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ACCESS TO FINANCE BARRIERS AFFECTING WOMEN-OWNED SMMES IN THE RENEWABLE ENERGY SECTOR: A CASE OF SOUTH AFRICA

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Matseba Mahwai

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Supervisor: Prof. Abdul Latif Alhassan

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Abstract

The renewable energy industry has been acknowledged as one of the fastest-growing industries globally. Consequently, the industry presents various opportunities, not only for economic growth but for gender mainstreaming as well. This industry may serve as a means to address the shortcomings of the fossil fuel sectors and promote female representation. However, the industry is male-dominated, highlighting the importance of ensuring inclusive participation in the renewable energy sector to avoid replicating the structural inequalities and exclusionary practices historically observed in the fossil fuel industry. As such, it has become necessary for research to be undertaken to investigate financial barriers that are encountered by women-owned small, medium and micro enterprises (SMMEs) when venturing in the renewable energy industry. The study employed a qualitative approach, allowing participants to express and describe their lived experiences and opinions in terms of financial access barriers. The data was collected through online interviews from 12 women-owned SMMEs operating within the renewable energy sector across various provinces in South Africa.

The thematic analysis of the interview data identified the following financial barriers faced by these SMMEs in venturing into the renewable energy sector: bureaucratic hurdles; early-stage risk aversion; lack of industry-tailored capital, high expected returns; lack of experience; lack of collateral; poor personal credit history; and perceptual barriers. Although some of the challenges faced by women-led SMMEs in the renewable energy sector are similar to challenges faced by SMMEs in other sectors, the uniqueness of this sector presents additional distinct barriers. Notably, traditional business evaluation methods are often applied, without tailoring these methods to align with the distinct characteristics of the industry.

The findings from this study underscore the importance of reforms, particularly amongst the finance providers, to review their business evaluation method and ensure that they align with the distinctive nature of this critical industry. A review of women-targeted initiatives should be performed to ensure that the eligibility considers the financial barriers women face rather than reinforcing them. In addition, South Africa can learn from countries like India, who have implemented a centralised online portal that serves as a resource for accessing diverse financing schemes for renewable energy projects. A centralised online platform exclusively dedicated to facilitating access to finance for renewable energy projects can be created where entrepreneurs, particularly females, can access information on available support, webinars, and workshops.

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List of Abbreviations

APEC	Asia-Pacific Economic Cooperation
BEE	Black Economic Empowerment
CCSA	Competition Commission South Africa
DMRE	Department of Mineral Resources and Energy (South Africa)
DTI	Department of Trade and Industry (South Africa)
EU	European Union
EPC	Engineering, Procurement, and Construction Contractor
G2	Group 2 – China and United States
GDP	Gross Domestic Product
GWNET	Global Women's Network for the Energy Transition
IDC	Industrial Development Corporation (South Africa)
IFC	International Finance Corporation
IPP	Independent Power Producer
IPPP	Independent Power Producers Procurement Programme
IRENA	International Renewable Energy Agency
IRP	Integrated Resource Plan
NDP	The National Development Plan
OECD	Organisation for Economic Co-operation and Development
REIPPP	Renewable Energy Independent Power Producer Procurement Programme
SAWEF	South African Women in Energy Forum
SDG	Sustainable Development Goal
SMMEs	Small, Medium and Micro Enterprises
UCT	University of Cape Town
UN	United Nations
UNDP	United Nations Development Programme
USD	United States Dollar

Chapter 1: Introduction

1.1 Background of the Study

The renewable energy industry has emerged as a pivotal driver of economic growth, which is driven by the demand for sustainable energy solutions and endeavours to mitigate climate change. Small, medium and micro enterprises (SMMEs) play a crucial role in various sectors, fostering innovation, creating employment, and driving economic growth (Enaifoghe & Ramsuraj, 2023; Ngo Ndjama & Van Der Westhuizen, 2024; Zhu & Kuriyama, 2016).In fact, SMMEs contribute immensely to the national GDP: 57% in the EU as well as 46% and 39% in G2 and SA respectively (Rajagopaul et al., 2020).

However, despite global efforts to promote gender equality and women's economic empowerment, women-owned SMMEs continue to encounter significant challenges in accessing finance, which is crucial for their growth and long-term viability. In fact, in developing countries, 70% of women with small- and medium-sized businesses do not access financing, which hinders women's economic empowerment (Pueyo & Maestre, 2020). This lack of financial resources limits women's capacity to invest in education, training, and entrepreneurial ventures, which are essential for participation in the renewable energy sector (Antasya & Kersana, 2023). The discrimination in loan approvals affects female applicants mostly in male-dominated industries, which perpetuates entrepreneurial gender segregation within the industry (Brock & De Haas, 2022). The financing gap for women-led SMMEs is estimated at $1.7 trillion (Henriette et al., 2022). Even more concerning, globally, women represent one in three growth-oriented entrepreneurs across various sectors, yet they receive less than 3% equity financing (Cecelski & Oparaocha, 2023). This financing gap is indicative of financial barriers in accessing finance by women-led businesses. As such, the prevalent narrative about female entrepreneurship is that females are over-represented among the poorest and most vulnerable business owners globally (Boutaleb, 2022). This is affirmed by Abor (2017), indicating that the majority of women entrepreneurs are found in the informal sector and contribute immensely to societal development. In fact, their contributions are often lost as they are over-represented among the poorest and most vulnerable entrepreneurs globally.

The renewable energy sector is growing at a rapid pace and therefore presents opportunities for economic growth. Women are widely recognised for their potential to contribute to entrepreneurial innovation, job creation, and overall economic development. Women are key drivers of innovation as such gender diversification in the energy sector is key to successful

clean energy transition(DMRE, 2021). However, they remain underrepresented in the energy sector in general. This gender gap in the energy, mining, and technology sectors, among other sectors, may be perpetuated into the renewable energy sector. The opportunities for the development of SMMEs presented by this sector should be utilised to bridge such gender inequalities. As such, financial and non-financial support for women-led businesses is key to equitable and just transitions (Pearl-Martinez, 2020).

According to Shankar et al. (2019) there is currently insufficient attention paid to SMMEs in various areas within the energy sector, to the extent that some stakeholders, including policymakers, raised concerns over the adequacy of evidence to support investments in female entrepreneurship and noted a need for better research to clarify this area of work. This is supported by Antasya and Kersana (2023) who found that the topic of gender has, within the realm of renewable energy, not been explored thoroughly.

As such, there is a general absence of government policies focused on women's financial needs in the renewable energy industry, which exacerbates the challenges they face and hinders their participation within the sector (Atahau et al., 2021). For instance, while South Africa's Integrated Resource Plan (IRP 2019) and Renewable Energy Independent Power Producer Procurement Programme (REIPPPP) provide a broad framework for renewable energy investment, they do not include clear mechanisms for enhancing women's access to finance or participation as entrepreneurs (DMRE,2019). Similarly, the National Development Plan (NDP 2030) highlights gender equity and energy access but does not present concrete financial instruments tailored for women-led SMMEs. Therefore, there is often a lack of financial products specifically designed to meet the needs of women entrepreneurs in the renewable energy sector, which can limit their ability to secure funding that aligns with their business models and growth strategies (Brock & De Haas, 2022). This study explores the challenges that are faced by women-led SMMEs in accessing finance within the renewable energy sector. The study further seeks to suggest recommendations to the policymakers, government, and relevant stakeholder on how to address the identified challenges and enable finance access.

1.2 Research Problem and Questions

Globally, the top two challenges in achieving the United Nations Sustainable Development Goals (SDGs) for Agenda 2030 are access to energy (SDG7) and gender equality and women's empowerment (SDG5)(Dutta, 2018). The challenges are more prevalent in developing economies. For example, South Africa's centralised power supplier (Eskom) produces 90% of

the electricity nationally (Baker 2011, p. 5 as cited by Nel, 2015). The power utility has been unable to meet the country's energy demands leading to severe load shedding. The power cuts have a detrimental impact on businesses and the economy as companies without an alternative power supply are unable to operate during periods of suspended electricity resulting in revenue loss. As a result, a national state of disaster was declared in 2023 because of the electricity crisis and load shedding severity (The Presidency, 2023). In addition, coal is utilised to generate 93% of Eskom's electricity, which contributes to more than 60% of South African greenhouse gas emissions (Blignaut et al., 2005 as cited inNel, 2015). As such, the South African government implemented policy goals with an objective to decarbonise the energy system (Nel, 2015). The set goals will require huge capital infrastructure investments in greener sources of energy generation. In fact, in the 2023 State of the Nation Address, the president announced a plan to roll out solar panels and support investments by small businesses in solar equipment. An amount of R1.5 trillion will be invested in South Africa's renewable energy frontiers, for example, green hydrogen and electric vehicles, over the next five years (The Presidency, 2023).

In a global context, an estimated USD 50 trillion investment is required by 2050 to transition to a green global economy with net zero emissions (IRENA, 2020 as cited in United Nations, 2023). Clearly, the unprecedented growth in the renewable energy sector constitutes an enormous opportunity for women's participation and gender-focused renewable energy investments. This is important and timely especially considering the low economic growth in South Africa as well as the country's high unemployment and poverty rates in previous years (Mandipaka, 2014).

The pandemic has exacerbated the prevailing inequalities, especially gender disparities (Profeta, 2021). The clean technology sector has the potential to create sustainable, resilient, and inclusive employment that is crucial for economic recovery. In fact, the COVID-19 pandemic presented opportunities for economic recovery as new investments will be required to adopt the necessary technologies and the development of the relevant skills in the "new normal" context (United Nations, 2022). Therefore, this presents an opportunity to bridge the gender gap and avoid the repetition of mistakes from the mining, technology, and other sectors with women's underrepresentation. Literature has revealed that women have the potential to contribute immensely to sustainable energy development when properly equipped. For example, Cecelski (2000 as cited in Shankar et al., 2019) found that with appropriate training and financial support, women have proven themselves capable of contributing effectively

throughout the energy value chains.

Regardless of the global recognition of the potential contribution of women in the renewable energy sector, there is little empirical research on this subject. According to Shankar et al. (2019), very few studies have addressed women-led SMMEs in the energy industry and their impact on the SDGs. UNDP and DBSA (2016), as cited by (Small Business Development Agency, 2019) affirm that there is a limited number of studies that focus on women-led businesses in South Africa, especially regarding financial barriers. In fact, according to Shankar et al. (2019), there is currently insufficient attention paid to SMMEs in various areas within the energy sector, to the extent that funders and policymakers have expressed concerns over the inadequacy of evidence, which hinders the initiatives to empower women.

Furthermore, there is still inadequate knowledge on gender mainstreaming options and how the role of women can be incorporated into the global sustainable energy access efforts (Glemarec et al., 2016). Hence, substantial investments may be poured into the improvement of energy systems globally but still fail to fill the energy access gap (Shankar et al., 2019). Encouragement of new women-led businesses and supporting the growth of SMMEs in the renewable energy space is key in filling the gap and ensuring that energy reaches the most remote corners of the globe (Shankar et al., 2019). This approach necessitates an understanding of the financial barriers that are faced by the underrepresented gender in the renewable energy industry. If these challenges are responded to sufficiently and appropriately then women may be empowered.

In sub-Saharan Africa, more efforts should be directed to capacitating women in the renewable energy sector and bridging the gender gap in the corporate culture(Henriette et al., 2022). Even though some support has been provided to women entrepreneurs, growing their enterprises beyond necessity to growth-focused, opportunity-based businesses remains a struggle (Shankar et al., 2019). This indicates the presence of constraints inhibiting their growth and survival. The low representation also indicates potential barriers to entry into the sector. According to Dhruba (2018), financing costs significantly impact returns and the viability of clean energy projects more than fossil fuel projects. However, women-owned businesses generally attract high interest rates. This negatively impacts their capacity to operate sustainably and profitably. In developing countries, these women-led businesses fail to attract finance due to low asset ownership and lack of access to financial networks, which further impedes growth (Cecelski & Oparaocha, 2023).

These sector barriers and constraints should be identified to ensure an aligned response by the relevant stakeholders. The following research question therefore arises: What are the financial barriers faced by women entrepreneurs when venturing into the renewable energy sector across various provinces in South Africa? This study seeks to identify these financial constraints faced by women entrepreneurs in the renewable energy sector which limit their participation and success in the industry.

1.3 Research Objectives

The aim of the study is:

- To explore the financial constraints that hinder women-led SMMEs from entering into the renewable energy sector in South Africa.

1.4 Scope and Justification of the Study

Research on financial barriers faced by women in South Africa's renewable energy sector is essential for promoting inclusive economic growth, achieving gender equity, informing more effective funding policies, and ensuring that the energy transition is just and empowering for all. Although research on the challenges faced by women in entrepreneurship is extensive (Iwu et al., 2022), limited attention has been paid to their participation in the renewable energy sector, particularly regarding access to finance. (Shankar et al. 2019) argue that the lack of data and evidence on SMMEs in the energy sector hampers the ability of funders and policymakers to make informed investment decisions, especially when it comes to empowering women's entrepreneurship. This gap is concerning, given that universal energy access (SDG7) and gender equality (SDG5) remain two of the most pressing global challenges for achieving Agenda 2030 (Dutta, 2018).The International Finance Corporation has echoed similar concerns, emphasizing the need to strengthen gender integration and embed equality within the renewable energy value chain in sub-Saharan Africa (Henriette et al., 2022). By identifying structural and institutional obstacles, the study provides evidence that can inform the design of more inclusive financing mechanisms and policy frameworks. Furthermore, the research can guide stakeholders—such as development finance institutions, policymakers, and private investors—in developing targeted interventions that not only enhance women's access to finance but also promote broader gender mainstreaming across the renewable energy value chain.

South Africa's rapidly growing renewable energy sector presents a unique opportunity to advance gender equity while driving economic development. However, in the absence of

targeted, evidence-based initiatives, the sector risks perpetuating the exclusionary dynamics characteristic of historically male-dominated industries, where discriminatory policies and societal norms have long hindered women's full participation. Therefore, this study also addresses the scarcity of empirical research focused on women-led SMMEs in the renewable energy sector and may inform reforms aimed at gender equality. Through qualitative interviews, it aims to generate practical insights for policymakers and stakeholders to promote equitable access to finance and foster a more inclusive renewable energy economy in South Africa.

