work that you did, and you also have to provide proof that the work is complete."

Respondent B: "Sometimes you get paid after six months? So obviously, your cash flow just goes to negative"

Respondent C: "Some payment delays, they sometimes lead to, like, delay some of the services, because you are running out of cash"

Respondent F: "Also the payment terms is like 60 days, sometimes even longer, you know, and that makes it challenging and that's why we've had to look at other ways to survive"

Respondent B alluded to the struggle of getting paid once services are rendered to the wind farms. The respondent gave this view:

Respondent B: "But the challenge that we are facing with our clients, sometimes we have to fight to get paid even after the service is being provided."

On cashflow challenges, respondents provided the following views:

Respondent E: "You have to pay for the vehicles, you have to buy material that you use of the sites and stuff like that. So if you didn't have or if you don't have the cash to do that, then you will be doomed and they will eventually cut your contract, forgetting that they are the ones that didn't pay you on time."

Respondent G: "Some invoices take a long time to be paid. So, we need money, cash flow for daily runnings"

Respondent H: "It affects us big time and in a negative way because sometimes you find out that we process the salaries later, not in time. It affects us in terms of paying other suppliers that we're working with and running the operations. Sometimes we end up getting penalties from SARS."

Alluding to difficulty in getting loans and any form of financial assistance from the banks, the respondents provided these views:

Respondent B: "We tried before to get a loan from the bank we have been banking with, but we never won so I don't know."

Respondent G: "Bank you need, you need to have money, you need to have a track record, track record of money in and out of your account for you to be even sitting down with a bank or financial manager or whatever. So, things are always an issue because I've seen with us, I mean, we've had money coming in and out of our account for almost three years now. But when we sat down with them, looking for an overdraft because some invoices take long to be paid, they don't care, so you won't get support at all. Unless you have money"

Respondent H: "I've started my company from scratch from nothing, nothing. So, tried to get funding, but I was not successful. So, I've decided, okay, let me just build this thing from scratch, I built it, I built it from scratch"

The respondents shared the same frustration of banks not providing any form of funding, payment terms being problematic to a point where sometimes they had to fight to get their payment. Cashflow challenges meant SMMEs are not able to pay their suppliers and workers on time.

4.3.1.4 Policy

Policies are very important as they ensure that there is a level of fairness that can be imposed in a market. This theme looks at the challenges that SMMEs face due to the lack of policy. A summary of these challenges is captured in Table 9.

Table 9: Challenges relating to Policy

Theme (x)	User Definition	Annotation	Codes	Frequency (y)
Policy (18)	regulations which will level the playing field, making access for SMMEs to renewable project services easier	common resounding message of the lack of regulations	lack of regulations	10 (4)
			local content is not enforced	5 (1)
			prices are not regulated	3 (1)

Source: (Author's own)

The respondents shared the following views on their frustration with the lack of regulation in the wind farm and the renewable energy industry in general:

Respondent A: "But I think the government lost it when they did not regulate this industry, because this industry should have been regulated by the government because it is companies that are coming outside to come and invest and develop in South Africa"

Respondent E: "So if we want to ever get somewhere where we are going to operate these wind farms ourselves as South Africans, without German support, we need to put robust policies and measures in place to say that, after two years of operations, by the OEMs, we do not want to have these wind farms operated by OEMs anymore. We want South African companies to operate fully the wind turbines. And that's when you will start to see skills transfer. That's when you start to see growth in the South African market in terms of operations and maintenance of these facilities"

Respondent G: "There needs to be more attention from the government in making sure that regulations are strict. Like I've been through the regulations, they're strict, but they're not followed up, on paper they are good. But I think there needs to be more follow-ups on what is happening."

Respondent I: "So from the government's perspective, I feel that they could do better or do more in terms of enforcing the rules and obligations and the legislation that they have set out for these companies to do business in South Africa."

