

https://dspace.org/

Leveraging the Energy Transition for greater black entrepreneurial participation in the Liquid Fuels sector in South Africa

Tlou, Dineo

2023
University of the Witwatersrand, Johannesburg
https://hdl.handle.net/10539/40379
Tlou, Dineo. (2023). The role of design houses [Master's dissertation, University of the Witwatersrand, Johannesburg]. WireDSpace.https://hdl.handle.net/10539/40379

Downloaded from a DSpace repository. https://dspace.org/

Leveraging the Energy Transition for greater black entrepreneurial participation in the Liquid Fuels sector in South Africa

Dineo Tlou

(Née Molatseli)

A research report submitted to the Faculty of Commerce, Law and Management, University of the Witwatersrand, in partial fulfilment of the requirements for the degree of Master of Management in Energy Leadership

Johannesburg, 2023

ABSTRACT

Background: The Liquid Fuels Industry in South Africa is a key contributor to the economy and development agenda of the country. The industry has been dominated by large multinational and privately-owned companies that control and own some of the factors of production.

Purpose: This study aims to examine how the energy transition can be leveraged for greater Black entrepreneurial participation in the liquid fuels sector in South Africa.

Design, methodology and approach: A qualitative study was conducted, and primary data was collected using semi-structured interviews with 14 Black entrepreneurs engaged in the liquid fuels sector; primarily sourced through the National Energy Wholesalers Association of South Africa (NAEWASA) and the South Africa Petroleum Industry Association of South Africa (SAPIA) as well as 4 active and former Black business executives in the liquid fuels industry. A combined total of 18 interviews was conducted. The method of analysis employed was thematic analysis to allow for further probing of participants.

Findings: The results indicate that Black entrepreneurs in the liquid fuels sector were aware of the energy transition, related activities as well as potential opportunities. They were, however, of the view that it was premature for South Africa considering the structural challenges. Business executives expressed a similar understanding of the energy transition but were aligned in that it needed to be paced for each country. Additionally, entrepreneurs experienced barriers to participation that impede their ability to be active participants in the sector. The results also indicate that the sector has skills requirements to enable entrepreneurial participation in the Energy Transition.

Keywords – Liquid Fuels Sector, Energy Transition, Entrepreneurial opportunities, Just Energy Transition, Skills requirements.

DECLARATION

I, Dineo Tlou, declare that this research report is my own work except as indicated in the references and acknowledgements. It is submitted in partial fulfilment of the requirements for the degree of Master of Management in Energy Leadership at the University of the Witwatersrand, Johannesburg. It has not been submitted before for any degree or examination in this or any other university.

Name: Dineo Tlou Signature: 

Signed at Sandton

On the 23 day of February 2023

DEDICATION

This paper is dedicated to all those that are dedicated to a sustainable energy future.

ACKNOWLEDGEMENTS

I would like to acknowledge the following people for their continued support on this journey;

- The Godhead - My Heavenly Father, Lord and Saviour Jesus Christ and Holy Spirit for giving me sufficient grace, strength, and divine wisdom during my studies
- My Family - My very supportive husband, Sir Pako and the Tlou Kings, Kgosietsile, Mmusi and Mookamedi Busang. Thank you for being my biggest cheerleaders and for being understanding of the sacrifices that were made during this time. We continue to be trailblazers. Kelebohile, my sister – we are here. Tsholofelo, my sister – thank you. To my parents and grandparents, your name will be great.
- My Supervisor – Professor Milford Soko for your wise counsel, guidance and support
- Programme Manager – Thabang Tsotetsi for your consistent support and encouragement
- Terri Carmichael for your guidance
- NAEWASA and SAPIA as well as the research participants that formed part of this study
- Business Executives for allowing me to tap into your years of experience and business insights
- My Pastors – Ps. Tim and Ps. Kemi Grage – We are building capacity
- The rest of my support structure – friends, colleagues, and fellow students – Thank you

TABLE OF CONTENTS

ABSTRACT ii

DECLARATION iii

DEDICATION iv

ACKNOWLEDGEMENTS v

LIST OF TABLES x

LIST OF ACRONYMS xi

CHAPTER 1. INTRODUCTION 1

1.1 INTRODUCTION 1
1.2 PURPOSE OF THE STUDY 1
1.3 CONTEXT OF THE STUDY 2
1.4 RESEARCH PROBLEM 4
1.5 RESEARCH OBJECTIVES 6
1.5.1 PRIMARY OBJECTIVE 6
1.5.2 SECONDARY OBJECTIVES 6
1.6 SIGNIFICANCE OF THE STUDY 6
1.7 DELIMITATIONS OF THE STUDY 8
1.8 DEFINITION OF TERMS 10
1.9 ASSUMPTIONS 11
1.10 STRUCTURE OF THE REPORT 11

CHAPTER 2. LITERATURE REVIEW 13

2.1 INTRODUCTION 13
2.2 BACKGROUND OF THE LIQUID FUELS SECTOR IN SOUTH AFRICA 13
2.2.1 LIQUID FUELS SECTOR REGULATION AND POLICY ENABLERS – SOUTH AFRICA 15
2.3 ENERGY TRANSITION 17
2.3.1 LIQUID FUELS ENERGY TRANSITION 20
2.3.2 ELECTRIC VEHICLES 23
2.3.3 "JUST" ENERGY TRANSITION 24
2.4 IDENTIFY THE BARRIERS TO ENTREPRENEURIAL PARTICIPATION IN LF SECTOR 26
2.4.1 BARRIERS OF ENTRY TO ENTREPRENEURIAL PARTICIPATION IN LF SECTOR 26
2.4.2 DETERMINE THE SKILLS REQUIREMENT TO ENABLE AN ET IN THE LF VALUE CHAIN 28
2.5 CONCLUSION OF LITERATURE REVIEW 29