The study will contribute to the following areas:

- Increase understanding by both business and government of the financial constraints encountered by women-owned SMMEs in the renewable energy sector.
- Develop better policy measures that are targeted at empowering women-owned SMMEs within the renewable energy sector that respond to financial barriers to entry and growth in the sector.
- Contribute to literature in the field of entrepreneurship and gender equality.

1.5 Organisation of the Study

The paper consists of five chapters as outlined below.

Chapter 1: Introduction

This introductory chapter gives context regarding the importance of research around women within the renewable energy sector. This chapter provides the background of the study, then presents the research problem and objectives.

Chapter 2: Literature Review

This chapter reviews literature on the importance of women-owned SMMEs in the renewable energy sector and provides a definition of SMMEs. It further provides an overview of the role of SMMEs in the economy, the role of women-owned SMMEs in the renewable energy sector, and a theoretical framework on the challenges faced by these women.

Chapter 3: Methodology

The third chapter provides an overview of the overall approach followed in undertaking the study. It describes the unit of analysis, sample size and strategy, target population, and further provides a discussion of the research approach and reasons for adopting the approach. The data

collection instrument is also described in this chapter and data analysis procedures to ensure trustworthiness.

Chapter 4: Data Presentation, Analysis and Discussion of Findings

The fourth chapter presents findings of primary research, together with analysis and interpretation of results. The findings are compared with the reviewed literature to highlight similarities with, or divergence from, the existing trends, providing a foundation for future research.

Chapter 5: Conclusion, Recommendations, and Avenues for Future Studies

The last chapter presents a summary of key findings that inform conclusions of this study. Additionally, it presents recommendations to address identified challenges. Lastly, avenues for future research are proposed.

Chapter 2: Literature Review

2.1 Introduction

This chapter explores the existing body of knowledge related to finance barriers faced by women-owned SMMEs in the renewable energy industry. Through an examination of key theories, empirical studies, and critical perspectives, this chapter's objective is to contextualise this research topic within the broader academic discourse. The main sections covered in this chapter are as follows: Definition of terms and concepts; overview of the context of the topic; theoretical and conceptual framework; and a review of empirical literature related to the role and challenges faced by women-owned SMMEs within the renewable energy industry.

2.2 Definition of Terms and Concepts

2.2.1 Small Medium and Micro Enterprise (SMME)

There is a general lack of consensus amongst researchers regarding what constitutes an SMME(Agwa-Ejon & Mbohwa, 2015; Jordaan, 2020; Okyere, 2017). The definition varies across countries and industries. Generally, the number of employees is used as an indicator of company size and informs classification as shown in Table 2.1 (Serame, 2019).

Table 2.1: OECD - Classification of SMMEs by Number of Employees

	Micro	Small	Medium	SME	Large
EU Countries, Iceland, Norway, Switzerland	1-9	10-49	50-249	1-249	250+
Australia	0-9	10-49	50-199	0-199	200+
Canada	0-9	10-49	50-499	0-499	500+
Japan	4-9	10-49	50-249	1-249	250+
Korea	5-9	10-49	50-199	5-199	200+
Mexico	0-10	11-50	51-250	1-250	251+
New Zealand	1-9	10-49	50-99	0-99	100+
Turkey	1-19	20-49	50-249	1-249	250+
United States	1-9	10-99	100-499	1-499	500+

Source: OECD Studies on SMEs and Entrepreneurship SMEs, Entrepreneurship, and Innovation

However, the number of employees is not the only indicator of company size. For example, in the European Union (EU), SMME is defined based on staff headcount and turnover or balance sheet total as per Table 2.2.

Table 2.2: EU - Classification of SMME by Staff Headcount, Turnover or Balance Sheet Value

Company Category	Staff Headcount	Turnover	Or Balance Sheet Total
Medium	Less than 250	Less than €50 million	Less than €43 million
Small	Less than 50	Less than €10 million	Less than €10 million
Micro	Less than 10	Less than €2 million	Less than €2 million

Source: (European Union, 2020)

The EU thresholds are significantly high in the South African economic climate. In South Africa, the National Small Enterprise Act Schedule 1 (Amendment) defines a small enterprise as

" a separate and distinct business entity, together with its branches or subsidiaries, if any, including cooperative enterprises, managed by one owner or more predominantly carried on in any sector or subsector of the economy mentioned in column 1 of the Schedule and classified as a micro, a small or a medium enterprise by satisfying the criteria mentioned in columns 3 and 4 of the Schedule" (Zulu, 2019, p. 1)

The National Small Enterprise Act defines enterprise size by sector based on total full-time equivalent of paid employees and total turnover as per Table 2.3.

Table 2.3: The National Small Enterprise Act – Classification of SMME by Number of Employees and Annual Turnover

Size or class of enterprise	Total full time equivalent of paid employees	Total annual turnover
Micro	0 to 10	Less than R20 million
Small	11 to 50	Less than R80 million
Medium	51 to 250	Less than R220 million

Source: The DTI (2021)

The definition of SMME includes both registered and unregistered businesses. The businesses may be male-owned or female-owned, formalised or informal, street vendors, or home-based spaza shops, and so forth.

2.2.2 Financial Inclusion

Financial inclusion refers to the availability and usage of affordable, appropriate, and accessible financial services and products—such as savings, credit, insurance, and payment systems—by individuals and businesses, especially those who are underserved or excluded from the formal financial system (Ozili, 2020).Singh and Singh Kondan (2011) as cited by (Cicchiello et al., 2021) explain financial inclusion as the process of ensuring that individuals and businesses have access to adequate financial services and products in a sustainable manner. On the other hand, (Mahendra Dev, 2006) defines financial inclusion as the delivery of affordable financial services to disadvantaged and low-income groups. While financial inclusion is often discussed in the context of individual financial resilience, it also plays a critical role in enabling entrepreneurship—particularly for women-owned businesses in emerging sectors like renewable energy. Access to tailored financial products is vital not only for personal well-being but also for empowering women-led SMMEs to contribute meaningfully to economic development and the green economy.

There is an abundance of literature on the importance of financial inclusion for economic growth. Financial inclusion has received a lot of recognition amongst policymakers and researchers because it is considered a critical tool in poverty reduction (Chibba, 2009). In fact, there is increasing evidence that financial inclusion has significant benefits for the disadvantaged, especially women and poor adults (Ozili, 2020). It strengthens economic empowerment and active participation of the disadvantaged (Cicchiello et al., 2021). Empirical studies reveal that financial inclusion is vital to economic growth of every country and a pivotal accelerator of economic progress (Ifediora et al., 2022). Moreover, financial inclusion improves social inclusion in many societies (Bold et al., 2012). Financial inclusion encompasses many socio-economic benefits as well. Financial inclusion, financial stability, and economic growth are interlinked, in the short and long run (Jima & Makoni, 2023). As a result, policymakers across the world recognise financial inclusion as a key to poverty reduction and economic growth, and dedicate remarkable resources to reducing financial exclusion levels (Ozili, 2020). As such, financial inclusion is considered vital in meeting the SDGs (Sahay et al., 2015).

In the least developed countries in Asia and Africa, economic growth leads to financial inclusion, while unemployment and low literacy rates negatively affect financial inclusion (Cicchiello et al., 2021). This is affirmed by Koomson et al. (2020) who confirmed that

financial inclusion leads to the reduction of poverty in Ghanaian households. In fact, according to Agyemang-Badu et al. (2018), financial inclusion decreases poverty levels and bridges income inequalities gaps in Africa. However, in developing countries, women are more exposed to financial exclusion when compared to their male counterparts (Cicchiello et al., 2021). This reduces financial inclusion rates and negatively affects economic growth and development. Growing evidence suggests that financially inclusive markets have lower poverty and inequality rates (Cicchiello et al., 2021).

Literature suggests that financial inclusion increases innovation in companies and promotes the formation of new ones, thereby increasing job creation and poverty alleviation (Cicchiello et al., 2021). However, the majority of SMMEs in Africa are unbanked and access to finance is a significant challenge (Demirgüç-Kunt et al., 2012). Furthermore, SMMEs in Africa tend to use informal financing, which indicates that financial systems do not meet the needs of the enterprises (Demirgüç-Kunt et al., 2012). Financial systems with high transaction costs may be exclusionary by design. The lack of inclusive financial systems leads to reliance on personal savings to pursue education or entrepreneurial opportunities (Demirgüç-Kunt et al., 2012). Inequalities in financial access and limited usage of the formal banking sector in Africa are some of the hindrances of socio-economic development and economic growth (Ifediora et al., 2022).

2.2.3 Gender Mainstreaming

Gender mainstreaming is a concept that was shaped at the 1985 Nairobi World Conference on Women and established as a strategy in international gender equality policy. The concept became popular within the United Nations and other international organisations as a strategic tool for development and public policy mechanisms (Tu & Nilsson, 2015). Gender mainstreaming is a plan or blueprint in formulating a policy or legislation, project or programme design and development that has included as its foundation, and the varying characteristics and needs of men and women with the goal to ensure that the benefits or impacts of the involvement are proportionate (DMRE, 2021). It involves reconstructing, revamping, and overhauling a vital area of feminism (Walby, 2005). There are various definitions of gender mainstreaming.

Gender mainstreaming is recognised globally as a critical key to bridging gender inequality gaps. It involves the integration of a gender perspective into the planning, development, enforcement, and evaluation of policies, regulations, and spending programmes, with the aim to

ensure gender equality and prevent discrimination. It has become a key element in discussions around development globally (Tu & Nilsson, 2015).

Gender mainstreaming policies appear to contribute to the negative or threatened response from men towards women empowerment, as it leads to males' sense of exclusion and disempowerment (Tu & Nilsson, 2015). The efforts to achieve gender equality may be hampered by men's negative reactions to women empowerment, resulting in a backlash in the objective of gender mainstreaming (Tu & Nilsson, 2015). As such, Daly (2005) argues that gender mainstreaming is underdeveloped as a concept and needs to be rethought to understand the underlying issues of gender inequality and the impact of gender mainstreaming on societal norms.

2.3 Overview of Entrepreneurship in South Africa

South Africa's entrepreneurial ecosystem is underperforming, ranking 40th out of 51 economies mainly due to, amongst other things, high failure rates of start-ups and the inability to adapt and thrive in uncertain conditions (Bowmaker-Falconer et al., 2023). However, compared to peers, South Africa is fairing on par or average (Motsomi, 2024). Some researchers argue that the historical context of apartheid had a profound and lasting effect on entrepreneurship in South Africa and shaped the spatial and institutional landscape of entrepreneurship in the country(Swartz et al., 2019). Nevertheless, entrepreneurship is viewed as a critical solution to the country's high unemployment rates. In fact, the government estimates that 90% of new jobs could be generated by 2030 through entrepreneurship (Kim & Davidson, 2024). This is supported by Bowmaker-Falconer and Meyer (2022) who found that entrepreneurship is positioned as a crucial factor to achieving several SDGs and is recognised as a vital driver for economic development and inclusion in South Africa. They further emphasises the importance of women's participation to foster economic development and growth(Bowmaker-Falconer & Meyer, 2022). In fact, countries with greater gender equality tend to have higher GDP per capita and increased economic resilience (Sri Gugan et al., 2024).

The importance of women's participation in entrepreneurial activities is broadly recognised in the literature for various reasons. Globally, women entrepreneurs are regarded as highly innovative, growth-oriented, and focused on national and international markets (Boutaleb, 2022). The unrealised contribution of female entrepreneurs in economic development has been recognised by various researchers, including International Finance Corporation (IFC, 2016), Minniti and Naude (2010), and Nsengimana et al. (2017a as cited by Etim & Gervase Iwu,

2019). Globally, women are described as a “potential force” to be unchained for societal and economic benefit (Etim & Gervase Iwu, 2019, p. 6). According to Agarwal and Lenka (2015),]women bring balance to the economy; without them the economy will be unbalanced. In fact, countries with economies that can pull through an unexpected crisis, have a high number of female entrepreneurs (Yadav & Unni, 2016). In South Africa, women entrepreneurs play a critical role in poverty reduction and entrepreneurial innovation, and they contribute significantly to the economy. Studies across various countries have found that women-led businesses are more profitable and larger when placed in male-dominated industries (Alibhai et al. 2017).

Although women entrepreneurs’ potential to contribute to the economy is widely acknowledged, their contributions are not well recognised in developing economies. In many parts of the world, systems are not gender-neutral and are generally designed to favour males (Boutaleb, 2022). This is supported by Etim and Gervase Iwu (2019), indicating that women’s contributions are well recognised in developed economies compared to in developing economies. In developing economies, females are not afforded the same opportunities and therefore tend to be less impactful in driving economic growth (Boutaleb, 2022). Hence, a bigger percentage of males tend to identify an opportunity and participate in entrepreneurial activities earlier compared to women (Zhu & Kuriyama, 2016). As a result, women entrepreneurs are generally poor compared to their male counterparts (Boutaleb, 2022). Furthermore, female-owned SMMEs tend to be concentrated in the informal sector and generally shy away from high-tech industries (Etim & Gervase Iwu, 2019). This is affirmed by Abor (2017), indicating that the majority of women entrepreneurs are found in the informal sector. In addition, according to Boutaleb (2022), women tend to run smaller, younger, less profitable companies. This may be expected, especially in less developed countries where businesses are operated from home with a primary purpose to provide for household essentials. In addition, women are more likely to start a business with no employees but are less likely to start a business with more than 20 employees (Boutaleb, 2022). This may also be influenced by the motive for starting a business. Most women start the business for survival and are therefore more likely to follow a prudent approach of becoming self-employed. In fact, in 2021 in a global study, 72.5% of women reported the key motive for starting a business was job scarcity, whereas 63.3% of men reported wealth creation as the primary motive (Boutaleb, 2022). The motive to start a business is also influenced by economic status. According to Xavier et al. (2012), entrepreneurship in developed countries is generally opportunity-driven, while in

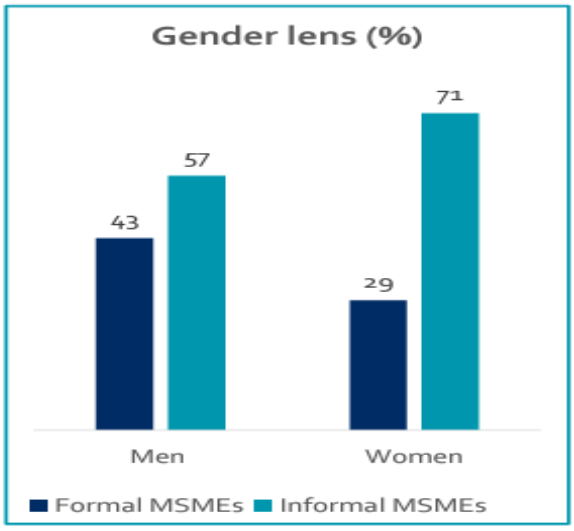
poorer economies it is driven by the need for survival. As a result, the participation of females in the entrepreneurial market are likely to be in micro businesses or are more survivalist. Thus, they are more dominant in the informal sector compared to their male counterparts (Motsomi, 2024). Table 2.4 provides statistics as of 2020 regarding the relative share of men- and women-owned SMMEs in South Africa.