4.2.1.5 Human Capital

This theme refers to the skill that is necessary for SMMEs to have so that they can be competitive and be potential service providers for core services in the wind farms such as service and maintenance of the wind turbines. The core services are usually reserved for OEMs. Table 10 provides a summary of challenges relating to human capital

Table 10: Challenges relating to Human Capital

Theme (x)	User Definition	Annotation	Codes	Frequency (y)
Human Capital (6)	skills, training opportunites which will allow SMMes to be able to compete with big players	SMMEs lack skills and the knowledge important to maintain wind turbines	lack of skill to operate the wind turbines	2 (1)
			lack of knowledge in the maintenance of wind turbines	1 (1)
			lack of training opportunities	1 (1)
			lack of skill	1 (1)
			lack of skill not an issue	1 (1)

Source: (Author's own)

The respondents provided the following views regarding challenges related to human capital:

Respondent D: "What is not being done is to have some sort of training, especially for the SMME"

Respondent E: "The skills transfer will be minimum for many years to come."

Respondent E: "We need to start doing skills transfer to operate these wind turbines in the future."

Respondent H: "There are not too many people who have the knowledge or know-how to maintain the wind turbines."

4.3.2 *Emerging Themes*

4.3.2.1 Unfair Competition

Unfair competition came out as one of the emergent themes. SMMEs in the wind sector find themselves facing well-established, well-financed, and well-resourced companies. Table 11 provides a summary of codes making up this theme.

Table 11: Unfair Competition

Theme (x)	User Definition	Annotation	Codes	Frequency (y)
Unfair Competition (6)	any behaviour of conducting business by wind farms which can result in SMMEs being treated unfairly	SMMEs face bigger role players, and business practices resulting in competition being unfair	unfair competition	3 (3)
			competing against bigger players	2 (2)
			OEM preffered service provider for turbine maintenance	1 (1)

Source: (Author's own)

Respondents shared the following views regarding the challenges they face:

Respondent E: "OEM is the preferred service provider if you look at it, for that, for that scope of the operations of the turbine, and the maintenance of the turbine the OEM is the preferred service provider for turbine maintenance"

Respondent A: "So companies that have been there for longer than me, they are in a good space of securing more contracts than I will so the competition, just not fair in that sense"

Respondent F: "We're competing against bigger players."

4.3.2.3 Non-Compliance

Another theme that emerged is non-compliance. This theme refers to conducting business in a way that does not follow accepted norms and standards. The cause of this is usually a lack of regulations and policies which would typically ensure that there are repercussions to any deviations. Table 12 provides a summary of the challenges due to non-compliance.

Table 12: Non-Compliance

Theme (x)	User Definition	Annotation	Codes	Frequency (y)
Non Compliance (8)	compliance methods which the wind farms should abide by and through which they should be regulated	wind farms seem to not care about compliance, most likely stemming from them not being regulated	non compliance	4 (2)
			usage of unaccredited service providers	2 (1)
			wind farms would rather not comply and pay fines	1 (1)
			government support programs are there but not enforced	1 (1)

Source: (Author's own)

The respondents shared the following views:

Respondent I: "But if there was to be someone that would be allocated by the government to say they go door to door in these wind farms, make sure that whatever they report that they are doing is being done as per what is being reported."

Respondent E: "Number of non-compliances in most of these plants, you'll be amazed, you'll be amazed on how many you'll get, but there are no serious consequences that these guys are getting. So typical consequence to non-compliance would be fine."

Respondent E: "So, the consequence of non-compliance is very small and most of these companies have opted to just pay the fine. Wind farms would rather not comply and pay fines."

Non-compliance is not only by the wind farms but there is also an element of SMMEs non-compliance. Respondent D elaborates further on this:

Respondent D: "People they are expecting you to give them jobs, while they're not even complying. So, they don't have a broader way of understanding how the operations need to be done."

The ramifications of non-compliant SMMEs are felt, respondent F expands on this by noting that it's impossible to compete with non-compliant SMMEs as they will always price their services lower:

Respondent F: "You can't compete against those guys because they're not compliant if, you're not compliant you offer cheap operations"

4.3.3 *Views on the REIPPPP*

Given the challenges SMMEs face during the operational phase of wind farms, this section seeks to answer the second part of the research question:

To what extent have these challenges shaped the perceived view that REIPPPP is benefitting SMMEs?

Table 13 provides a summary of how the respondents view the renewable energy program in South Africa.