CHAPTER 3. RESEARCH METHODOLOGY 31

3.1 INTRODUCTION 31
3.2 RESEARCH APPROACH 32
3.3 RESEARCH DESIGN 32
3.4 DATA COLLECTION METHODS 34
3.5 POPULATION AND SAMPLING 34
3.5.1 POPULATION 35
3.5.2 SAMPLE AND SAMPLING METHOD 35
3.6 THE RESEARCH INSTRUMENT 37
3.7 PROCEDURE FOR DATA COLLECTION 38
3.8 DATA ANALYSIS AND INTERPRETATION 40
3.9 LIMITATIONS AND CHALLENGES OF THE STUDY 42
3.10 TRUSTWORTHINESS 43
3.10.1 TRANSFERABILITY 43
3.10.2 CREDIBILITY 44
3.10.3 DEPENDABILITY 44
3.10.4 CONFIRMABILITY 44
3.11 ETHICAL CONSIDERATIONS 44

CHAPTER 4. PRESENTATION OF FINDINGS 49

4.1 INTRODUCTION 49
4.2 RESULTS PERTAINING TO OBJECTIVE 1 49
4.2.1 *THEME 1: ENTREPRENEURS AND BUSINESS EXECUTIVES IN THE LIQUID FUELS SECTOR HAVE A PERSPECTIVE ON WHAT SIGNIFIES AN ENERGY TRANSITION* 50
4.2.2 *THEME 2: ENTREPRENEURS IN THE LIQUID FUELS SECTOR BELIEVE THE COUNTRY IS NOT READY FOR AN ENERGY TRANSITION. BUSINESS EXECUTIVES BELIEVE THE ENERGY TRANSITION SHOULD BE PACED FOR EACH NATION.* 52
4.2.3 *THEME 3: ENTREPRENEURS IN THE LIQUID FUELS SECTOR PERCEIVE THE CAPITAL COSTS OF THE ENERGY TRANSITION TO BE HIGH* 55
4.3 CONCLUSION OF OBJECTIVE 1 56
4.4 RESULTS PERTAINING TO OBJECTIVE 2 57
4.4.1 *THEME 1: ENTREPRENEURS AND BUSINESS EXECUTIVES IN THE LIQUID FUELS SECTOR PERCEIVE LACK OF ACCESS TO FINANCE TO BE A BARRIER TO PARTICIPATION.* 58
4.4.2 *THEME 2: ENTREPRENEURS IN THE LIQUID FUELS SECTOR PERCEIVE LACK OF ACCESS TO SUPPLY TO BE A BARRIER TO PARTICIPATION* 63
4.4.3 *THEME 3: ENTREPRENEURS AND BUSINESS EXECUTIVES IN THE LIQUID FUELS SECTOR PERCEIVE LACK OF ACCESS TO INFRASTRUCTURE TO BE A BARRIER TO ENTREPRENEURIAL PARTICIPATION* 64
4.4.4 *THEME 4: ENTREPRENEURS IN THE LIQUID FUELS SECTOR PERCEIVE LACK OF ACCESS TO MARKETS TO BE A BARRIER TO ENTREPRENEURIAL PARTICIPATION* 66
4.4.5 THEME 5: ENTREPRENEURS IN THE LIQUID FUELS SECTOR PERCEIVE LACK OF ACCESS TO COMPETITIVE PRICING STRUCTURES TO BE A BARRIER TO ENTREPRENEURIAL PARTICIPATION 67
4.4.6 THEME 6: ENTREPRENEURS AND BUSINESS EXECUTIVES IN THE LIQUID FUELS SECTOR PERCEIVE ONEROUS REGULATORY REQUIREMENTS TO BE A BARRIER TO ENTREPRENEURIAL PARTICIPATION 68

4.5 CONCLUSION OF OBJECTIVE 2 70
4.6 RESULTS PERTAINING TO OBJECTIVE 3 71
4.6.1 *THEME 1: ENTREPRENEURS IN THE LIQUID FUELS SECTOR PERCEIVE CASH FLOW MANAGEMENT AS A REQUIRED SKILL TO ENABLE ET PARTICIPATION IN THE LF VALUE CHAIN* 72
4.6.2 *THEME 2: ENTREPRENEURS IN THE LIQUID FUELS SECTOR PERCEIVE INTERPERSONAL SKILLS AS A REQUIREMENT TO ENABLE ET PARTICIPATION IN THE LF VALUE CHAIN* 73
4.6.3 *THEME 3: ENTREPRENEURS AND BUSINESS EXECUTIVES IN THE LIQUID FUELS SECTOR PERCEIVED BUSINESS ACUMEN AS A REQUIREMENT TO ENABLE ET PARTICIPATION IN THE LF VALUE CHAIN* 74
4.6.4 *THEME 4: ENTREPRENEURS IN THE LIQUID FUELS SECTOR PERCEIVED BUSINESS EXPERIENCE AS A REQUIREMENT TO ENABLE ET PARTICIPATION IN THE LF VALUE CHAIN* 77
4.6.5 *THEME 5: ENTREPRENEURS IN THE LIQUID FUELS SECTOR PERCEIVED KNOWLEDGE OF THE SECTOR AS A REQUIREMENT TO ENABLE ET PARTICIPATION IN THE LF VALUE CHAIN* 79
4.7 CONCLUSION OF OBJECTIVE 3 82
4.8 RESULTS PERTAINING TO OBJECTIVE 4 82
4.8.1 *THEME 1: ENTREPRENEURS AND BUSINESS EXECUTIVES IN THE LIQUID FUELS SECTOR IDENTIFIED OPPORTUNITIES IN CLEAN FUELS* 83
4.8.2 *THEME 2: ENTREPRENEURS IN THE LIQUID FUELS SECTOR IDENTIFIED OPPORTUNITIES IN RETAIL STATIONS* 85
4.8.3 *THEME 3: ENTREPRENEURS AND BUSINESS EXECUTIVES IN THE LIQUID FUELS SECTOR IDENTIFIED OPPORTUNITIES IN UPSTREAM ACTIVITIES* 85
4.8.4 *THEME 4: ENTREPRENEURS IN THE LIQUID FUELS SECTOR IDENTIFIED OPPORTUNITIES IN CLEAN TECHNOLOGY* 87
4.8.5 *THEME 5: ENTREPRENEURS AND BUSINESS EXECUTIVES IN THE LIQUID FUELS SECTOR IDENTIFIED OPPORTUNITIES FOR CAPACITY BUILDING IN THE SECTOR* 88
4.9 CONCLUSION OF OBJECTIVE 4 89
4.10 SUMMARY OF THE FINDINGS 89
4.11 COMPARISON OF LITERATURE REVIEW AND OWN FINDINGS 90