Table 2.4: Relative Share of Men and Women-owned SMMEs in South Africa

Category	Male	Female
Micro-enterprise (0 – 10 employees)	82.4%	87.2%
Small enterprise (11 – 50 employees)	16.6%	12.3%
Medium enterprise (51 – 250 employees)	1.1%	0.5%

Source: Motsomi et al. (2021)

Figure 2.1: Relative Share of Men and Women-owned SMMEs in South Africa



Source: Motsomi et al. (2021)

2.4 Theoretical Framework

This study draws on liberal feminist theory, entrepreneurship theory, and the resource-based view to frame the analysis of access to finance barriers faced by women in the renewable energy sector. These theories are discussed below:

2.4.1 The Liberal Feminist Theory

The liberal feminist theory argues that women can perform on the same level as their male counterparts if emancipated (Menig, 2018). Women and men should therefore be treated equally by the law (Lorber, 1997). Many have relegated the entrepreneurial status of women. Such arguments indicate that women are weak entrepreneurs, lack basic qualities of a good entrepreneur, are not risk takers, are emotional, and are unable to take quick decisions in challenging situations (Al-Harthi & Alharthi, 2013). The liberal feminist theory suggests that women's lower position in society stems from unequal opportunities. Therefore, with equal opportunities, women are capable of competing with their male counterparts. In developing markets, women-owned SMMEs have the potential to improve employment and business growth when given equal opportunities with males(Zhu & Kuriyama, 2016). The thinking capacity of women and men is the same; however, women tend to lack confidence and act inferior to men due to a lack of education, discrimination, and a general lack of equal opportunities (Lorber, 1997). Women have more qualities and capabilities to become successful entrepreneurs, however, they should also possess the ability to recognise opportunities and evaluate associated risk (Al-Harthi & Alharthi, 2013). Literature suggests that if women-led SMMEs receive the relevant support they would be empowered to run successfully and contribute to the economy immensely.

The need for gender equality is key for all economies, regardless of development status (Zhu & Kuriyama, 2016). One study indicates that the improvement of gender equality could add $12 trillion to the world GDP by 2025 (Zhu & Kuriyama, 2016). Regardless of the recognition of the benefits of gender equality on the economy, women entrepreneurs still face more challenges when compared to their male counterparts. Previous literature (Agwa-Ejon & Mbohwa, 2015; Grewe & Stein, 2011; Mahat et al., 2021; Small Business Development Agency, 2019; Zhu & Kuriyama, 2016) found that women-owned SMMEs generally lack access to finance, financial and technical skills, networking opportunities, and access to markets. As a result, there is a high failure rate of women-led SMMEs and a low prospect to

venture into entrepreneurship by women.

2.4.2 The Entrepreneurship Theory

There is a lack of consensus regarding the definition of entrepreneurship globally. Entrepreneur refers to an individual who takes risks and is involved in such business activities with no certainty on the outcome (Al-Harthi & Alharthi, 2013). Another definition suggests that "entrepreneurship is about the discovery and exploitation of profitable opportunities" (Shane & Venkataraman, 2000, p. x). The definition of entrepreneurship involves the presence of quality opportunities and the presence of enterprising individuals (Venkataraman, 1997 as cited in Shane & Venkataraman, 2000). This suggests that entrepreneurship includes, amongst others, an individual's ability to identify profitable opportunities. Schumpeter argues that entrepreneurship refers to innovation by independently owned new firms that cause creative destruction and yield equitable wealth distribution (Spencer et al., 2008). Entrepreneurship is not tied to a specific gender; an entrepreneur may be a male or a female. Entrepreneurs are born and not made as some values are cultivated in early childhood and cannot be taught later in life (Cunningham, 1991). In contrast, Rigley et al. (2010) argue that entrepreneurs are not born and can be made as entrepreneurship education enhances opportunity identification and networking. This study argues that one's ability to identify and evaluate new opportunities can be improved by education. However, there are some critical entrepreneurial skills that an entrepreneur should possess and cannot be taught. This includes, for example, determination (Rigley et al., 2010)Click or tap here to enter text.. Entrepreneurship is influenced by personality traits as much as it is influenced by other factors that one is not born with, such as education (Al-Harthi & Alharthi, 2013). In the current economic state, entrepreneurs should keep abreast of economic and social advancement to remain competitive (Al-Harthi & Alharthi, 2013). This theory ties in with the purpose of this study as it aims to identify challenges that women-owned SMMEs face in accessing finance within the renewable energy sector, their ability to respond to those challenges, and recommendations for support that can be provided to alleviate the challenges. Although there is conflicting evidence on whether entrepreneurs are born or made, there is a general consensus that education positively affects some entrepreneurial capabilities (Yan et al., 2018). Therefore, in order to run sustainable businesses, women-led SMMEs need the ability to identify opportunities and take advantage of these opportunities; however, certain challenges, such as lack of finance, may hinder them from doing so.

Entrepreneurship involves starting and building a business which, generally, supports most people at home or in the community (Adebayo, 2015 as cited inEtim & Gervase Iwu, 2019). Entrepreneurship is also described by words such as aptitude, innovation, and creativity. Other definitions describe entrepreneurship based on its objective of a unique or new production, or the development of a new identity in society (Al-Harthi & Alharthi, 2013).

2.4.3 Resource-Based Theory

The resource-based theory suggests that sustainability and efficiency are powered by a company's capabilities: both tangible and intangible resources that are difficult to substitute or copy (Davis et al., 2009). The non-tangible resources include an entrepreneur's cognitive ability to recognise a new opportunity, assemble resources to respond to the identified opportunity, and their capability to create diverse outputs that are superior to the competitors (Alvarez & Busenitz, 2001). This theory suggests that the uniqueness and diversity of a firm's resources informs its competitive advantage. The ability of SMMEs to succeed is also propelled by their individual ability to identify opportunities amid challenges. However, many SMMEs lack the resources to respond to the identified opportunities. This theory aligns with the purpose of this study because if SMMEs are resourced to respond to opportunities and address challenges in the fast-growing renewable energy sector, they would be capacitated to evolve and grow sustainably.

2.5 Conceptual Framework

The conceptual framework for examining access to finance barriers faced by women-owned SMMEs in the renewable energy industry focuses on four interconnected constructs: barriers to access; mediating factors; external factors; and financial outcomes.

a) Barriers to Access

Barriers to access encompass challenges that disproportionately affect women entrepreneurs. These barriers lead to limited funding options, thereby constraining the growth potential of these SMMEs. Many countries, particularly in emerging markets, exhibit similar financial constraints for women entrepreneurs, such as lack of collateral, inadequate financial infrastructure, and cultural norms that limit women's business activities (Dassanou et al., 2014). In South Africa, as presented under review of empirical literature, these constraints are also prevalent and may be exacerbated by historical inequalities, an underdeveloped economy, and

specific regulatory environments.

The key barriers faced by women globally in accessing finance include:

i) Lack of collateral

Women generally lack the traditional assets required by banks as security for loans, hindering their ability to secure such financing (Hector & Hattingh, 2024). As such, women entrepreneurs experience a higher percentage of loan application rejections compared to their male counterparts (Gruver et al. 2024).

ii) High funding costs due to risk perception

Female-owned SMMEs often face high interest costs that may deter them from seeking or accepting finance (Hector & Hattingh, 2024). This may be due to the high-risk perception attached to women by financial institutions (Atahau et al., 2021). The high finance costs may also lead to compressed profit margins, thereby hindering business growth and increasing default risk. Furthermore, banks perceive women as micro-enterprise owners, leading to a focus on microfinance (Dassanou et al., 2014). This leads to limited access to larger loans, further hindering growth.

iii) Limited financial literacy

Women generally have less access to education and training in financial literacy, thereby impacting their ability to understand funding requirements (Abdou Kalliny et al., 2023). This may affect their ability to effectively engage with financial institutions and secure funding.

iv) Complex loan application process

CCSA (2023) revealed that women generally find the loan application process complex and time-consuming. This is supported by Gruver et al. (2024) who found that in Nigeria the majority of women reported that the loan application process is too complex, which contributes to lower application rates.

v) Limited access to information

A review of literature revealed that women generally have less access to information regarding available financial products (Abdou Kalliny et al., 2023; CCSA, 2023; Hector & Hattingh, 2024). This creates knowledge gaps that hinder women from making informed financing decisions and further restrict their access to financial products and services.

b) Mediating Factors

Mediating factors refer to factors that assist in mitigating barriers and improve access to financial products and support. These factors include supportive policies, targeted financial products, and access to networks that can provide mentorship and financial literacy training, enabling women to better navigate the financial landscape. Addressing mediating factors is essential for enhancing the participation of women-owned SMMEs in the green economy and ensuring they overcome the barriers to accessing finance.

The key mediating factors include:

i) Education and training programmes

Access to education and training programmes may enhance financial management skills. Financial literacy plays a crucial role in enhancing access to credit by empowering women to understand financial products, manage their finances effectively, and build strong relationships with lenders, ultimately leading to improved financial inclusion (Bakar et al., 2024).

ii) Supportive policies and government initiatives

Supportive government policies play a critical role in dismantling barriers to financial access for women and promoting their economic independence. These policies are mostly aimed at creating an enabling environment for women, encouraging entrepreneurship and addressing gender bias (Ncube, 2023).

iii) Mentorship and guidance

Mentorship is a key component in empowering entrepreneurs to overcome barriers to accessing finance, as it provides the necessary support, knowledge, and confidence to navigate the financial landscape effectively (Bakar et al., 2024). Through mentorship and guidance, women can forge relationships and acquire the necessary knowledge and confidence to overcome some of the hindrances in accessing finance. In fact, some researchers found that more women are accessing tailored business knowledge and guidance through mentorship programmes and entrepreneurial initiatives (CCSA, 2023). This enhances financial skills, thereby improving their prospects of obtaining finance.

iv) Access to business networks

Participation in women-centered networking structures can facilitate collaboration as well as knowledge and resource sharing (CCSA, 2023). These structures can promote information

sharing on available funding sources and their requirements as well as foster partnerships while mitigating the barrier of a lack of information when accessing finance.

c) External Factors

Broader economic challenges, such as inflation and market volatility, can disproportionately impact women-owned SMMEs, making it harder for them to secure financing and sustain their operations (Hector & Hattingh, 2024). In South Africa, this would be more prevalent, compounded by economic disparities and an underdeveloped economy, which is susceptible to volatilities (Dassanou et al., 2014). The adverse movements in the economic environment tend to affect women more severely compared to their male counterparts (Dassanou et al., 2014).

d) Financial Outcomes

This reflects the impact of these barriers and mediators on the overall performance of women-owned SMMEs, including their ability to secure funding, invest in renewable technologies, and achieve sustainable business growth. The lack of access to finance leads to the following key outcomes:

i) Limited business growth

Financial exclusion perpetuates a cycle of poverty, hinders business growth, and limits the capacity of women entrepreneurs to contribute to the national economy (Bakar et al., 2024). Without financial resources, women are unable to expand their business operations, diversify, and achieve scalability, ultimately limiting business potential. This limits entry into new markets, particularly those that require significant upfront investment, such as renewable energy (Hector & Hattingh, 2024).

ii) Increased vulnerability

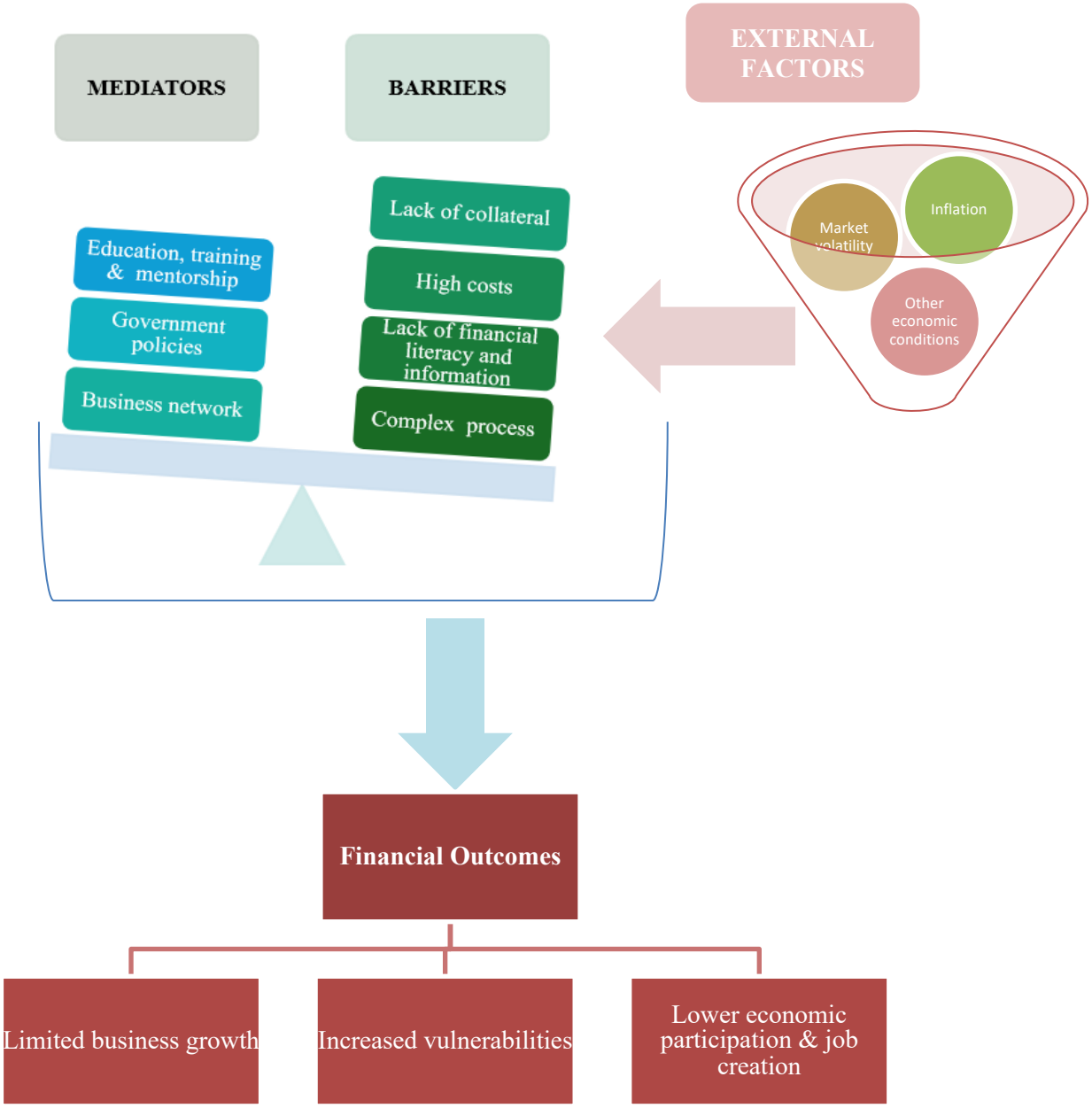
The lack of financial literacy skills to navigate complex financial systems and make informed decisions exposes women to unfavorable lending terms, leading to financial instability and increased vulnerabilities to economic shocks (Ncube, 2023).