Table 13: Summary of the views on REIPPPP

Views on renewable energy program	Respondent								
	A (n)	B (n)	C (n)	D (n)	E (n)	F (n)	G (n)	H (n)	I (n)
negative	1		1	1	2	1	1	1	1
positive		1		1					
Number of Mentions Total(n)	**1**	**1**	**1**	**2**	**2**	**1**	**1**	**1**	**1**

Source: (Author's own)

In general, there were more negative views on REIPPPP than positive views. Some of the positive views on REIPPPP shared by the respondents are:

Respondent B: "If it wasn't because of this renewable energy program, some of these SMMEs, we're not going to exist even maybe, maybe we even would have closed on long term ago"

Respondent D: "I'll be honest with you when it comes to job creation it does. It does a lot in terms of making sure that people are working"

Some of the negative views towards REIPPPP shared by the respondents are:

Respondent A: "To be quite honest, it started very well. But I can see now that we are losing it. First of all, the wind farms are built. Most of them are built in poor areas and by that I mean the wind farm should be able to develop a lot of companies within that local area."

Respondent D: "To be honest out of 10 I'll give you I'll give you 4"

Respondent E: "So you, if you look at it in that regard, in terms of is it beneficial? Some people will say it's beneficial, but I would say that it's only beneficial for a selected few."

Respondent E: "Beneficial to South Africans, I'll say maybe 20%"

Respondent F: "Well, look, I think it's been here for a while, but I think it's there's a lot more work that could be offered to communities and companies like us, but it's like stagnant. I think it's like it's like a dead ghost. You know, we've got Wind Farms and stuff, but what is happening there?"

Respondent G: " But I think there need to be more follow-ups on what is happening. You promised this and this as an IPP when you came in, you said this, and this and this is, I mean, this has to be someone on the ground, making sure this is happening"s

CHAPTER 5. DISCUSSION

5.1 Introduction

This section synthesizes the findings in Chapter 4 and provides a discussion of the main findings thereof. This will be done in three parts. The first part will provide a discussion of the findings as per the Isenberg entrepreneurship framework and the second part will provide a discussion of the themes that emerged. Finally, a discussion relating to the second part of the research question will be provided.

5.2 Discussion of Challenges from the Isenberg entrepreneurship model perspective

5.2.1 *Support*

Support in the context of this study refers to any form of support from the government, wind farms, or external bodies to alleviate the challenges SMMEs face. This can be in the form of training opportunities, ensuring easier access to financial structures, enforcing policies, and putting any other systems to ensure that SMMEs can compete fairly. Respondents of this study expressed vehemently the lack of support from the government and the wind farms.

Most respondents were not aware of any support programs that are offered in the renewable energy sector by either government, wind farms, or any external bodies. Figure 5 shows some of the support programs in the renewable industry as noted by Mhkwebane and Semelane (2020, pp. 17–18).

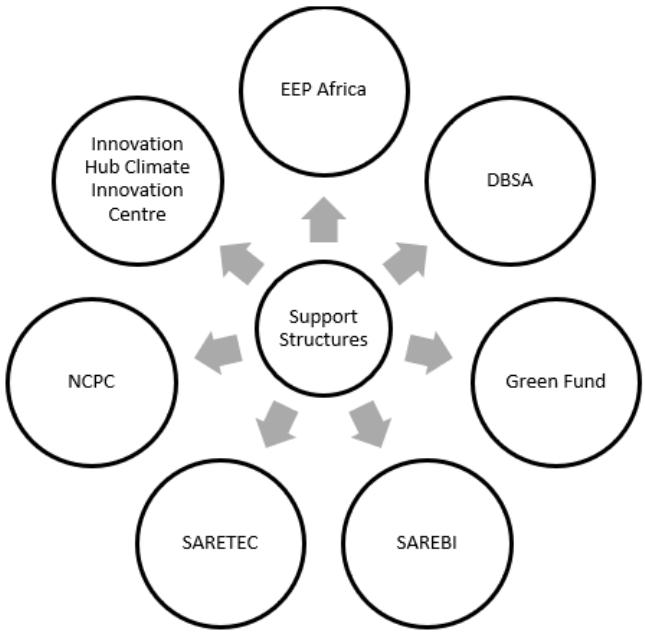


Figure 6: Support structures in the renewable energy sector (S. E. Mkhwebane & Semelane, 2020)

The respondents who mentioned being aware of support structures were not aware of processes to follow to obtain this support. The support structures that were alluded to were that of wind farms selecting a prospective SMME to support through funding towards training opportunities. Since the wind farm selects who to support, this funding is only available to a selected few SMMEs.