CHAPTER 5. DISCUSSION OF THE FINDINGS 93

5.1 INTRODUCTION 93
5.2 DEMOGRAPHIC PROFILE OF RESPONDENTS 93
5.3 DISCUSSION PERTAINING TO OBJECTIVE 1 94
5.4 DISCUSSION PERTAINING TO OBJECTIVE 2 98
5.5 DISCUSSION PERTAINING TO OBJECTIVE 3 101
5.6 DISCUSSION PERTAINING TO OBJECTIVE 4 104
5.7 UNEXPECTED FINDINGS 106
5.8 CONCLUSION 106

CHAPTER 6. CONCLUSIONS & RECOMMENDATIONS 107

6.1 INTRODUCTION 107
6.2 CONCLUSIONS REGARDING RESEARCH OBJECTIVE 1 107
6.3 CONCLUSIONS REGARDING RESEARCH OBJECTIVE 2 109
6.4 CONCLUSIONS REGARDING RESEARCH OBJECTIVE 3 110
6.5 CONCLUSIONS REGARDING RESEARCH OBJECTIVE 4 111

6.6 RECOMMENDATIONS 117
6.6.1 IMPLICATIONS FOR OIL MAJORS/ BUSINESS 117
6.6.2 IMPLICATIONS FOR GOVERNMENT 117
6.6.3 IMPLICATIONS FOR ENTREPRENEURS 118
6.7 SUGGESTIONS FOR FURTHER RESEARCH 118

REFERENCES 119

APPENDIX (A) Participant Information Sheet 129

APPENDIX (B) Research Instrument – Interview Guide 131

APPENDIX (C) Participant Consent Form 133

APPENDIX (D) – Letters requesting permission to conduct research 135

APPENDIX (E) – Sample Letter approvals from NAEWASA and SAPIA to conduct Research 141

APPENDIX (F) – Ethics clearance certificate 142

LIST OF TABLES

Table 1: Consistency table: research questions and propositions

Table 2: Profile of respondents

Table 3: Extract of initial identified codes

Table 4: Consistency table: research questions, propositions, data collection and data analysis

Table 4.1: Objective 1: Themes

Table 4.2: Objective 2: Themes

Table 4.3: Objective 3: Themes

Table 4.4: Objective 4: Themes

Table 4.5: Comparison of literature review and findings

Table 5: Summary of participants

Table 6: Consistency table: research questions, conclusions, and contribution to knowledge

LIST OF ACRONYMS

BP - British Petroleum

BEV – Battery Electric Vehicle

CAQDAS - Computer Aided Qualitative Data Analysis Software

CTL – Coal to Liquids

CF1 - Clean Fuels I

CF2 - Clean Fuels II

CNG – Compressed Natural Gas

DOE – Department of Energy

EAP - Economically Active Population

EE - Employment Equity

ESD – Enterprise Supplier Development

ET – Energy Transition

EV – Electric Vehicle

FCEV – Fuel Cell Electric Vehicle

GHG – Green House Gas

GTL – Gas to Liquids

HEV – Hybrid Electric Vehicle

IEC – Internal Combustion Engine

IMF – International Monetary Fund

JET – Just Energy Transition

LF – Liquid Fuels

LNG - Liquefied Natural Gas

Mt CO2-eq - Megatonne Carbon Dioxide Equivalent

MSA – Main Supply Agreement

NAEWASA - National Energy Wholesalers Association

NATREF - National Petroleum Refiners

NDP – National Development Plan

NERSA - National Energy Regulator of South Africa

NOC – National Oil Company

NP – National Party

NPC – Non-Profit Company

PCC - Presidential Climate Commission

PetroSA - Petroleum, Oil and Gas Corporation of South Africa SOC Ltd

PPM - Parts Per Million

SANS - South Africa National Standards

SAPIA – South African Petroleum Industry Association

SARS – South African Revenue Services

SATMAR - The South African Torbanite Mining and Refining Company

SDGs - Sustainable Development Goals

SETA - Sector Education and Training Authority

CHAPTER 1. INTRODUCTION

1.1 Introduction

This chapter sets out to highlight the context of the study and the relevance of the research in South Africa. The purpose of the study is detailed with a clear description of the research problem and objectives. The significance of the study, delimitations or boundaries and definition of terms are also specified. The chapter concludes by explaining the assumptions of the study and the structure of the research paper.

1.2 Purpose of the study

This research study aims to examine how an Energy Transition in South Africa can be leveraged for greater Black entrepreneurial participation in the country's Liquid Fuels (LF) sector. To this end, the study assesses the changes that are required to facilitate the successful participation of entrepreneurs in the industry, which has been historically dominated by multinational oil companies. In particular, the study sets out to identify possible entrepreneurial opportunities in the liquid fuels value chain as well as evaluate the skills required for entrepreneurs to operate successfully in the sector.