iii) Lower participation in the economy

Women-led businesses may struggle to compete with their male counterparts who have better access to financial resources, leading to lower market share and profitability, thereby hindering

sustainability of their businesses (Ncube, 2023). This will also diminish their capacity to hire and retain employees, leading to lower job creation by women. This is an outcome that is undesirable considering South Africa's high employment rates.

Figure 2.2 Graphic Presentation of the Conceptual Framework



Source: Candidates' design

2.6 Review of Empirical Literature

2.6.1 The Role of SMMEs in the Economy

SMMEs play a critical role in economic development as they possess great potential to create jobs, enhance competition, and drive innovation and technological advancements (Zhu &

Kuriyama, 2016). SMMEs account for 99.8% of businesses in the EU, 99% in G2 (Group 2 – China and United States), and 98,5% in South Africa (Rajagopaul et al., 2020). This is supported by Jili et al. (2017 as cited in Zhou et al., 2023), who found that SMMEs represent 90% of businesses in South Africa. As such, they are often referred to as the engine of the economy due to their pivotal position in the economy. They account for 68% of private jobs in the EU and 65% in G2, and therefore play a critical role in job creation (Rajagopaul et al., 2020). More than 25.8% of the workforce is employed by SMMEs in various industries in South Africa(Rajagopaul et al., 2020). It is estimated that SMMEs will account for over 90% of new jobs by 2030 (Bushe 2019 as cited in Chukwuneme et al., 2023). This emphasises the importance of empowering SMMEs to allow for the predicted job creation and reduce the high unemployment rate in South Africa.

In South Africa, The National Development Plan 2030 (NDP 2030) considers SMMEs as significant sources of employment and growth (van Staden, 2022). SMMEs contribute immensely to the national GDP: 57% in the EU as well as 46% and 39% in G2 and SA respectively (Rajagopaul et al., 2020). Although the SMMEs' GDP and employment contribution for South Africa is lower, comparatively, it is clear that SMMEs are a key tool to poverty alleviation and sustainable growth in various economies, including South Africa. Furthermore, they facilitate inclusive growth as 38% of SMMEs in SA are owned by women compared to 30% and 25% in the EU and G2 respectively (Rajagopaul et al., 2020). The survival of SMMEs is therefore critical to the sustainable economic growth of South Africa and the achievement of some of the SDGs. For example, through job creation in both the formal and informal sector, SMMEs contribute to these SDGs, amongst others:

- Goal 1: End poverty in all its forms everywhere: SMMEs contribute to this goal through job creation in both the formal and informal sector.
- Goal 2: End hunger, achieve food security and improve nutrition and promote sustainable agriculture.
- Goal 5: Achieve gender equality and empower all women and girls. The empowerment of women-led SMMEs contributes to the achievement of this goal.

The need to support SMMEs on the road to recovery is critical with the current economic turbulence. Regardless of the vital contributions that SMMEs make to the economy, they have a high failure rate due to numerous challenges that they face. The estimated SMME failure is

between 70% and 80% in South Africa (Mashombo, 2014 as cited in Chukwuneme et al., 2023).

South Africa's newly established enterprises have a low survival rate as per international standards (Boutaleb, 2023). The top performing SMMEs in the African continent are Angola and Sudan (Boutaleb, 2023). In fact, the entrepreneurship activity in South Africa is said to be the lowest when compared to the rest of Africa and the world (Singh, 2020). Therefore, more efforts need to be directed to the empowerment of SMMEs so that they are better resourced to contribute to the economy.

2.6.2 Challenges Faced by Women-owned SMMEs

Despite the recognition of female entrepreneurs' potential to contribute to economic development, women still face more challenges compared to their male counterparts as cleary depicted in figure 2.2, which impedes their ability to make impactful contributions to the economy (Etim & Gervase Iwu, 2019). Globally, females have been disadvantaged with regards to labour market participation and remuneration when compared to males (Zhu & Kuriyama, 2016). In this context, women's entrepreneurship becomes particularly important as it presents an opportunity to bridge the gender inequality gap created by the labour markets (Zhu & Kuriyama, 2016).

In developing countries, women entrepreneurs are unable to respond to opportunities due to financial and socio-cultural constraints, even though they are equipped with the relevant skills to identify and take advantage of opportunities (Shastri & Sinha, 2010 as cited in Etim & Gervase Iwu, 2019). In South Africa challenges encountered by women entrepreneurs include lack of training and education, lack of access to finance, and gender discrimination (Chinomona & Maziriri, 2015). This is confirmed by Zhu and Kuriyama (2016), who found that women generally lack the relevant business skills required, including financial knowledge and numeracy (Zhu & Kuriyama, 2016). According to OECD (2009), the lack of managerial knowledge and limited resources are key hindrances to SMME internationalisation.

As depicted in figure 2.2 collateral is one of the key barriers to women participation in the renewable energy sector. Collateral is generally required by financial institutions in order to provide finance, which disadvantages a lot of women, especially in sub-Saharan Africa where women do not have property or assets that can be mortgaged (Etim & Gervase Iwu, 2019). In

fact, women generally face disproportionately high levels of gender discrimination when accessing finance which limits their potential in enterprise formation (Etim & Gervase Iwu, 2019). More than half of Asia-Pacific Economic Cooperation (APEC) economies have no laws that prohibit gender- based discrimination with regards to access to credit, as of 2015 (Zhu & Kuriyama, 2016). As a result, women-owned SMMEs are faced with more challenges compared to males in accessing credit and therefore receive less funding from financial institutions than their male counterparts (Zhu & Kuriyama, 2016).

Literature has found that female entrepreneurs are forced to rely on their own personal savings, family, friends or community groups to fund their businesses (Zhu & Kuriyama, 2016). This leads to the use of non-bank financial institutions such as microfinance organisation and pawn shops , to name a few, which is more prevalent amongst women compared to men (Zhu & Kuriyama, 2016). In fact, according to the Department of Trade in Industry, in South Africa, most female entrepreneurs have been excluded from access to finance, land ownership, educational opportunities, and skills development (Mandipaka, 2014). As a result, these women are stuck as entrepreneurs and struggle to branch out and grow their businesses (Mandipaka, 2014). The ultimate outcomes of these hinderances include limited business growth and therefore lower participation in the economy, as outlined in the conceptual framework, figure 2.2.

Women also face discrimination due to societal stereotypes. The gender bias or stereotyped society perceives women as ‘subservient’ to men, more as ‘agents’ of reproduction, unskilled to manage businesses, intruders in male dominated sectors skilled to manage businesses, and as intruders into a male-dominated sector (Asare et al., 2015; Martin & Barnard, 2013; SBP, 2013, as cited by Etim & Gervase Iwu, 2019). This further constrains women from growing out of the informal sector or from penetrating the male-dominated sectors, such as energy.

Lastly, the impact of domestic responsibilities on women’s productivity levels cannot be ignored. Evidence that the low performance levels of women-owned enterprises are linked to time constraints due to domestic responsibilities, which significantly constrain females’ time and mobility, has been well documented (Etim & Gervase Iwu, 2019). Socio-cultural barriers have traditionally put women at a structural disadvantage. Household and caregiving duties are not accommodated in any statistics, thereby marginalising their contributions (World Economic Forum, 2020). For example, women globally perform 75% of unpaid domestic responsibilities which is not incorporated in economic productivity statistics. Support in work-life balance for

women is key to ensure the acceleration of women entrepreneurs (World Economic Forum, 2020). Brush et al. (2009) as cited by (Etim & Gervase Iwu, 2019) refers to as the 'motherhood' effect whereby the female's domestic responsibilities disadvantage her entrepreneurial uptake.

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2.6.3 The Role of Women in the Renewable Energy Sector

Literature confirms that women's empowerment is vital for the sustainability of the environment, efficiency and sustainability of climate change responses, and economic development (DMRE, 2021). Women entrepreneurs contribute to economic development by creating jobs, innovating, and diversifying economic activities (Sri Gugan et al., 2024).Participation of women improves decision-making processes is critical because females work more effectively compared to males (United Nations, 2022). Globally, women continue to grow rapidly in the energy sector, even though they are still underrepresented (Shankar et al., 2019).

While notable progress has been achieved towards gender equality, women are still subject to discrimination in most parts across the globe. This is despite literature confirming that women with equal access to education, decent work, and representation in political and economic decision-making processes will lead to sustainable economic development (UN Women, 2016). In fact, in South Africa, women's empowerment has been described as the key to development (DMRE, 2021). According to McKinsey (2015) reports, a full potential scenario of bridging gender gaps can result in US$12 trillion increase in global growth, and US$28 trillion in

additional GDP by 2025 (DMRE, 2021). The study further estimates that increasing female participation rates in sub-Saharan Africa, Eastern Asia, and Central Asia would increase output by between 40% and 45% (DMRE, 2021).

Gender-responsive and women-led initiatives proved to be successful in the green energy space, including the provision of sustainable energy solutions at varying levels (United Nations, 2023). Qualitative evidence and programme results suggest that female entrepreneurs tend to be more knowledgeable about their customer base and therefore benefit from lower supply chain and customer acquisition costs and encounter lower risk on customer payment (Glemarec et al., 2016). Empowering women in the delivery of off-grid renewable energy products and services, especially in areas with no/little access to national electricity, can create opportunities for women's leadership and employment. Decentralised sustainable energy solutions can also reduce the time spent by women on unpaid domestic work and contribute towards the efforts to close the gender gap (United Nations, 2023).

2.6.4 Challenges Faced by Women in Accessing Finance in the Renewable Energy Sector

In general, SMMEs face significant barriers to investing in renewable energy, including low awareness, risk avoidance culture, lack of expertise, lack of capital and access to finance (European Union, 2021). However, the majority of these challenges are prevalent amongst women, mainly due to historical constraints already in existence. Female entrepreneurs encounter barriers daily, influenced by cultural norms and institutional policies (Shankar et al., 2019). In India, the key challenges faced by women entrepreneurs in the renewable energy sector involve unfavourable market and regulatory conditions, and financial barriers (UN Women, 2016). Whereas in Asia, the main barriers to renewable energy entry include inadequate access to institutional finance, social and cultural norms, legal and regulatory frameworks and lack of technical expertise (Shahzad et al., 2022).

In West Africa, the challenges for women entrepreneurs include handling operational complexities, technological ability, lack of training and development, recruitment challenges, financial constraints, cultural stigma, lack of balance between personal and business responsibilities (Phasa, 2015). Seemingly, in Morocco, women continue to face discriminatory cultural challenges, which hinder their access to education, finance, and employment opportunities (UN Women, 2016) . World Bank 2014 survey indicates that men are 20% more likely to access loans than women (UN Women, 2016). The lack of access to finance hinders

women's participation in entrepreneurial opportunities in Morocco (UN Women, 2016).

In Indonesia, factors that hinder women-owned SMMEs' access to finance in the context of the renewable energy industry include discrimination in financial institutions, insufficient collateral, policy gaps, and a lack of financial literacy (Antasya & Kersana, 2023). Similarly, in Latin America and the Caribbean, access to finance challenges include insufficient supportive policies, perceived risk, inadequate financial products, lack of collateral, and lack of financial literacy (Atahau et al., 2021).

In particular, women-owned SMMEs have higher rates of unmet financial necessities than their male counterparts (Grewe & Stein, 2011). The gender finance gap is more prevalent in developing economies and is higher for bigger businesses (IFC 2017; Carranza et al. 2018 as cited in United Nations, 2023). Access to affordable finance, availability of collateral, and other assets remain key constraints for female-owned SMMEs. This is of major concern, especially considering the huge capital requirement of the renewable energy sector. If women are to participate in the renewable energy sector, their financial needs have to be met. Otherwise, financial exclusion of women may deepen the prevailing gender disparities in the sector.

Although women face numerous constraints, some findings argue that women's own biases and perceptions hinder the full realisation of their potential (United Nations, 2022). The findings are similar to a GWNET survey (2019), which found that the key barrier to women's participation in the energy sector varies based on the economy (United Nations, 2022). For example, in developed economies women indicate that their perception of the energy sector is the primary barrier, whereas in emerging and less developed economies, women claim that the main barrier is access to finance and training (United Nations, 2022).

Chapter 3: Methodology

3.1 Introduction

This chapter outlines the research methodology that was implemented in this research project. Various aspects of methodology will be discussed, including the research approach, design, population and sample, source of data, the data collection instrument, and the data analysis method.