Xola and Mcmaster(2018) highlight further support structures for SMMEs in the renewable energy space targeted specifically for the Eastern Cape province managed by municipalities in which wind farms are built. Some of these structures include dedicated supplier development, information sessions, and supplier days. Figure 6 depicts some of these support structures.

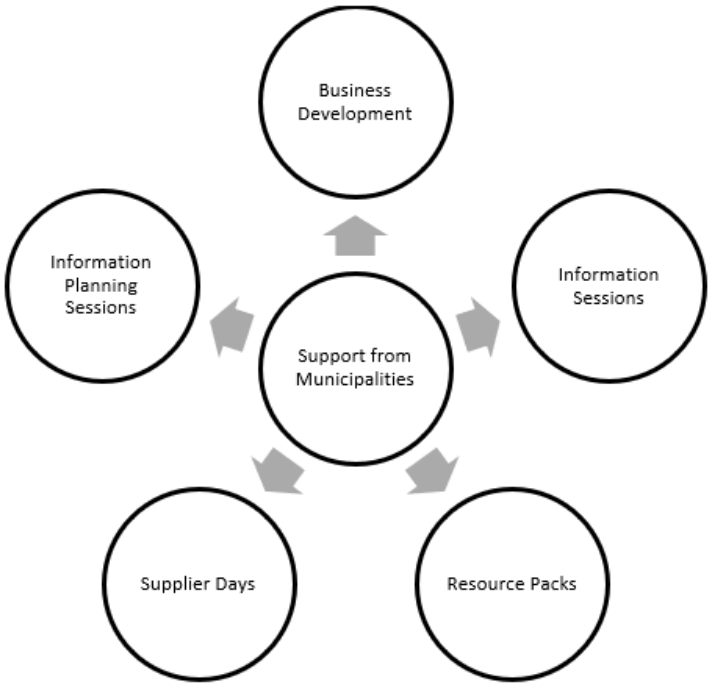


Figure 7: SMME support structures from municipalities in the Eastern Cape (Xola & Mcmaster, 2018)

The respondents still appeared unaware of these support structures. This may indicate a lack of access to information or inadequacies in the structures' ability to fulfill their supportive roles.

5.2.2 *Markets*

Challenges associated with markets were mostly on how job opportunities are made available to SMMEs in the wind farms. Most respondents expressed concerns about there not being standard processes to follow to obtain jobs. The respondents expressed that obtaining jobs depended mostly on "*who you know"* and the relationships you build within the wind farms. Networks not only include wind farms but individuals, organizations, and other companies that are in the industry. Networking can help SMMEs to improve their visibility in the market so that they easily secure jobs.

5.2.3 *Finance*

Respondents expressed financial challenges that they are faced with which make their business difficult. Banks do not offer them loans as they are viewed as high-risk. This finding is in line with Parker (2022) who duly notes that SMMEs in the renewable energy sector are faced with limited financial services and a lack of risk appetite from funders.

One respondent mentioned the rigorous process he had to go through with the bank to get an overdraft facility which was ultimately declined. The root cause for additional funds is the payment terms which do not seem favorable. Payment terms are usually 30 to 60 days and in some extreme cases respondents just do not receive payment at all until they apply pressure. This ultimately affects the SMME's cash flow making it difficult for them to perform their services, service their debts, and even pay their workers. Equipment also has a high capital cost resulting in SMMEs finding themselves in unfavorable situations of having to compete with bigger companies that are well resourced.

5.2.4 *Policy*

Policies and regulations play an important role in ensuring accountability and fairness in the renewable energy sector, particularly for SMEs. According to the respondents, wind farms currently operate without regulation, and are not held accountable for meeting economic development targets such as providing jobs for the local community and using local SMMEs for required services. This lack of regulation and oversight is seen as the root cause of some of the challenges faced by SMMEs, such as difficulty in accessing financial support, lack of support from wind farms, and difficulty in accessing the wind farm job market. Parker (2022) highlights that it is through policymakers that inclusive financing can be made available for SMMEs in the renewable energy sector.