According to Wisely & Hassan (2020), the energy transition is driven mainly by uncertainty about the future of multinational oil firms in a world that has become less dependent on fossil fuels; government requirements on disclosure of climate change risk activities, pressure from investors and communities, declining costs of alternative energy sources, and increasing government and investor support for alternatives to fossil fuel. The main approaches that are being explored by industry players in tackling the energy transition vary, ranging from improving efficiencies and reducing carbon footprint, incorporation of renewable technologies in companies, to the diversification of portfolios and possible continuation with fossil fuels (Hassan, 2020).

This qualitative study looked at the Energy Transition in South Africa and possible entrepreneurial opportunities in the liquid fuels value chain and evaluated the skills required for black entrepreneurs to participate in the sector.

1.3 Context of the study

The context of this study is South Africa, an emerging market with an abundant supply of natural resources and a population of approximately 60 million people. The country's energy sector is central to commercial success and general development, through energy production that contributes to economic development, stimulation of employment and infrastructure expansion (Ratshomo, 2019). Liquid fuels are not only used as a source of energy but are an input into heterogeneous synthetic matter, chemical feedstock and chemicals including pesticides and fertilizer for food production and transportation fuels (Vassiliou, 2018).

With a refining capacity of 703 000 barrels per day, Africa's largest after Egypt, South Africa has very few confirmed crude oil reserves and is heavily reliant on (crude oil) imports as well as refined fuels to fulfil petroleum demand (KPMG, 2016). In addition to crude oil imports, the production of liquid fuels in the country is also dependent on coal and natural gas (Trollip, Butler, Burton, Caetano & Godinho, 2014). Coal is the biggest contributor of primary energy (69%) in South Africa, with crude oil and renewable energy contributing 14% and 11% respectively. Gas and nuclear energy contribute only 3% towards the country's primary energy supply (Ratshomo, 2019).

The major liquid fuel products in South Africa are illuminating paraffin (IP), diesel, petrol, heating fuel oils, jet fuel, liquefied petroleum gas (LPG) and bitumen, with diesel and petrol being the most popular (SAPIA, 2020). The country uses various modes of transport to move liquid fuels products, notably rail, road and pipeline (KPMG, 2016).

The Liquid Fuels (LF) industry in South Africa accounts for nearly 34% of final energy consumption, 6% of gross domestic product (GDP) and approximately 31 billion litres of sales. Historically, the industry has been dominated by large multinational and privately-owned companies; some of which have existed in South Africa for almost a century – as well as a state-owned company, Petroleum Oil Gas Corporation of South Africa (PetroSA). Most of these companies are vertically integrated and enjoy complete control of the entire value chain from upstream activities such as importing to downstream activities such as refining, distribution and retailing with ownership of relevant infrastructure (Paelo, Robb, & Vilakazi, 2014).

Not only is the development of the LF industry strategically central to South Africa's economic development and energy security, it also plays a significant role in the broader economy, providing inputs to many other sectors (Paelo, Robb & Vilakazi, 2017). Historically, the growth in local liquid fuels production was rooted in the strategic decisions of the apartheid government to ensure security of supply, in a national environment characterised by the country's international isolation (Nair, Mondliwa & Roberts, 2015).

The apartheid system gave rise to unbridled concentrations of ownership and dominance in the economy by a few white-controlled conglomerates. The laws that were passed by successive apartheid governments, such as the Petroleum Products Act 120 of 1977, ensured the exclusion of the Black majority of the South African population from industry and economic participation. The Act imposed an embargo on the publishing, disclosure, cession of information and commentary on the sourcing, production, conveyance, and storage of product in South Africa, making access to refining, marketing, and retailing opportunities impossible (Mokoena & Lloyd, 2005).

Mokoena & Lloyd (2005) identify the entry barriers in the sector as being economic; location of service outlets, lack of regulatory support and access to capital driven by investment in infrastructure and logistics. According to Paelo, et.al. (2017), barriers to entry included market access, access to infrastructure such as pipelines, oil majors controlling key inputs and leveraging economies of scale with vertical agreements between oil majors. These entry barriers, propped up by the market power of major oil companies, resulted in less competition, exorbitant prices, and limited innovation.

To redress historical imbalances, the post-apartheid government published the White Paper on Energy Policy in 1998 that expressed the intention to lower the barriers to entry for Black people to enable participation in the industry (Malatsi, 2018). The White Paper also committed to local Black ownership across the value chain as ownership was historically racially skewed due to apartheid policies. Black ownership was projected to reach 25% of all aspects of the liquid fuels industry with objectives to regulate the sector to enable open market access and stimulate increased competition (Kapdi, 2017).

Subsequently, in the year 2000 the Liquid Fuels Charter (LFC), a sectoral charter, was signed by a total of seven (7) major oil companies who committed themselves to transformation in the liquid fuels value chain including pipelines, storage facilities, oil exploration, transport, retail and refining (Kapdi, 2017).

Although a great deal of effort has been invested in transforming the liquid fuels industry by the post-apartheid government and regulatory bodies, the sector is still generally dominated by major oil companies and the barriers of entry and participation for new entrants remain very high. The industry is stunted by a paucity of enterprise and skills development, lack of preferential procurement, lack of access and licences and untransformed retail and wholesale sectors (Kapdi, 2017). By 2017, over 1000 wholesaling licenses had been issued, but approximately 10% were being utilised by companies that had been able to penetrate the industry and successfully operate. These wholesalers were able to penetrate the liquid fuels sector but due to the market dominance and infrastructure ownership of oil majors, there is heavy reliance on oil majors for supply as well as market access (Paelo, Robb, & Vilakazi, 2017). The distribution and retailing of liquid fuels have minimal barriers of entry because of low capital requirements. A lack of relevant capabilities such as refining, storage, primary distribution (by pipeline, rail, road from refineries to depots and storage facilities) and secondary distribution have limited entry to primarily these downstream activities, leaving the overwhelming dominance of the oil majors in the industry intact (Mondliwa & Roberts, 2019) ; (Paelo et al., 2017).