3.2 Research Approach

Research approach refers to the procedure adopted to conduct research, which includes an outline from the overall assumptions to detailed methods on how data will be collected, analysed, and interpreted (Grover, 2015). There are three main categories of research approaches: a qualitative approach, a quantitative approach, and a mixed approach (Creswell, 2009).

According to Grover (2015, p. 5),the three approaches can be classified as follows:

1. Quantitative: “approach of measurements and numbers.”
2. Qualitative: “approach of words and images.”
3. Mixed Methods: “approach of measurements, numbers, words and images.”

The research problem and purpose of the study inform the research approach (Grover, 2015). The decision on which approach should be deployed “is guided by philosophical assumptions an approach brings to the study; procedures of inquiry (research designs) the chosen approach it necessitates; and specific research methods of data collection, analysis, and interpretation as guided by the design” (Grover, 2015, p. 1).

Qualitative research is appropriate when there is little research on a phenomenon or concept and it therefore needs to be explored or understood (Creswell, 2014). There is a limited number of studies that focus on challenges faced by women-led businesses in South Africa (UNDP & DBSA, 2016 as cited in Small Business Development Agency, 2019). Previous literature presents similarities in challenges faced by women-owned SMMEs in developing markets (Nyathi, 2021). However, these studies lack specific focus on the renewable energy sector in South Africa. The research gap increased due to the pandemic, which presented new challenges and opportunities. Qualitative research is useful for exploring and understanding individuals’ or groups’ perceptions/perspectives of social or human problems. It is therefore used to explore the behaviours, perspectives, experiences, and feelings of people, and it

emphasises the understanding of these elements (Creswell, 2014). The objective of this study was to understand the financial barriers (experiences, feelings, perception or frustrations) that are encountered by female entrepreneurs in the South African context when venturing into the renewable energy sector.

With the research question being exploratory in nature, the study merits a qualitative approach. In addition, the results cannot be captured numerically, but in words, and therefore further justified a qualitative approach. The aim of qualitative research is to understand the subjects' realities from their perspectives, which can be achieved by reaching people who can share their unique reality within the study area.

Phenomenology is a powerful qualitative research strategy that is well-positioned for problem exploration, as it focuses on the study of an individual's lived experiences within the world (Neubauer et al., 2019). It is a useful strategy for researchers to identify the essence of human experiences about a phenomenon as explained by participants (Creswell, 2009). Phenomenological research is relevant in this research to understand the financial challenges experienced by women entrepreneurs as described by them. An inductive process was therefore employed.

3.3 Research Design

Research design is "a plan or proposal to conduct research" (Creswell, 2009, p. 5). It refers to the overall plan to address an issue that necessitates the integration of various parts of the study in an orderly and rational manner, thereby ensuring to solve the issue in an efficient way. It forms the blueprint for the collection, measurement, and analysis of data as well as the interpretations and the reporting of conclusions based on that data (Grover, 2015).

Iacobucci and Churchill (2018) indicate that exploratory studies are important in understanding the current status of events, obtaining new inputs and insights, making enquiries and assessing a phenomenon in light of new conditions. There is limited insight regarding financial barriers faced by female-led SMMEs within the renewable energy sector, hence women are underrepresented in this sector. This suggests the existence of challenges that must be explored and responded to at the appropriate level.

3.3.1 Unit of Analysis

The unit of analysis refers to the 'what' or 'who' is being studied (Kaai, 2019). The unit of analysis can be a word, a phrase, a character, and so on (Neuman, 2014). The unit of analysis for this study was "the entity" that is being studied. This included all female-owned SMMEs (as defined by DTI) operating within the renewable energy industry. The study focused on female-owned SMMEs located within the renewable energy sector in any province in South Africa.

3.3.2 Target Population and Sampling

A population is an "entire group about which some information is required to be ascertained" (Banerjee & Chaudhury, 2010, p. 1). This refers to the entire group that the researcher intends to study, analyse, and draw conclusions about. This includes all female-owned SMMEs (as defined by DTI) located in South Africa, which have been operational for at least a year, and are currently involved in renewable energy projects. Only SMMEs with majority female ownership formed part of the targeted population for this study.

A sample of participants was selected since it was not practicable to obtain insights from all women within the renewable energy sector. The sampling strategy is the plan to be adopted to ensure that the sample is representative of the population (Landreneau, 2006). The sampling procedures in qualitative research are not clearly defined in comparison to those used in quantitative research, however, the strategy should be aligned to the goals of the study and be feasible given the resources of the researcher. Consequently, the researcher should evaluate the suitable sampling strategy, taking into account the relevance and credibility of the study (Shaheen et al., 2018). As such, the selection of participants in qualitative research is dependent on the purpose of the research and is mainly at the researcher's discretion (Shaheen et al., 2018). Generally, in qualitative research, a researcher continues to sample until they no longer receive new information or gain new insights (Shaheen et al., 2018). This is supported by Landreneau (2006) who argues that in qualitative approaches, sampling continues until saturation. However, Cohen et al. (2007)argues that reaching a point where nothing new is encountered usually does not happen in phenomenology. This is affirmed by Adams and Van Manen (2017) who indicate that data saturation is irrelevant to phenomenology.

Probability sampling strategy tries to formulate an accurate representative sample with mathematically predictable errors (Neuman, 2014). Therefore, results from a sample selected using probability sampling are more representative of the population (Landreneau, 2006). A

probability sampling method is, therefore, preferred and considered a 'gold standard' for representative samples (Neuman, 2014).

However, most qualitative studies use non-random sampling methods and non-representative samples (Neuman, 2014). Non-probability sampling is a simpler substitute for probability sampling, even though it is less accurate in terms of sample representation (Neuman, 2014). Sample results from a non-probability sampling design are less likely to be reflective of the population because the sample is selected using non-random methods (Landreneau, 2006). This method is recommended when probability sampling is impossible, expensive, the researcher has time constraints, or random sampling is impractical (Neuman, 2014).

Non-probability sampling is further broken down into convenience methods, which refers to non-random sampling techniques in which the researcher selects participants as he/she comes across them, and quota sampling, in which the researcher first places participants in categories and then selects participants to reach a set number in each category, and subjective sampling in which the researcher selects participants based on judgement (Neuman, 2014). Subjective sampling is widely used and more relevant in selecting participants who are experienced with a particular subject (Adams & Van Manen, 2017). It is for this reason that the non-probability sampling method known as subjective sampling was utilised. This method allows the researcher the flexibility to specifically target or select participants with certain characteristics that, in the researcher's view, are aligned to the study at hand.

3.3.3 Sample Size

Determining appropriate sample size in qualitative research is ultimately dependent on the researcher's discretion and expertise in evaluating the quality of data gathered in relation to its intended purpose, specific research methods, purposeful sampling techniques used, and the expected research results (Sandelowski, 1995). Even one sampling unit selected purposefully for a study can answer a research question in a qualitative study that requires depth (Patton, 1990 as cited in (Shaheen et al., 2018). As such, a qualitative approach has no fastened rules in terms of sample size. For example, a big sample size may be useful for studying behavioural differences, whereas a smaller sample size can be useful for a detailed analysis (Shaheen et al., 2018). Sample size determination in qualitative research is influenced by various factors such as the nature of the topic and quality of data (Shaheen et al., 2018). (Gill,2020)

However, phenomenological approaches generally utilise small sample sizes that are homogeneous and purposive (Gill,2020). They select participants who can offer a relevant perspective on the phenomenon of interest who share a certain lived experience(Gill,2020). Previous literature recommends a minimum sample size of 12 to reach data saturation (Clarke & Braun, 2013; Fugard & Potts, 2014; Guest et al., 2006 as cited by Vasileiou et al., 2018). On the contrary, Hennink and Kaiser (2022) found that research using empirical data reaches saturation within a narrow sample size, generally 9 to 17, or 4 to 8 for focus groups (Hennink & Kaiser, 2022). Nevertheless, sample sufficiency should be appraised with close reference to the relevance to the study at hand and not necessarily with the application of numerical guidelines on sample size (Shaheen et al., 2018).

Saturation is the most common benchmark for assessing the sufficiency of samples in qualitative research (Hennink & Kaiser, 2022). However, there is general lack of clarity on how saturation should be assessed and the sample sizes needed to reach saturation (Hennink & Kaiser, 2022). The researcher's decision to stop collecting further data is informed by purpose, quality, and synthesis of the data already collected by the researcher (Shaheen et al., 2018). It is dependent on the researcher, what the researcher considers to be useful and credible, and what the researcher considers to be feasible with the timeframe and resources at hand (Shaheen et al., 2018). Therefore, a sample size of 12 was deployed for this study due to the time and resource constraints.

3.3.4 Data Collection Instrument

Data collection instruments are tools utilised for the collection of information such as interviews, questionnaires, surveys, and so forth. The appropriateness of the data collection instrument is vital in ensuring the validity and reliability of the research project (Creswell, 2014). Qualitative research methods provide a better understanding and detailed insights into participants' lived experiences. Qualitative research employs various data collection methods, including observations, interviews, textual data or visual data (Gill et al., 2008). Data collected through interviews is very common in qualitative research (Shaheen et al., 2018). This is because interviews provide richer data in a straightforward manner (Barrett & Twycross, 2018). The research question (Refer to Appendix A) guides the type of interview to be used, together with the researcher's preference and the nature of the participants(Barrett & Twycross, 2018). Interviews are a powerful adaptable data collection tool, which enables multi-sensory angles

to be utilised (Cohen et al., 2007). This is supported by Alshenqeeti (2014) who argues that interviews allow researchers to investigate participants' views in more detail. They are effective in obtaining an understanding of participants' interpretation of their world and experiences (Cohen et al., 2007). Interviews are considered more powerful data collection tools when compared to other tools, such as questionnaires (Utibe, 2020).

Semi-structured interviews consist of key questions that assist to align with the area being explored, but also allow the researcher and participant to diverge in order to pursue an idea or response in more detail (Gill et al., 2008). However, some researchers argue that the COVID-19 pandemic has posed significant challenges to the use of semi-structured interviews, such as a shift to remote methods, which poses constraints in maintaining the natural flow of conversation and capturing the non-verbal cues, thereby affecting the depth and quality of data collected (Kakilla, 2021). On the contrary, this method is known to promote guided conversations and facilitate the collection of qualitative, open-ended data, allowing researchers to gain insights into participants' thoughts, feelings, and beliefs about specific topics. It is considered more effective in building rapport, which leads to richer and more honest responses (DeJonckheere & Vaughn, 2019). To mitigate challenges related to virtual settings, the researcher should remain adaptable and adjust questions based on the conversation flow, which can uncover deeper insights and improve the quality of data collected (Kakilla, 2021). Therefore, the use of semi-structured interviews is still superior in gaining deeper insights from participants, but should be tailored to overcome the challenges posed by a virtual setting. The semi-structured interview method was therefore preferred for this study as it provides the flexibility of obtaining more insights while still being efficient in terms of time. Consequently, primary data was collected through virtual interviews.

3.3.5 Data Collection Procedure

The researcher should obtain approval from a relevant research ethics review board before the research begins (Sutton & Austin, 2015). As such, once ethical clearance was obtained from the University of Cape Town on 13 January 2025, female entrepreneurs within the renewable energy industry were identified from various platforms, including social media and Google. These female entrepreneurs were contacted via email and telephone and invited to participate in the study.

Data was collected by means of interviews from 12 female entrepreneurs within the renewable

energy industry. The researcher personally performed the fieldwork. An interview schedule with questions on barriers to finance access faced by women-owned SMMEs was prepared.

Participants were informed about the details of the study and given assurances regarding ethical principles, such as anonymity and confidentiality. This practice is critical in assisting participants to understand what to expect from the interview and improving the likelihood of honest responses (Gill et al., 2008). In addition, it was the primary responsibility of the researcher to safeguard participants' rights and data, and inform them of their rights, including the right to withdraw from the study at any time without adverse effects (Sutton & Austin, 2015). Therefore, the participants signed consent forms confirming that the interview was not conducted under duress and that they had the freedom to not participate in the study (Refer to Appendix B). The researcher assured confidentiality of their identity and the information collected. Firstly, the participants' names were replaced with numbers and letters to ensure they remain anonymous. Secondly, the recordings were kept in a password-protected laptop, which only the researcher can access. Virtual interviews were then conducted with the participants at the agreed time.

Interviews should be audio recorded and transcribed verbatim afterward, which ensures protection against bias and provides a permanent record of the conversation (Gill et al., 2008). In addition, field notes are essential during interviews as they complement audio recordings and allow the researchers to document their impressions, non-verbal cues, and behaviors that may not be captured by the audio recording (Sutton & Austin, 2015). The researcher recorded the interview through Microsoft Teams and Google Meet, depending on the participants' preferences.