Some of the findings regarding policy that were noted by the respondents were the lack of regulations and local content not being enforced. Furthermore, there is an element of unethical business practices such as fronting and corruption. These findings are in line with that of Nkoana (2018, p. 39) who notes some of the objectives that REIPPPP is not fulfilling such as boosting local black

entrepreneurs and also the local manufacturing industry. Given this challenge, Nkoana recommends that government monitor closely if IPPs are sourcing services from emerging black entrepreneurs.

The lack of policy can be seen as the root cause of some of the challenges already faced by SMMEs. Figure 7 depicts the relationship the lack of policy has with other themes. If policies are put in place, the challenges faced by SMMEs that result in difficulty to access financial support, lack of support from the wind farms, and the difficulty to access the wind farm job market can be curbed.

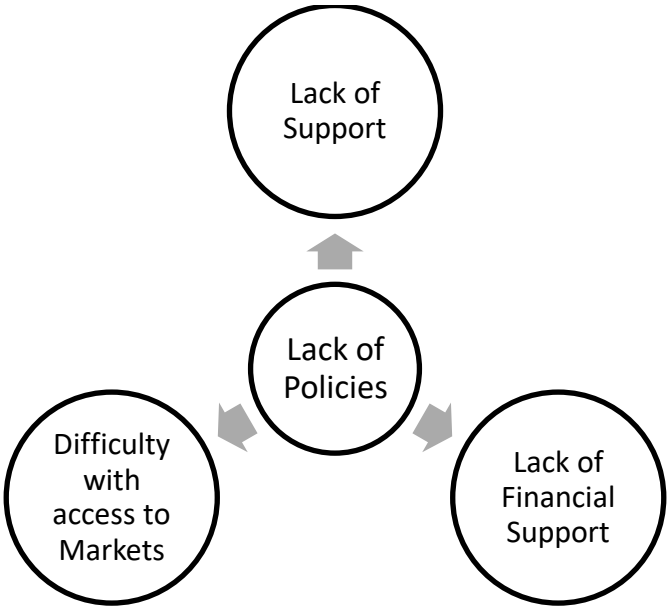


Figure 7: Relationship between lack of policies and other themes (author's own)

The government needs to put policies in place to ensure that wind farms are held accountable for meeting their promises and to provide the necessary support to SMMEs to thrive in the industry.

5.2.5 *Human Capital*

SMMEs in the renewable energy sector can increase their competitiveness by shifting from offering ad hoc services such as security or logistics to providing core services such as maintenance of wind turbines. However, this requires specialized training and support from OEMs as the maintenance of wind turbines is a highly specialized field. Some of the respondents offering maintenance

services for the wind turbines have reported a lack of skill in this area, preventing them from breaking into this market and becoming more competitive. SMMEs need to have access to the right training and support to develop the necessary skills and expertise to provide these core services, and for OEMs to be willing to work with SMMEs to build capacity in the industry.

5.3 Discussion of emerging themes

5.3.1 *Unfair Competition*

Unfair competition came out as one of the emergent themes. This theme was characterized by SMMEs having to face off against bigger companies that are well resourced and have the financial muscle to execute services at ease. There is also an element of the OEM always being the preferred service provider. The emergence of this theme can be seen as a consequence of the lack of policies that are needed in this industry to level the playing field.

Figure 8 shows the themes that result in unfair competition. The lack of policy results in SMMEs being overlooked over the bigger players. In terms of market and access to jobs in wind farms, bigger companies and those who have networks are more advantaged. Also, the challenges related to access to finance mean SMMEs cannot compete will big and well-resourced companies. All these factors result in unfair competition in wind farms.