1.4 Research problem

Petroleum is used in all economic sectors and accounts for the bulk of worldwide primary energy needs. The liquid fuels sector, however, has been faced with the urgent challenge to decarbonise and transition to cleaner sources of fuel to ensure the sustainability of the industry and the environment (Papadis & Tsatsaronis, 2020). South Africa, like many other countries, has committed to the Paris Agreement for a low-carbon future. The commitment was for restricting "…the increase in the global average temperature to well below 2°C above preindustrial levels, and pursue efforts to limit the temperature increase to 1.5°C above pre-industrial levels…" (DFFE, 2020).

To achieve this transition, the country, which is listed among the world's carbon emitters due to heavy reliance on fossil fuels such as coal and crude oil; may need to implement drastic policy measures to diversify the energy mix and reduce emissions (Wright & Calitz, 2020).

The global shift towards greener sources of energy presents a challenge to South Africa. The country needs to take action to preserve the environment and industry, mitigate global warming, improve community health, as well as present opportunities for greater entrepreneurial participation in the liquid fuels sector through an energy transition that is fair and just. A just transition refers to the application of justice to the transition of a sustainable energy system ensuring fairness and people-centeredness (Halsey, Overy, Schubert, Appies, McDaid & Kruyshaar, 2019).

Great strides have been made in the liquid fuels sector to try and give access to previously disadvantaged Black entrepreneurs opportunities in the sector, but very little progress has been made in achieving the 25% ownership of all aspects of the liquid fuels industry as projected in the Liquid Fuels Charter. The barriers to entry are high in every part of the liquid fuels value chain except retail and wholesale segments even though a lack of transformation is very prevalent (Kapdi, 2017). In 2017, the Department of Energy (DOE) presented the dearth of transformation in the retail segment, indicating 78% white ownership of dealer-owned retail sites with 93% volume contribution on company-owned sites while Indians had 22% ownership on dealer-owned sites (Komane, 2017). The study of Makiva, Ile, and Fagbadebo (2019), further supports that ownership of infrastructure in the sector is dominated by major oil companies that were historically subsidised by the government and that the retail and wholesale industries were still not transformed.

This research is being undertaken because of the paucity of Black entrepreneurial participation and opportunities in the liquid fuels value chain; due to lack of transformation both in terms of the oligopolistic ownership structure of the industry but also in terms of racial and gender representation.

The research problem for this study is therefore focused on the research question**:** How can the Energy Transition be leveraged to rectify the historical exclusion of Black entrepreneurs from the liquid fuels sector value chain in South Africa?

1.5 Research objectives

The objectives of the study are derived from the statement of the problem.

1.5.1 *Primary objective*

The primary objective of the study will be to examine how the Energy Transition in South Africa can be leveraged for greater Black entrepreneurial participation in the country's Liquid Fuels (LF) sector.

1.5.2 *Secondary objectives*

The secondary objectives formulated from the primary objective will be:

To conduct an empirical study that will accomplish the following

a) Identify the activities that signify the Energy Transition in South Africa
b) Identify the barriers to entrepreneurial participation in the LF sector
c) Determine the skills requirement to enable an ET in the LF value chain
d) Identify opportunities for entrepreneurs in the LF ET

1.6 Significance of the study

The Energy Transition which is inevitable for the industry and the country to meet Paris Agreement commitments and ensure sustainability of the sector, will potentially bring about changes in the product offering and infrastructure in the sector. In the liquid fuels and broader oil and gas industry, the energy transition is still a fairly new concept and the execution thereof still in infancy (Mahajan & Bandyopadhyay, 2021).

Wisely & Hassan (2020) argue that several players in the liquid fuels space have begun investing in research and certain infrastructure to enable the energy transition such as electric vehicle (EV) charging stations, hydrogen fuels for certain modes of transport (marine, air, and road) as well as battery storage technologies. In addition to hydrogen, industry players need to consider alternatives to liquid fuels such as biofuels, propane, ethanol, and natural gas. Biofuels can be defined as liquid fuels of a renewable nature, sourced from biological matter through chemical processes (Shah, 2017).

Mathee (2014), Dominković, Bačeković, Pedersen, and Krajačić (2018); Mahotas (2019) state that an energy transition in the liquid fuels sector should explore options such as electro mobility with renewable energy as the primary source, green hydrogen, alternative fuels such as biofuels and green fuels. This notion is further supported by Papadis and Tsatsaronis (2020) that add renewable electro-fuels and synthetic fuels via the process of biomass-to-liquid to the list of considerations.

The White Paper on the Renewable Energy Policy that was published in 2003 by the South African Government has included a requirement for biofuel production with recommendation for a 5% biodiesel blend on diesel fuels and bioethanol for ethanol blends (Majozi & Veldhuizen, 2015).

With the transition to cleaner sources of energy, it is not yet known whether potential players in the liquid fuels sector will be able to participate in the liquid fuel economy or whether the retail and wholesale portions of the value chain will remain untransformed.

This study was valuable because although a limited sample was interviewed, this research is the first that examines how the energy transition can be leveraged for greater entrepreneurial participation in the liquid fuels sector of South Africa considering that the energy transition is a new phenomenon. The study highlighted the challenges that entrepreneurs in the sector are faced with that hinder participation, that need to be addressed to enable participation in the energy transition. The study also highlighted the skills required to enable participation in the ET as well as the opportunities that entrepreneurs identified with the transition.