3.3.6 Qualitative Data Analysis

The most crucial aspect of data analysis is to remain true to the participants' voices, as the objective is to interpret and report their experiences accurately (Sutton & Austin, 2015). In addition, reflexivity, which involves researchers being aware of their own biases, backgrounds, and influences on the research process, is critical in enhancing the trustworthiness of the data (Busetto et al., 2020). Trustworthiness is one of the key elements that makes research findings worthy of attention (Lincoln & Guba, 1985). Trustworthiness criteria are concerned with the acceptability and usefulness of a study for various stakeholders (Nowell et al., 2017). Trustworthiness encompasses various elements, which include credibility, transferability,

dependability, and confirmability, to parallel the conventional quantitative assessment criteria of validity and reliability (Nowell et al., 2017).

a) Credibility

Lincoln and Guba (1985)claim that the credibility of a study is determined when researchers or readers are confronted with the experience and they can recognise it. Credibility addresses the 'fit' between respondents' views and the researcher's representation of them (Tobin & Begley, 2004 as cited inNowell et al., 2017). Credibility addresses the question of how the findings are aligned to reality (Anderson et al., 2014). Lincoln and Guba (1985) recommend various methods to address credibility, for example, prolonged engagement, persistent observation, data collection triangulation, and researcher triangulation. They also suggest members' checking external debriefings on the research process, which may increase credibility (Nowell et al., 2017). This study's credibility was ensured by sending a copy of the interview transcript to the participant so that they could confirm the alignment and credibility of the contents.

b) Transferability

Transferability refers to the extent to which the research findings can be applied to a broader context. It refers to the 'generalisability' of the findings (Nowell et al., 2017). The researcher may not know stakeholders who may wish to rely on the study, thus sufficient information should be provided to allow those who wish to transfer the findings to understand the context and apply their judgement in transferring findings to other contexts (Lincoln & Guba, 1985). To support this, the methods and time frames of data collection in the study should be fully described, including the duration of the field study, as these factors influence the degree to which the completed research can be applied to another context (Anderson et al., 2014). In this study, detailed records including how data was collected and analysed to derive the findings and conclusions were kept and documented. This will allow evaluation by other researchers on the applicability and context of the findings.

c) Dependability

Hammersley (2013) indicates that dependability makes sure that if other researchers were to examine the data of the research, they would arrive at similar findings, interpretations, and conclusions about the data, demonstrating that there was not anything missed in the research study or that the researcher was not misguided in their final report. The readers should be able to understand and evaluate the research process to examine the dependability of the research (Lincoln & Guba, 1985). Peer review or debriefing are some of the recommended measures to

ensure dependability. Having another researcher read and react to the field notes with their own interpretations is key in ensuring dependability (Anderson et al., 2014). Dependability was ensured by availing sufficient and appropriate records involved in the research process to enable verification and auditing.

d) Confirmability

According to Lincoln and Guba (1985), confirmability is achieved when the requirements of credibility, transferability, and dependability are met. It is concerned with demonstrating that the findings are deduced from the collected data and not the researcher's perception or imagination. Objectivity is the comparable positivist assumption of confirmability. Qualitative researchers who pursue objectivity may rely on the involvement of other researchers and on constructs like precision and accuracy in their research practice (Anderson et al., 2014). Confirmability was ensured by safekeeping the detailed records involved in the research processes, including data collection and analysis.

Chapter 4: Discussion of Findings

4.1 Introduction

This chapter presents a discussion of the study's findings in line with the methodology outlined in Chapter 3. The primary aim was to explore the financial access barriers faced by women-owned SMMEs in the renewable energy sector. Section 4.2 provides an overview summary of the participants' demographic characteristics. Sections 4.4 and 4.5 comprise critical information of this study, which includes the analysis of key findings arranged in accordance with the two research questions and objectives. The interviewees' statements are presented to reflect their emotions, opinions, and supporting quotations. To maintain the validity of responses, they are recorded and quoted verbatim, regardless of any language errors. The data in this study were analysed using thematic analysis. The findings are initially categorised into first-order dimensions, followed by second-order themes, and ultimately, their aggregate dimensions. The aggregate dimensions will reflect the primary themes of the access to finance challenges faced by women-led SMMEs within the renewable energy industry in South Africa.

4.2 Description of the Sample

Primary data was collected in the form of virtual interviews conducted with 12 women within the renewable energy industry across different provinces in South Africa. All 12 participants who were identified and approached for the study agreed to participate and completed the interviews, resulting in a response rate of 100%. Participants were selected using a purposive and snowball sampling strategy, which helped ensure that those contacted had a relevant profile and were willing to share their experiences. This high response rate may also be attributed to the direct referrals and pre-engagement communication, which fostered trust and clarity about the study’s purpose. No invited participants declined, withdrew, or were unavailable during the data collection period.

These participants represent a diverse range of areas within the renewable energy sector, including solar installations and maintenance, solar farm development, wind farms, hydrogen energy, green ammonia production, and agrivoltaic energy generation (see Table 4.1). The businesses vary in size, from emerging start-ups to more established entities within the sector, but all have been in operation for more than one year and fall within the DTI’s definition of SMME. The participants are founders or business owners with the majority shareholding in their businesses. These entrepreneurs had firsthand experience navigating barriers within the

sector, particularly in accessing finance. These participants are considered relevant in providing critical insights, experiences, and frustrations when accessing finance as female entrepreneurs within the industry. By engaging with participants across different provinces and industry segments, the study captures a broad spectrum of financial barriers, thereby offering a comprehensive understanding of these barriers.

Table 4.1: Population Representation

The table below provides a representation of the participants of this study:

Participant	*Province*	*Company Age (Years)*	*No. of employees*	*Sector*	*Size*	*Date of interview*	*Duration of interview*
RE1	Limpopo	17	4	Photovoltaic (PV) solar EPC contractor	Micro	20 Jan 2025	00:25:32
RE2	Limpopo	6	3	Utility-scale renewable energy developer	Micro	16 Jan 2025	01:15:20
RE3	Mpumalanga	6	4	Photovoltaic (PV) solar system service & maintenance	Micro	23 Jan 2025	00:36:15
RE4	Gauteng	9	40	Solar and wind peripheral products/services	Small	23 Jan 2025	00:44:36
RE5	Western Cape	5	4	IPP (independent power producer) - Wind	Micro	29 Jan 2025	01:25:01
RE6	Limpopo, Gauteng, North West	6	4	Photovoltaic (PV) solar EPC contractor	Micro	09 Feb 2025	00:33:34
RE7	Gauteng, Western Cape, North West, Limpopo	5	5	Photovoltaic (PV) solar EPC contractor	Micro	31 Jan 2025	00:45:43
RE8	Gauteng	15	40	IPP - wind and solar	Small	14 Feb 2025	00:50:56
RE9	Northern Cape, Free State	16	6	IPP - green ammonia, hydrogen, solar and wind	Micro	14 Feb 2025	00:52:08
RE10	Gauteng	7	3	Photovoltaic (PV) solar EPC contractor	Micro	18 Feb 2025	00:47:30
RE11	Limpopo	8	9	Photovoltaic (PV) solar EPC contractor	Micro	21 Jan 2025	00:56:12
RE12	Gauteng	12	5	IPP - agrivoltaic and solar	Micro	21 Jan 2025	00:27:44

Source: Researcher's estimate from study data

4.3 Thematic Findings: Financial Barriers Faced by Women Entrepreneurs when Venturing into the Renewable Energy Sector

The thematic analysis of the responses by the women entrepreneurs identified the following themes: bureaucratic hurdles; early-stage risk aversion; lack of industry-tailored capital, high expected returns; lack of experience; personal barriers; and perceptual barriers (see Figure 4.1) These encompass the financial barriers faced in venturing into the renewable energy sector by the women interviewed. The key themes in relation to the challenges faced are presented in Figure 4.1 are discussed in the subsections that follow.

4.3.1 Bureaucratic Hurdles

Participants expressed struggles with the prolonged application process and delayed response from financing institutions. The impersonal nature of interactions, lack of dedicated support, and physical distance were highlighted as some of the barriers when navigating the bureaucratic processes, especially with the development finance institutions. This ties with findings of some researchers who confirmed that women generally find the finance application process to be complex and time-consuming, which deters them from seeking this form of finance (CCSA, 2023; Gruver et al. 2024).. These delays threaten the ability of start-ups to survive in this industry because they are highly dependent on quick funding to cover their operational expenses. Therefore, they cannot afford to wait for extended periods without financial support due to resource limitations. The respondents expressed their frustrations using the sentiments below:

> **RE4***: It takes long for you to be funded. The processes take long. They would take at least six months. So within that six months, if you are not working and you are depending on this as your bread and butter, that's a challenge, because you can't really fully operate.*

> **RE11**: *You'll travel about 200 kilometres, there's not even a small office where we say people, all SMEs, will go and inquire what's happening. They will tell you everything's on the website.*

Evidently, participants are frustrated over the inaccessibility of financial institutions, compounded by lengthy application processes that make follow-ups challenging, especially at the start-up phase. Furthermore, the delays in decision making hinder these SMMEs' ability to meet their operational cash commitments. This study also found that these entrepreneurs end

up relying on personal savings to fund their start-ups due to financial barriers encountered.

4.3.2 Early-stage Risk Aversion

The study revealed that women entrepreneurs within the renewable energy industry often grapple with risk aversion, which deters them from seeking finance in the early stages of the business. Some participants indicated that their societal responsibilities erode their financial risk appetite. One participant expressed:

> *I'm already thinking about what if it doesn't work out, you know? What about schooling for the kids? So I think, with all the societal responsibility that women carry. Our level of risk-taking in terms of how we approach finances is different to our counterparts.*

Other participants expressed their preference for organic business growth and therefore prioritise stability over rapid business expansion through loans. One of the participants expressed: *"I wanted the organic growth of the company because, like I say, ultimately, it's all about minimising the risk."* The participants linked their quest for risk aversion to volatile demand levels prevalent in the industry, thereby exacerbating the uncertainty in cash flows. One participant noted:

> *When I started the business, the demand was really high, with load shedding being at level five or six. Now, having gone through almost a year period with no load shedding. The supply is super high. The demand is super low. So, imagine if I'd gone into that financing as a start-up, and then this happens. Where would that lead us?*

These sentiments highlight the reluctance of females to take financial risks without a secure safety net. These findings are consistent with previous studies (Al-Harthi & Alharthi, 2013; Pavlova & Gvetadze, 2023) that confirmed that women entrepreneurs have a lower appetite for debt due to risk aversion. Women entrepreneurs who prefer steady, controlled expansion while avoiding the negative impact of volatile demand levels are discouraged from seeking finance. This market demand volatility is largely driven by load shedding, as demand for solar installations and other energy alternatives surge during periods of power outages and diminish when the energy supply from Eskom stabilises.

The study also found that risk aversion and concerns regarding market demand are no longer identified as barriers once the SMMEs are well established in the industry. This is due to the fact that women may have built rapport, developed a more established market presence, secured

sufficient financial resources, and refined their business models. As a result, the immediate risk concerns identified at the start-up phase become less prominent.

4.3.3 Lack of Industry-tailored Capital

The participants felt that financing criteria employed by most financing institutions generally focus on revenue generation, which is a challenge because renewable energy development projects typically involve long gestation periods before revenue is generated and require huge upfront costs. Traditional assessment methods used by lenders do not adequately account for these industry-specific dynamics. Lenders tend to be more inclined to finance projects with certainty around revenue generation, a characteristic that is often lacking in renewable energy projects. This discovery has not been connected to any findings from previous research as an access to finance barrier for SMMEs. This could be attributed to the fact that previous literature on access to finance barriers focused on various SMME sectors, but not the renewable energy sector. These various SMMEs would, in general, be able to project their expected revenue for the coming year and meet this criterion, something that is not prevalent in the renewable energy sector. Hence, the uniqueness of the sector is bound to present additional financial barriers. This is also evident in the sentiments expressed by some participants:

> **RE2**: *I've been asked so many times, what is your six months revenue because these people do not understand this industry […] and for us as developers, there is no revenue which is a major barrier when raising capital because developing projects is a very long process […] what you need is risk capital, where would you get risk capital?*

> **RE4**: *…you are not making profit. You're not selling electricity, because most of the times you've not constructed the plant. So it's like, how do you show that your company still makes sense financially? How do you show that you can co-finance?*

Participants further expressed apprehensions regarding the limited availability of women-targeted financing initiatives within the industry. Although these participants acknowledge the availability of women targeted financing initiatives such as the South African Women's Entrepreneurial Fund (SAWEF), IDC – Women's Entrepreneurship Fund, amongst others, there is nothing in the stipulated requirements that prioritises these women or aligns with the challenges that they face: *"there is nothing in them that says it is for women, it is only on*

paper." Participants expressed that although the availability of these initiatives is undisputed, the terms and conditions of these initiatives are as follows: *"it's the same as any other in terms that you get anywhere else".* This suggests that accessibility of these initiatives remains a challenge, as they perpetuate the same financial barriers encountered with other financial providers.

Furthermore, the study found that women entrepreneurs struggle to attract finance for certain parts of the value chain as investors and financial institutions are reluctant to take on responsibilities associated with high-risk components of the industry, preferring to allocate resources to phases or areas that are considered predictable and safer. The participants expressed these sentiments:

> **RE2**: *So you are using, you are applying for money in order to be able to use it for development purposes, which is sunk costs, so there's no one who's willing to fund sunk costs. So I went into that knowing very well that there's no one who's able to fund.*

This suggests that the development phase of a solar farm project is considered risky, as ultimate success is not guaranteed, making grants essential for covering this phase.

> **RE12***:…there's no one who is willing to do the part that has like the higher risk, and so you have to find, you have to really strive to get the development finance that's really, like the gap.*

In addition, certain parts of the industry such as green hydrogen are still in their infant stage, and this novelty contributes to a widespread perception of high risk. According to the participants, these misconceptions are fuelled by the lack of knowledge about the industry's operational realities. Previous literature aligns with this finding, confirming that investors perceive the industry to be risky and therefore adopt various strategies to mitigate the risks and navigate the complexities of the industry (Khanzadi, 2023). This constrains the availability of finance and creates a finance gap for certain parts of the value chain within the industry. For women entrepreneurs, this constraint is compounded by the high-risk perception already attached to this gender.

4.3.4 High Expected Returns

This research found that women entrepreneurs often encounter stringent financial expectations that make access to capital particularly challenging when venturing into the industry. Some

participants expressed that banks require businesses to demonstrate a turnover that is at least three times the loan amount before considering approval, creating a significant barrier for early-stage ventures with little to no revenue. This issue is particularly pronounced in this sector, which is characterised by high capital requirements. Consequently, some women resort to informal lenders, especially for purchase order financing, where they are subjected to exorbitant charges and exploitative terms due to their financial vulnerability. One participant expressed:

> **RE11**: *So the guy drafted in a partnership, sort of a partnership agreement. He said to me, he wants the 50% of my profit just for him to lend me R50,000 so you can imagine the level of desperation that people have.*

Furthermore, these women expressed that the borrowing costs are consistently high, with interest rates above the prime lending rate, making capital even more expensive. These rigid financial demands disproportionately impact small and emerging businesses, particularly those led by women, who already face systemic barriers in securing investment due to gender-based biases in the financial sector. These findings were also confirmed by other studies (Atahau et al., 2021; Hector & Hattingh, 2024) , which found that female-owned SMMEs often face high interest costs due to a high-risk perception attached to this gender, which may deter them from seeking or accepting finance.