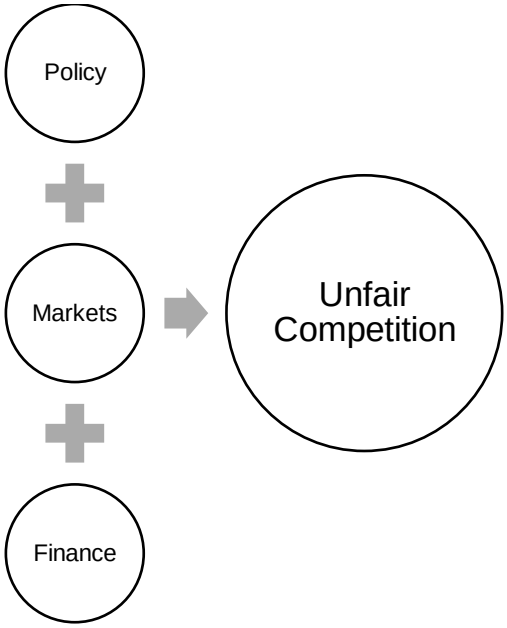


Figure 8: Relationship between Unfair Competition theme with other themes (author's own)

5.3.2 *Non-Compliance*

Another theme that emerged is non-compliance. There is an element of wind farms using services from unaccredited service providers. This came out as a concern as it meant that these service providers could provide cheaper services stemming from the fact that they do not spend a lot of money ensuring their compliance. There is also an element of economic development targets that each wind farm is meant to achieve. It came out that wind farms would rather pay fines imposed on them than comply with these economic development targets.

CHAPTER 6. CONCLUSION AND RECOMMENDATIONS

6.1 Introduction

This section will provide a conclusion, recommendations, a discussion around the limitations of this study, and suggestions for future research. The conclusion will encapsulate the main answers of this study given the research question: “What are the challenges facing SMMEs in the operational phase of renewable wind projects for the case of Eastern Cape province. Furthermore, the second research question: “How have these challenges shaped the views that SMMEs have on the renewable energy program” will be addressed.

6.2 Conclusion

The findings of this study identified the challenges facing SMMEs during the operational phase of wind farms as lack of support, lack of finance, human capital, lack of policy, and challenges related to access to markets. These challenges are as per Isenberg's entrepreneurial framework which describes the typical challenges that entrepreneurs face. Further challenges that emerged included unfair competition and non-compliance by both wind farms and SMMEs.

Challenges related to support pointed to the lack of support coming from the government and the wind farms. In cases where some of the respondents alluded to knowing of support structures coming from the government or wind farms, they were not aware of processes to obtain such support. Financial challenges such as access to financial resources either from banks or the government were also alluded to. Further financial challenges stemmed from the unfavourable payment terms SMMEs found themselves in, which would result in cashflow problems making it difficult for them to perform their services, pay their workers, and also service their debt.

Challenges related to markets detailed how SMMEs have difficulty in obtaining jobs from the wind farms and only those with good networks could easily obtain these jobs. Challenges related to human capital included the lack of knowledge and training which meant that SMMEs could not partake in highly specialized

services such as servicing wind turbines. OEMs remain the sole service providers for such services and SMMEs are mostly left with ad hoc services required by wind farms.

The lack of policies governing wind farms and the renewable energy ecosystem were also highlighted. Wind farms are seen as operating in silos and not being accountable to anyone although they are expected to report on economic development obligations as set out by the government.

Due to the aforementioned challenges, some of the themes that emerge are non-compliance and unfair competition. Challenges related to non-compliance refer to wind farms not complying with the economic development targets' obligations and not being held accountable as already highlighted. The unfair competition that SMMEs face in the wind farms relates to how bigger companies are well resourced, have the financial means, and can effectively exploit their networks to easily obtain jobs in the wind farms.

Given these challenges, participants held a negative view of the renewable energy program of South Africa and did not see it as being beneficial to SMMEs.

6.3 Recommendations

With the shift from fossil fuel-based production of electricity to sustainable methods such as wind and solar, it is clear that the renewable energy program of South Africa is still in its infancy. It is therefore imperative that the identified challenges facing SMMEs are well addressed given that there are yet more wind farms to be developed.

The government remains the focal point in addressing these challenges. Regulatory frameworks to govern how wind farms interact with SMMEs need to be developed. This will form the building blocks for addressing the remainder of the challenges that SMMEs face. Government can promulgate these regulations through municipalities in which these wind farms operate. A multi-stakeholder approach which will include SMMEs, financial institutions, government, non-governmental entities, and wind farms will be required.