The enablement of entrepreneurial participation in the liquid fuels sector is important to study for contribution towards ensuring justice in the energy transition within the sector. Additionally, the study will inspire further research beyond the outlined scope through recommendations that will arise because of this study. The curiosity of the phenomenon of leveraging the energy transition to ensure greater entrepreneurial participation in the liquid fuels sector, will incite scholars to endeavour to gain understanding, thereby giving rise to theories that extend existing ones or conceptualise new ones that can illuminate understanding. The benefits of the study include;

- the equipping of role players including policy makers and oil majors with research on the barriers of entrepreneurial participation in the sector,
- understanding the required skills sets for participation in the sector even with the energy transition,
- an increase in the level of understanding and awareness that exists regarding the energy transition among entrepreneurs and business, and highlighting
- the possible opportunities that the energy transition could present to entrepreneurs

1.7 Delimitations of the study

According to Simon (2011), delimitations are factors of the research study that restrict the scope. This notion is supported by Miles and Scott (2017), who further indicate that delimitations were primarily related to the study's parameters of interest.

The aim of the research is to study the energy transition and whether it can be leveraged for greater entrepreneurial participation. The scope of the study is delimited to the liquid fuels sector in South Africa. Other aspects of the broader energy sector in South Africa do not form part of the scope. There is a vast body of literature that is available but the focus of the study is on the background of the liquid fuels sector, energy transition, barriers for entrepreneurial participation, the skills requirement to enable an ET in the LF value chain and possible entrepreneurial opportunities due to the scope.

The population included Black entrepreneurs that were doing business in the sector at the time of conducting the study and those that had been struggling to overcome the barriers to entry and/or participation, as well as active and former Black business executives that had been or were active across the liquid fuels value chain. Including other racial groups of entrepreneurs and business executives in the sector may have skewed the results of participation. The entrepreneurs were limited to those that were members of NAEWASA and SAPIA at the time of conducting the study, which are professional bodies in the sector representative of start-ups and all industry participants respectively. Other participants were referred by members of the two (2) organisations. The business executives were limited to those that have or were actively participating in the liquid fuels value chain at the time of conducting the study. The study was also limited in terms of geographic locations due to COVID-19 restrictions and some interviews were conducted on online platforms, Zoom and Microsoft Teams as a result. Other interviews were conducted via cell phone due to load shedding that affected network connectivity.

1.8 Definition of terms

Biofuels	Liquid fuels of a renewable nature, sourced from biological mater through chemical processes (Shah, 2017)
Decarbonisation	The deliberate act of reducing carbon emissions that are a result of human actions; with the sole objective of progressively eradicating the emissions (Chiaramonti, Talluri, Scarlat, & Prussi, 2021)
Energy Transition	A global transition of the energy sector from fossil fuels (crude oil, petroleum, coal and natural gas) to renewable energy sources (wind and solar) (Verbong & Loorbach, 2012). A sustainable systemic change in the variables related to the energy value chain and a global transformation of the production and consumption of energy to lower carbon sources (Hassan, 2020)
Just Energy Transition (JET)	The application of justice to the transition of a sustainable energy system ensuring fairness and people-centredness (Halsey, Overy, Schubert, Appies, McDaid & Kruyshaar, 2019).

1.9 Assumptions

Assumptions are factors in the research study that are out of the control of the research scope. These factors are accepted as plausible for the research study (Simon, 2011). In this study the assumptions made were:

- The selected sample of 14 entrepreneurs was a purposively selected expert sample of entrepreneurs in the LF sector
- The selected sample of 4 business executives from various parts of the liquid fuels value chain was a purposively selected expert sample of the voice of business in the LF sector
- Participants of the study understood the questions asked and answered honestly and truthfully
- A qualitative study would allow for a deeper understanding of the phenomenon of whether the energy transition can be leveraged for greater entrepreneurial participation

1.10 Structure of the report

Chapter 1 provided a summary of the study, providing insight into the purpose as well as the background to the study. The research problem and objectives of the study were stated and terms that were used throughout the study defined. The chapter ends with an explanation of the assumptions made in the study and the limitations of the study.

Chapter 2 contains a theoretical description of relevant literature. The literature expounds on crucial concepts in the study. The key terms of this study are Liquid Fuels Sector, Liquid Fuels Regulation, Energy Transition, Just Energy Transition, Skills development.

Chapter 3 provides a discussion of the research methodology including the research design and population. The collection of data, research instrument, data validity and reliability will be presented. The analysis of data as well as analysis techniques were discussed.

Chapter 4 gives a synopsis of the results and findings, and they are documented and reported in alignment with the objectives identified in Chapter the 1.

Chapter 5 gives a discussion of the empirical data collected, incorporating the literature documented in Chapter 2 with the findings from the study.

Chapter 6 provides a summary of the study and is concluded by detailed recommendations from the study and for future research followed by a conclusion.

CHAPTER 2. LITERATURE REVIEW

2.1 Introduction

The purpose of this section is to gain an understanding of contemporary literature relevant to this study, with specific reference to the background of the liquid fuels sector, energy transition, barriers for entrepreneurial participation, the skills requirement to enable an ET in the LF value chain and possible entrepreneurial opportunities.

2.2 Background of the Liquid Fuels Sector in South Africa

The liquid fuels sector in South Africa consists of a rich history that dates back pre-1930s. The country's refined liquid fuels requirement was completely imported before the country developed synfuel refining capacity in 1930 (SAPIA, 2014).