Financing costs significantly impact returns and the viability of clean energy projects more than fossil fuel projects (Dhruba, 2018) . High finance costs lead to compressed profit margins, thereby hindering business growth and increasing default risk. The profit margins of IPPs are already under pressure due to the declining procurement prices of clean energy supplied to Eskom. In fact, IPPP (2024) has documented a notable consistent decline in South Africa's procurement tariffs for clean energy, resulting in tariffs that are some of the lowest in the world. Obviously, this adversely impacts SMMEs in their formative stages, jeopardising their ability to establish profitability and secure financial support.

4.3.5 Lack of Experience

The study found that an inability to demonstrate capabilities through previous experience hinders finance access. Finance providers are reluctant to advance funds where previous success in a similar project cannot be demonstrated, regardless of the profitability potential that is demonstrated by the entrepreneur. One of the participants expressed:

> **RE2:** *You will still be asked, have you done this before?[…] when I did my first project, the question that was asked was, "Is this my first project? What have I done before?" So, you have to have some type of previous experience, right? I didn't have that.*

This might be amplified by the high-risk perception attached to women by financial institutions and investors. Another participant expressed this:

> **RE11:** *One of the major barriers I've faced is the lack of trust and credibility that lenders seem to have in women-owned businesses. There is a perception that we lack the technical expertise, experience, and financial acumen to handle larger-scale projects and manage the associated risks […] I don't know how many purchase orders they've been cancelled under my name…*

The findings are aligned with some of the findings outlined in the literature review section of this study. Women with less experience face more challenges in meeting the criteria set by financial institutions, thereby affecting their chances of obtaining loans (Pavlova & Gvetadze, 2023). Company experience significantly impacts women's ability to access finance by influencing perceptions of credibility, financial performance, and knowledge of financial processes (Singh & Dash, 2021). This is concerning, particularly given that the industry is in its early stages, and a lack of expertise is an inherent challenge within the sector. Women would be disproportionately affected by this requirement because they typically lack expertise. Female entrepreneurs lack experience due to historical constraints, cultural norms, and institutional policies, which already disadvantage women in this male-dominated industry (European Commission, 2022; Shahzad et al., 2022; Shankar et al., 2019). Nevertheless, participants found that this hindrance is alleviated once they have completed successful projects in the sector and have built relationships with the financiers.

4.3.6 Personal Barriers

Lack of collateral and a negative personal credit profile were identified as internal or personal barriers that ultimately hinder finance access, as discussed in the following sections.

a) Lack of Collateral

The majority of the participants identify the collateral requirements from financial institutions, including banks, as a significant barrier, especially for start-ups. Some researchers have found that female entrepreneurs are significantly more likely to be asked for a guarantor compared to

their male counterparts, despite similar approval rates for loan applications (Brock & De Haas, 2022) . The findings of this study are consistent with findings from other researchers (Etim & Gervase Iwu, 2019) who found that the collateral requirement disadvantages many women, especially in sub-Saharan Africa where women do not have property or assets that can be mortgaged. Women generally lack traditional assets required by banks as security for loans, hindering their ability to secure loans (Hector & Hattingh, 2024). Women entrepreneurs, particularly those starting new ventures, generally lack the adequate assets needed to secure funds, which constrains their ability to access finance (Brock & De Haas, 2022). Most start-ups are not generating sufficient revenue, and do not have assets that can be utilised as collateral. Therefore, some of the requirements set by lenders automatically disqualify women in the industry. Below are statements made by some of the participants expressing their frustration with regards to the collateral requirement.

> **RE2:** …*So at the end of the day, I am starting from scratch, I don't even have collateral. I don't even have any balance sheet to start with. That still does not help. No one has sort of factored that […] And I am one of the people who developed a project from zero. I literally created value of a project that is close to 2 billion rand from nothing. I started from nothing. There was nothing on the ground, went to a community, did all the work, but I was still asked, "What is my skin in the game?"*

> **RE8:** *Most women don't have asset base. So that also becomes a problem, because if you have to raise collateral the house is not in your name, then it poses the question, because then you need the consent of the other person.*

As such, at least 75% of the participants revealed that they had to rely on personal savings to fund their businesses in the sector due to their inability to meet the financing requirements. One of the participants whose company was instrumental in the development of a R2 billion solar farm indicated that she believes that her renewable energy business that was used for this solar farm project would not exist if she relied on accessing finance from any of the financial institutions. She had to start a consulting business that financed her solar farm development project. This confirms findings of others (Zhu & Kuriyama, 2016), who found that female entrepreneurs are forced to rely on their own personal savings, family, friends, or community groups to fund their businesses. The finance limitation hinders women's ability to grow and scale their

business. However, the collateral requirement was not identified as a barrier past the start-up phase, as these women would have built stronger balance sheets.

a) Poor Personal Credit History

The participants indicated that credit history, even in their personal capacity, is a hindrance to them accessing finance as start-ups venturing in the sector. Therefore, poor personal credit record creates barriers to access to business loans. This finding underscores the interconnectedness between an individual's financial decisions and corporate financial outcomes. This is consistent with previous studies, which revealed that lenders assess the personal credit history of business owners when evaluating loan applications for SMMEs (Alok et al., 2024). Although the evaluation at a personal level might be seen as a hindrance, it is much like a double-edged sword; banks require this assessment to safeguard themselves against potential defaults. In fact, comprehensive credit risk management strategies enhance the performance of financial institutions and mitigate potential losses (Mogga et al., 2018). As such, a strong personal credit score can enhance the perceived creditworthiness of the business, making it more likely to secure funding.

Despite the recognised importance of assessing personal credit risk, it remains a barrier to women's access to finance, resulting in lost opportunities and, consequently, constrained growth prospects. This poses an even greater obstacle in this vital sector, which is defined by its high risk and significant capital requirements. One of the participants indicated that she currently has a signed purchase order, and it is one of the biggest projects she has ever been awarded; however, all her loan applications have been rejected, not only by the commercial banks but by development finance institutions as well. Below the participants express their frustration and disappointment with the requirement:

> **RE11:** …*I've reached where I don't know what to do anymore, because I don't get assistance, I've been rejected. The reason is because the same story of the credit record that I have, this is for one of the projects, the bigger project that I've ever had.*

> **RE4**: …*our financial systems, when one is looking for a business loan, whether your business is profitable so it's linked to your credit profile as a person, and your business could be profitable, can pay its loans. But if you once had a history of a bad credit profile, then that affects the delays, or you do not get the full amount that you are requesting, and that challenges really prohibit you in doing business timelessly, and*

you find that you have lots of delays because of cash flow issues…

b) Perceptual Barriers

The result of this study paints a very gloomy picture as the participants believe that the preconceived notions and psychological stereotypes ingrained in this male-dominated industry are a key constraint to accessing both equity and debt finance – a challenge they believe is unlikely to change. This concurs with the study by Pavlova and Gvetadze (2023) who argue that resource holders will discount female entrepreneurs and the investment-worthiness of their enterprises. Below are expressions of the gender bias stereotypes that these participants have experienced. RE4, who sought equity finance from an all-male private company, expressed her sentiments:

> **RE4:** *…the client also had given an offtake to say, as soon as this is done, we will pay it off […] but after three weeks of interaction and submitting, they then said, "Oh, no, you know, the risk with all female team is that project might just not be completed on time due to personal factors that usually affect females," a blow in my stomach.*

Similarly, RE2 expressed the following:

> **RE2**: *They don't even trust your capabilities, I get asked, "Who are my real partners?" It is very offensive. So as a woman, whenever you're sitting here, you're thinking, you've done well, but people psychologically, they don't trust because they think there is someone's behind.*

Interestingly, some female entrepreneurs in the industry have noted that investors prefer male-led teams and feel confident investing in businesses dominated by a male presence. These women are therefore compelled to ensure their teams are dominated by males to align with investor expectations to secure finance:

> **RE4**: *Some of the mitigating issues that one has to do as a female is to actually have a 40 female, 60 male ratio when you put your team together, because I've realised psychologically, men would want to invest in teams where they see there's a dominance of other males.*

This practice may undermine the progress of gender mainstreaming and further perpetuate gender disparities. The disparities are further exacerbated by superficial inclusion through the

structural exclusion of women, where some businesses within the sector are presented as female-owned, which are in substance owned by males, a concept generally referred to as "fronting". This involves appointing women to meet the legal requirements while denying the genuine authority, decision-making power, and other responsibilities or opportunities attached to their role (Dennis et al., 2022). One participant indicated:

> **RE11:** *I don't know how many men approached me, but when I read the terms, it means that these people will just use my face.*

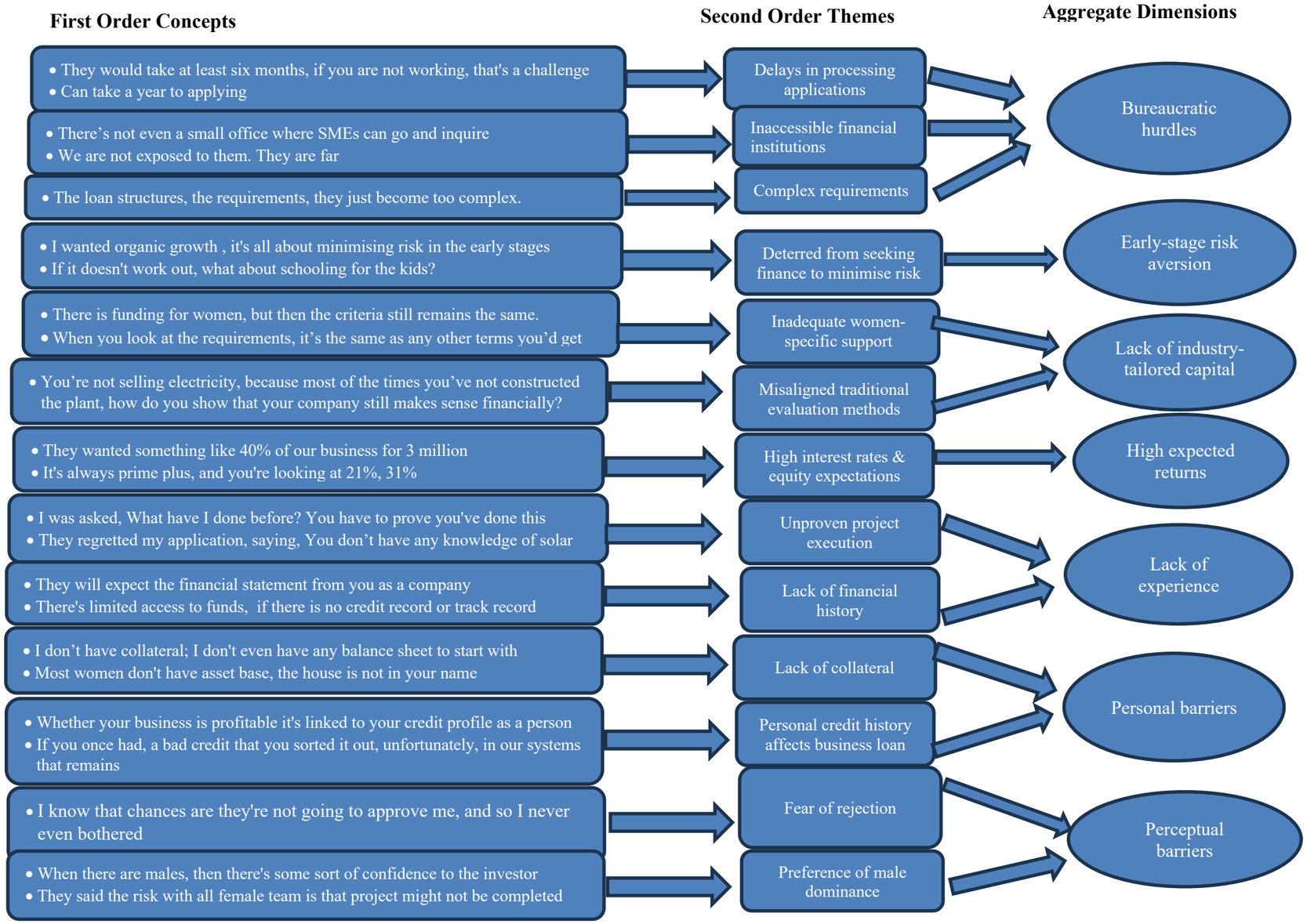
This unethical approach is frequently employed to exploit policies and programmes aimed at fostering female entrepreneurship and promoting gender equality in the sector. Therefore, this approach not only undermines the intended purpose of the initiatives designed for female entrepreneurs but distorts the substance of the competitive landscape and creates an uneven playfield leading to a lot of mistrust and skepticism towards women-owned enterprises. This makes it even harder for genuinely women-led businesses to be taken seriously and secure the necessary financing.

In addition, women entrepreneurs often expressed that they encounter psychological hurdles when seeking financial support, mainly due to the internalised effects of repeated negative experiences. This is expressed by one of the participants:

> **RE6:** *…not even one person that I know have ever got funding or approval I was never positive about getting funding elsewhere, because I don't know, I don't relate to anyone who's ever got funding.*

This fosters self-doubt and reluctance to engage in funding pursuits due to the anticipation of rejection. This is consistent with previous findings by Pavlova and Gvetadze (2023), who confirmed that fear of rejection and internalised discrimination are amongst the reasons for the credit gender gap.

Figure 4.1 Data Structure Summary of Key Themes to Find Out from SMMEs what the Access to Finance Barriers are when Venturing into the Renewable Energy Industry



Chapter 5: Conclusion and Recommendations

5.1 Introduction

This chapter presents conclusions and recommendations derived from the empirical findings of this study. These conclusions and recommendations are grounded in the responses to the problem statement, the research objectives, and the overall findings of the research.

5.2 Summary and Conclusions

This study aimed to investigate the financial barriers faced by women-led SMMEs, particularly in the context of the renewable energy industry. Evidently, women in the renewable energy sector face substantial financial barriers when venturing into the industry, many of which may persist even after they have established their businesses in the sector. Some of these barriers are unique to the industry, highlighting the distinct nature of this industry and underscoring the necessity for targeted reforms to effectively overcome these challenges.