It is through policy that local content must be enforced. OEMs must be forced to collaborate with SMMEs to perform services in wind farms. Not only will this give opportunities to SMMEs but will ensure that there is skill transfer which will help curb the human capital challenges. Given that there are several government and non-governmental support structures for SMMEs in renewable energy, these structures must be well advertised. Furthermore, processes of obtaining such support need to be transparent. Policies and regulations can further help change the tender system from a private to a public system.

Proper audits must be conducted to ensure that support structures offered by the government or wind farms benefit SMMEs.

Business intervention is another avenue that can help drive and assist the government with policy formulation. Business intervention can assist in the following ways:

- Advocacy and lobbying: Business organizations can advocate for policies that will ensure that wind farms favor SMMEs to provide services.
- Partnerships: Business organizations can partner with SMMEs to make it easier for them to access financing.
- Monitoring and evaluation: Business organizations can monitor and evaluate the impact of the policies set up by the government to promote the inclusion of SMMEs in the renewable energy sector. This can be a form of audit that can help inform improvements in the formulation of new policies

In addition to business intervention, the involvement of civil society organizations can also help keep the government accountable by advocating for the inclusion of SMMEs as service providers to wind farms, monitoring that this is happening, and reporting the findings.

6.4 Limitations

This study had a limitation of the low number of respondents who took part in this study. This study can therefore not be used to generalize on the challenges that

SMMEs face during the operations phase of wind farms for other regions of the country.

6.5 Suggestions for future research

The following are proposed for future research:

- Conduct a similar study in another region of the country to determine if similar challenges are experienced. This can be used to strengthen the findings of this study
- Further research into the deficiencies of the current support structures offered by different entities in the renewable energy sector. This is important as the respondents of this study seemed to not be aware of the existence of such support structures.

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Appendix A – Draft Interview Questions

1. What is the core service you are providing to wind farms?
    a. What do you think is the competitive landscape for the service you are providing?
2. How are you made aware of the work opportunities you can take part in?
    a. Do you think these opportunities are well communicated?
3. What barriers and challenges are you faced with when providing your core services?
4. Do you think there is enough support offered to SMMEs by the government for them to benefit from the renewable energy program?
    a. Are you aware of any support structures available for SMMEs in the wind sector?
    b. What is the process of obtaining this support?
5. Do you think there is enough support offered to SMMEs by wind farms for them to benefit from the renewable energy program?
    a. Are you aware of any support structures available for SMMEs in the wind sector offered by wind farms?
    b. What is the process of obtaining this support?
6. How does funding affect your ability to execute your services?
    a. Are you aware of any funding structures available for SMMEs in the renewable energy sector?
    b. What is the process of obtaining this funding?
    c. How does cashflow affect your operations?
7. What are your views about the Renewable Energy Program in South Africa?
    a. To date do you think it has been beneficial to SMMEs?

8. Is there anything else you would like to add?

Appendix B – Ethics Clearance Certificate

Graduate School of Business Administration
University of the Witwatersrand, Johannesburg

Wits Business School Ethics Committee
Constituted under the University Human Research Ethics Committee (Non-Medical)

Ethics Clearance Certificate

Ethics protocol number: WBS/BA0700696V/407
This certificate is only valid with a legitimate ethics protocol number and signed by the Researcher (below)

Project title	Challenges facing small, medium and micro enterprises servicing operational wind farms in the Eastern Cape, South Africa
Investigator / Researcher	Mr Taamane Maraba
Nature of Project	MBA (Research Article)
Decision of the Committee	Approved, provided stakeholders and participants are advised that anonymity and confidentiality cannot be guaranteed.
Issue Date of Certificate	04 10 2022
Expiry date	Date of submission of the project / research report
Chairperson	Prof Anthony Stacey ☎ +27 11 717 3587 +27 82 880 4531 anthony.stacey@wits.ac.za

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Declaration by Researcher

One copy must be signed by the Researcher and returned to the Chairperson of the Wits Business School Ethics Committee.

I fully understand the conditions under which I am authorized to carry out the abovementioned research and I guarantee to ensure compliance with these conditions. Should any departure to be contemplated from the research procedure as approved I undertake to resubmit the protocol to the Committee.

Signature

9 October 2022
Date:

Appendix C – Interview Transcripts

Research Data:

https://1drv.ms/u/s!AirVc3tKYvVgjqdtQ7G38EUkYT0yGA?e=s6Bqch