From 1948, the National Party (NP), a white minority ruling party, enforced laws that resulted in decades of apartheid segregation; an era of racial separation, that was oppressive and detrimental to the Black majority (Majozi & Veldhuizen, 2015). The Liquid Fuels industry was highly regulated and racially segregated in South Africa (Maleka, Mashimbye, & Goyns, 2010). The apartheid era sparked global outrage, with many countries demonstrating activism and solidarity with the marginalised population by introducing sanctions against South Africa that would exclude the country from global economic participation and international trade. The period of international isolation posed a major risk to the security of energy supply for the country (Majozi & Veldhuizen, 2015).

In response to the strategic and political mandate of ensuring security of supply, the government became intentional about producing liquid fuels domestically from generous coal reserves, while limiting import dependence of crude oil (Maleka et al., 2010). This led to the commission of refining capacity through Engen Petroleum, previously Mobil in 1954 (SAPIA, 2014).

The South African government continued to be instrumental in the establishment and development of the liquid fuels industry in the country, commissioning Sasol One, a coal to oil synthetic fuel plant producing coal and diesel in Sasolburg in 1955, through the South African Coal Oil and Gas Corporation Limited, later known as the state owned Sasol (Verhoef, 2003). The objective of ensuring security of supply resulted in protection for Sasol including beneficiation of various incentives from the government such as refinery investment and tariff protection of approximately 20% of the fuel price (SAPIA, 2014). Industry players including other oil companies were obligated to purchase Sasol synfuels at import parity pricing with the addition of hypothetical logistics costs (Paelo et al., 2017). This was shortly after the government established the Main Supply Agreement (MSA) that required oil companies to purchase Sasol product for marketing demand. Sparks (2016) argues that Sasol had the groundwork laid out in synthetic fuels by Anglo Vaal, that procured Fischer-Tropsch process rights from Germany when the country developed synfuel refining capacity around the 1930s. Anglo Vaal and The South African Torbanite Mining and Refining Company (SATMAR) played an important role in producing petrol from a type of coal called Torbanite (Sparks, 2016). This period was followed by the establishment of a crude oil refinery in Durban in 1963 by a 50/50 joint venture between Shell South Africa and British Petroleum (BP) South Africa called SAPREF (Van Alstine, 2009).

Historically, only few oil companies were authorised to procure strategic infrastructure like refineries and depots as under the National Key Points Act of 1980 these were classified as National Key Points (Miller & van Meelis, 2005). The resultant effect of these protectionist policies was vertical integration across the liquid fuels value chain, establishing the market power of oil majors (Van Alstine, 2009).

The year 1965 saw the commissioning of the first refined product pipeline from Durban to Johannesburg, closely followed by the commissioning of the Caltex refinery, now Astron, in Cape Town and another base oil refinery close to SAPREF by BP and Shell. The crude oil pipeline succeeded this development in 1969 for the purposes of transporting crude oil from the coast to inland refinery. Between 1969 and 1971, a joint venture between Sasol, Total South Africa and National Iranian Oil company led to the formation of National Petroleum Refiners (Natref) in Sasolburg (SAPIA, 2014).

In addition to international isolation due to apartheid, the oil crisis of 1973 jeopardised security of supply as Middle East oil supply was compromised. Between 1976 and 1982, Sasol Two and Three were commissioned in Secunda as a response to International sanctions and the oil crisis (Booth, 2011).

The country's footprint in the liquid fuels industry grew rapidly and by 1992, there was a need to increase diesel production for military operations (Miller & van Meelis, 2005). The world's first gas-to-liquids (GTL) refinery was established in Mosselbay to mitigate diesel shortages; by South Africa's National Oil Company (NOC) named the Petroleum, Oil and Gas Corporation of South Africa SOC Ltd. (PetroSA), previously Mossgas, converting methane rich gas into low sulphur synthetic fuels and other valuable products. Oil companies had to again enter into an upliftment agreement, obligating them to uplift from Mossgas (Mabena, 2005); (SAPIA, 2014) .

The liquid fuels industry trajectory in South Africa has historically been in support of a few oil majors and this was made possible by government assistance in the form of incentives and a regulatory framework that reinforced these industry trends.

2.2.1 Liquid Fuels Sector Regulation and Policy enablers – South Africa

The Liquid Fuels Industry was highly regulated in favour of apartheid government and before the 1976 Soweto uprising, regulation was structured around unsigned government agreements. The advent of a democratic government however, brought about regulatory reforms within the sector (Kapdi, 2017).

The sector is regulated by the Department of Energy (DOE) as well as the National Energy Regulator of South Africa (NERSA). The DOE receives directives from the White Paper on Energy Policy. Introduced in 1998, The White Paper on Energy Policy aimed to deregulate the sector and ensure 25% ownership of all aspects of the liquid fuels value chain by the Black majority (Malatsi, 2018). DOE regulates the industry in terms of licensing as well as the prices of petrol, illuminating paraffin and liquefied petroleum gas (LPG). These are published in the Government Gazette on a monthly basis and are available from government electronic media (Nair, Mondliwa, & Roberts,

2015). The Parliamentary Portfolio Committee on Mineral Resources and Energy provides oversight over the DOE.

NERSA is also responsible for the regulation of piped-gas, electricity and petroleum pipelines (SAPIA, 2014). Paelo et al. (2014) argued that although NERSA was mandated to exhort the owners of infrastructure (storage facilities, pipelines, gantries) to avail capacity that has not been committed to independent operators, there is limited commercial benefit for oil majors to invest capital in expanding capacity for the purposes of assisting new players.

The Liquid Fuels sector is regulated by various legislation including the Petroleum Pipelines Act, 2003 (Act 60 of 2003), Petroleum Products Act, 1977 (Act 120 of 1977), The National Energy Act, 2008 (Act 34 of 2008), National Environmental Management Act, 1999 (Act 107 of 1999), the Central Energy Fund (CEF) Act, 1977 (Act 38 of 1977), Mineral and Petroleum Resources Development Act, 2002 (Act 28 of 2002) and the Petroleum Pipelines Levies Act, 2004 (Act 28 of 2004) (SAPIA, 2014).