A significant finding of this research is the evident lack of industry-tailored business evaluation methods, which ultimately disqualifies women-owned SMMEs within the sector from financial access. The continued reliance on traditional business evaluation methods by financiers, despite the unique challenges and opportunities inherent in the industry, reflects a gap in sector-specific knowledge. The lack of alignment between the women-targeted initiatives and women's financial barriers also highlights the lack of understanding of these barriers, hence the misaligned response. This not only restricts access to appropriate funding but also perpetuates a cycle where women struggle to secure the necessary finance and meaningfully participate in this critical industry. Addressing this issue requires the development and implementation of industry-tailored evaluation methods that align with the distinctive features of the renewable energy sector.

South Africa, through the Department of Mineral Resources and Energy, has implemented various initiatives to support women in this industry. However, bureaucratic hurdles remain a significant obstacle for SMMEs, particularly for women entrepreneurs in this heavily regulated industry. The lengthy turnaround times, lack of access to information, complex application processes, impersonal nature of services, and misalignment of these initiatives with financial barriers faced by women impede entry and growth within the sector. The fact that both start-ups and established SMMEs encounter lengthy turnaround times as a challenge suggests that the SMMEs may be subjected to the same amount of scrutiny regardless of size. This further

highlights the knowledge gap and, therefore, the lack of industry-tailored evaluation methods, leading to inefficiencies within the system. This industry remains in the early stages of development and, as such, a widespread shortage of knowledge and expertise is probable. Nevertheless, these delays may also be linked to the perceived high-risk long-term nature and capital intensiveness of the projects within the industry, necessitating heightened scrutiny and risk management procedures by the financiers. The knowledge gap further exacerbates uncertainties, necessitating the adoption of stringent risk management measures for financiers to protect their investments. Unfortunately, these much-needed risk management measures have dire consequences for women-owned SMMEs within the sector, thereby hindering growth and sustainability. For example, the high-risk perception associated with the industry not only makes it challenging for women to secure necessary funding but also leads to higher expected returns as investors and financiers seek risk compensation.

Despite the progress made towards gender equality, female entrepreneurs continue to face significant barriers when seeking financial support due to ingrained social and psychological stereotypes. A troubling discovery of this study is the practice of fronting, where companies are owned by females only on paper to gain access to certain benefits. On the other side of the coin, women entrepreneurs have also resorted to fronting, where they feel compelled to create a façade of male dominance in their teams to appease investors' expectations and secure financing. This practice not only undermines the genuine gender mainstreaming efforts but also perpetuates inequalities by restricting access to both debt and equity financing by authentic female-owned businesses. The practice also distorts the competition landscape in the industry and misaligns the benefits of finance, as it disproportionately favours businesses that may not reflect genuine diversity. This deep-rooted culture is unlikely to dissipate in the short term and requires reforms and interventions aimed at transforming investor attitudes and ensuring that the misalignment in the flow of resources is addressed.

Evidently, societal responsibilities often carried by women entrepreneurs play a significant role in limiting their appetite for financial risk, which ultimately hinders business growth. In addition, the link between personal and credit profiles further discourages women from seeking finance due to anticipated rejection. The fact that personal financial setbacks heavily impact business finance access, regardless of business prospects, reveals a fundamental flaw in the financial systems. This unfair projection highlights a lack of thorough analysis, showcasing inefficiencies within the system. It underscores a framework that resorts to

rejection as a risk-avoidance strategy rather than conducting a proper analysis of the risk that will inform an appropriate risk-response measure.

These challenges, compounded with constantly decreasing Eskom tariffs, intense competition, volatile demand levels driven by loadshedding, and the dominance of multinationals with big balance sheets, threaten the survival of women-owned SMMEs in the sector. The mistakes of the fossil fuel industries may be perpetuated in this already male-dominated industry, thereby marginalising women-owned SMMEs into extinction.

5.3 Policy Implications and Recommendations

Addressing these hurdles requires regulatory reforms, streamlined processes, and improved access to clear, industry-specific information. The findings underscore the importance of digitalisation in order to simplify the finance application process. While South Africa has established an Energy One Stop Shop website to streamline energy application processes, the website is not assisting with breaking the barriers to financial access once they have obtained the necessary licence. South Africa can learn from countries like India who have implemented a centralised online portal that serves as a resource for accessing diverse financing schemes for renewable energy projects through the Indian Renewable Energy Development Agency (Kwatra Sameer, 2019). A centralised online platform exclusively dedicated to facilitating access to finance for renewable energy projects can be created where entrepreneurs, particularly females, can access information on available support, webinars, and workshops. This could involve offering dedicated workshops, webinars, and advisory services to assist entrepreneurs in understanding the loan application processes and eligibility criteria. The website can link or integrate into the existing Energy One Stop Shop website to enhance accessibility and visibility. Such integration would also alleviate the frustrations of having to resubmit the licences and permits when seeking finance, thus streamlining the process. This approach will not only break the barrier of a lack of access to information and delays in the due diligence process, but also provide networking opportunities for women in the sector.

In addition, several financial instruments such as blended finance, impact investing, and green bonds, to name a few, could be employed to mitigate the risk inherent in this sector and encourage investment; however, limited awareness and understanding are the key hindrances to access. Moreover, it is important that women-targeted initiatives undergo regular reviews to ensure that qualifying criteria effectively addresses specific barriers that females encounter in accessing finance. The review should also evaluate the cost of finance and other terms of

the finance to ensure that they are indeed favorable to women and distinct from other terms that women find out there. Initiatives are not targeting women if they still perpetuate the same barriers that women face elsewhere. A loan at prime minus or revenue-based repayment terms would assist these women in accessing cheaper forms of finance. Standardised methods of evaluating businesses specifically tailored for the industry should be designed and implemented. Commercial banks and other investors should be encouraged to review their evaluation processes and ensure they are aligned with the realities of the industry. The interconnectedness between the personal and business profiles should also be addressed by this review. If the project demonstrates great potential, the bank should perform an analysis of the nature of circumstances that led to defaults and implement mitigating measures rather than just automatic rejections. These would ensure that female entrepreneurs are indeed prioritised and that the initiative achieves its objective of gender mainstreaming.

All these efforts will prove futile if the issue of fronting remains unaddressed, as the flow of resources will continue to be misaligned. Efforts to improve financial accessibility may inadvertently exacerbate this unethical and exploitative behaviour, as the enhanced accessibility of financial resources to women may heighten the desire of men to exploit these opportunities. However, this issue is a tricky one as both parties – the "fronter" and the "frontee" – would generally agree to protect their agreement, mainly due to information asymmetries. Women are disadvantaged by this practice as they fail to realise their full potential under these exploitative arrangements. This is not just a financial barrier, but a psychological barrier, which can only be stopped by women. Consequently, it is essential to educate at an early stage about the risks they face once they attain their qualifications, as they may encounter their male counterparts seeking to take advantage of their success. Females should also be mentored and educated on the dangers of this unethical practice. Furthermore, the impersonal nature of these initiatives makes it easier for this unethical practice to continue to exist. Conducting face-to-face interviews and providing mentorship to the women entrepreneurs who receive this funding may assist in mitigating this practice, as the financiers would have continuous engagements with these women. The mentorship and training programmes should also educate women on the dangers of this unethical practice. This will ultimately lead to fronted female entrepreneurs realising this exploitation and either reporting or pulling out of these arrangements.

There should be regulations around multinationals in terms of the maximum equity stake they

can get from a project and the minimum that a local company can hold. These multinationals are able to survive on thin profit margins due to economies of scale, an advantage that local SMMEs, especially those that are female-owned, do not have. Eskom's procurement tariffs should also accommodate a premium when dealing with local IPPs or small-scale energy producers. Eskom's procurement tariffs are already said to be one of the lowest in the world, an indication that they may not be market related. This continued decline in tariffs linked to intensive competition threatens the survival of new entrants in the industry and underscores the need for market-related tariffs when dealing with the SMMEs and previously disadvantaged groups.

Lastly, it was challenging to obtain information on women in this male-dominated industry. Establishing a database for women in the industry will help enhance research, providing access to valuable data that is important for the advancement of this evolving and developing field. This would provide financiers with valuable data to evaluate the sector and allocate their funds more effectively within it.

5.4 Avenues for Future Studies

This study aimed to understand financial barriers that are faced by female-owned SMMEs with a focus on the renewable energy industry. Overall, the study found that most of the access to finance challenges in this sector are more industry-specific challenges and not necessarily gender specific. However, for women entrepreneurs, these challenges are compounded by already existing gender-specific barriers, which have been outlined in previous literature. However, one of the key findings of this research was the lack of women's prioritisation in women-targeted initiatives. The eligibility criteria and other terms of these initiatives were reported by the participants to be "*the same as any other terms out there, nothing in them specifically says they are for women."* As such, they do not address the access to finance barriers faced by women. This research did not investigate or review these requirements and terms, as it was beyond the aim and scope of this study. However, it is crucial that these requirements are evaluated for alignment to ensure that they do not perpetuate the same barriers that women entrepreneurs face elsewhere. The initiatives should also be evaluated for their effectiveness to determine whether they are actually targeting women, because the initiative cannot be said to be targeting women while not carrying favourable terms for women that assist in alleviating the financial barriers that they face elsewhere. This would ensure that the efforts of gender mainstreaming achieve their objective and are not rendered ineffective.

Another key troubling finding was that of fronting, which is not only unethical but also exploits women and distorts the competitive landscape of the industry. It also leads to the misalignment in the flow of resources and ultimately distorts the statistics and reporting that is made on women entrepreneurs who actually benefit from initiatives. Companies that are owned on paper by women and that benefited from the women-targeted initiatives will be reported as part of the success stories, whereas the benefit flowed to males, thereby perpetuating the poverty struggles of females. Future studies can aim to quantify the impact of this exploitative practice on the already reported success stories and investigate strategies employed by other countries to mitigate it, which South Africa can adopt.

In addition, a concerning finding of this study was that BEE partners, who are generally local minority shareholders of these projects, carry the risk of the project as equity shareholders with no returns for a long period. This is more prevalent in projects that generally have long gestation periods, such as the construction of a solar farm. In this case, the equity holder will exhaust their savings and even obtain loans to buy the minority equity stake in a project that is worth billions. However, there is no flow of income whatsoever from the project for many years, typically 15 to 20 years, as these projects take a long period to be completed, connected to the grid, and finally generate revenue. During this gestation phase, all that the equity holder has is a share certificate with no income to show for it, but all the risk. Furthermore, even if the equity holder endures until the end of the project, they have to spend the first few years redirecting all their returns to repay the finance costs for the loans used in purchasing the equity stake. This finding was not explored in this study as it is not a financial barrier, but it is disheartening and perpetuates the cycle of poverty, especially for the previously disadvantaged. Future studies can investigate how these BEE partners can be alleviated of this exploitation and possibly participate in other parts of the project value chain while waiting for the maturity of their investment.

Lastly, due to time and resource constraints, this study focused specifically on the experiential realities of women entrepreneurs in the renewable energy sector. Future research could expand the scope by mapping the broader institutional and industry framework of the renewable energy sector in South Africa, including key supply-side actors such as commercial banks, development finance institutions, pension funds, and other financial intermediaries. Such studies could offer a more holistic understanding of how both structural market dynamics and supply-side financing practices shape access to finance for women-led SMMEs in the sector.

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Appendices

Appendix B: Participant's Consent Form

Master of Commerce in Development Finance
INTERVIEW/SURVEY CONSENT FORM

Participant name: ……

I volunteer to participate in a research project conducted by **Ms Matseba Johanna Mahwai** as partial fulfilment of the requirements for the **MCom Development Degree** at the Graduate School of Business. I understand that the research is designed to gather information about **Access to finance barriers affecting women-owned SMMES in the renewable energy sector** that I will be one of approximately 12 of people being interviewed for this research.

Background and purpose of the research

Women led business remain underrepresented within the renewable energy industry, regardless of their globally recognized potential of job creation and contribution to economic growth and ultimately, achievement of Sustainable Development Goals. Furthermore, growing women owned businesses beyond necessity to growth-focused and opportunity-based business remains a struggle. The purpose of this research is to explore the financial barriers that are faced by women owned SMMEs in the renewable energy industry. The study further aims to contribute to literature that will enhance the alignment of policy measures that are targeted at empowering women owned SMMEs within the renewable energy sector. The aim of the study will be to:

- Explore the financial constraints that hinder women-led SMMEs from entering into the renewable energy sector
- Understand the financial constraints that hinder women-led SMMEs from building their businesses into well established companies in the renewable energy sector

Ethics approval

The ethical clearance for this study was approved by the UCT GSB Research and Ethics Committee on 13 January 2025

Participation and confidentiality

I understand that my participation in this research is voluntary, that I will not be compensated and that I may withdraw at any time. The interview will take approximately 45 - 60 minutes to complete and will be audio recorded. I understand that I will not be identified by name in any reports using information obtained from this interview and that my confidentiality as a participant in this study will remain secure. Subsequent uses of records and data will be subject to standard data use policies which protect the anonymity of individuals and institutions. Should you have any questions or concerns please contact me +27 74 067 9049 or email: sngmat002@myuct.ac.za or my supervisor email: latif.alhassan@uct.ac.za

Consent

I consent to participate in this interview, based on the terms outlined above and subject to the following additional condition of my own (if any).

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Signed by interviewee **Date**

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Signed by Student **Date**

Appendix A: Interview Questions Guide

Research Topic: Access to finance barriers affecting women owned SMMEs in the renewable energy sector

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1. **Business Information**

   Business Name:

   Participant Name:

   Location of Business

   Age of Business:

   Sector in Renewable Energy: (Solar, Wind, Bioenergy, Hydro, Other)

   Position in Business:

   Number of Employees:

2. Financial barriers faced by women entrepreneurs when venturing into the renewable energy sector

2.1 What has your experience been with accessing finance for your business when venturing into the renewable energy industry, did you encounter any gender-specific barriers? What form of finance were you applying for?

2.2 Do you feel that the requirements set by lenders (e.g., collateral, credit history) are reasonable for women-owned businesses in your industry?Why?

2.3 In your opinion, what factors do you think contribute most to the difficulties in accessing finance in starting your business?

2.4 What has your experience been with accessing finance for your business when scaling up your business, did you encounter any gender-specific barriers? Which barriers did you encounter or in your opinion why did you not encounter any barriers?

2.5 How have these financial challenges impacted your business' growth plans or ability to invest in new opportunities?

2.6 What specific strategies or approaches have you employed to overcome these financial barriers?