The Liquid Fuels Charter, the first of its kind between private players in the sector and government, established in 2000 aimed to provide a structure for the advancement of the Black majority in the liquid fuels sector through actions such as advancing Employment Equity (EE), ownership and access of joint infrastructure, funding, procurement opportunities, retailing and wholesaling, support and capacity building including refining capacity (Malatsi, 2018). According to the Liquid Fuels Charter Audit report of 2011, the worst performing aspects of the charter were around access to infrastructure, building capacity and employment equity, confirming the fact that the Charter had not yet achieved all objectives (Moloto, 2011). Black ownership of 25% in all aspects of the liquid fuels value chain, as envisioned in the White Paper on Energy Policy of 1998, had still not been achieved as only the retail and wholesale sectors offered limited market access for potential players in the sector. A study by Ngxongo (2018) suggests that transformation had been demonstrated in the liquid fuels sector as evidenced by the entry of wholesalers, but that marginalisation had primarily affected women in the sector. Sekete (2018) argued that the liquid fuels retail industry was not transformed and the ownership structure did not in any way represent statistics of the Economically Active Population (EAP) in South Africa. Paelo et al.

(2017) present that the limited progress in achieving 25% black ownership can be attributed to policy and regulatory challenges, lack of access to supply, lack of skills and training, limited access to customers, exorbitant costs of entry and possible responses from major oil companies.

Crompton, Sing, Filter, and Msimango (2020) assert that measuring achievement of 25% Black ownership may be onerous due to the various policy interpretations; where some interpret the 25% as an ongoing plan given that some infrastructures (pipelines, rail lines) were state-owned. Others interpreted the policy as a pre-requisite for further reform. The retail and wholesale segments that have the lowest barriers to entry have been seemingly difficult to transform although there have not been annual appraisals for the White Paper on Energy policy 1998 as previously committed by the DOE (Crompton et al., 2020).

In March 2022, the Presidential Climate Commission (PCC) ratified the Just Transition Framework; a collaborative policy statement that will provide guidance in South Africa for the JET. The Just Transition Framework promotes the principles of Distributive Justice; costs and opportunities of the JET must be fairly apportioned, Restorative Justice; redressing past injustices such as non-equitable access to resources and Procedural justice; leaving no one behind (communities, entrepreneurs and the workforce) (PCC, 2022). The framework will act as a guideline for the Just Transition implementation plan.

2.3 Energy Transition

The advent of global warming and mounting pressure to realise Sustainable Development Goals (SDGs) has necessitated a general shift worldwide in economic and social aspects. This global shift is inclusive of much needed transitions in global energy systems to meet SDGs as well as Paris Agreement commitments (Bogdanov, Ram, Aghahosseini, Gulagi, Oyewo, Child and Barbosa, 2021). The developments made in achieving SDGs such as reduction of inequality, health, and food security, protecting ecosystems and development of sustainable cities and economies, among others, have been imperilled by the effects of climate change. This is as a result of

greenhouse gas (GHG) emissions that emanate from global energy production and consumption (Bogdanov et al., 2021). Historically, global energy systems have undergone several periods of transitions as a result of stimulants such as global warming, technological advancement, attempts at reducing limitations to clean energy access, energy security and so forth (Child & Breyer, 2017).

Energy transitions are commonly described as a set of processes that necessitate transformation of energy systems from one scale, configuration or state to another (Child & Breyer, 2017). Edomah, Bazilian, and Sovacool (2020) define energy transitions as sustainable changes in energy systems that are of a structural nature and that will result in shifts in trends of energy production and use. Historically, major energy transitions occurred during periods of industrial revolutions with transitions from the use of wood and steam engines while the post-2000's energy transition is focused on moving away from hydrocarbons such as coal, natural gas and crude oil (O'Connor, 2010). York and Bell (2019) suggest that during an energy transition, two (2) processes transpire, the expansion of new energy sources through addition of necessary infrastructure and increased production of the energy source. The second process is an energy transition which refers to the significant reduction of established sources of energy. It is argued that the term "energy transition", only be used when there is a definite shift from one energy source to the other and not in the case of incorporating new energy sources (York & Bell, 2019). Edomah (2020) simply refers to energy transitions as a "…shift, or movement, away from the use of fossil fuels…". Global (2020) cites energy transitions as a shift away from the production and consumption of fossil fuels such as coal, gas and oil to renewable energy sources such as solar, wind and lithium-ion batteries with the aim of reducing energy related carbon emissions to restrict global warming. Edomah (2020) further argues that there are various reasons for an energy transition including the fact that fossil fuels are finite. What is of importance though, is that the threat posed by fossil fuels to the environment is the leading motivator for an energy transition (Edomah, 2020).

Kühne, Parush, Shmueli, and Jenal (2022a) suggest that energy transitions are complex in nature due to the requirement to balance socio-cultural, political, technological, and moral aspects, where the absence of balance may lead to various

social conflicts. Social conflicts, which manifest as groups that are supportive of or against a change such as in the energy transition, can be managed using Ralf Dahrendorf's conflict theory that asserts that controlled social conflicts may be good for societal development. This conflict theory can be an instrumental framework in understanding the relationship between social energy conflicts stemming from the ET and the development of society. According to Kühne (2020), Ralf Dahrendorf's conflict theory has an interest in conflicts that are inherent in hierarchies and inter-group conflicts between groups with comparable power structures. In South Africa, social conflicts relating to the energy transition have developed between trade unions and labour force, government, oil majors and coal producers as well as environmentalists or climate change activists among others. Environmentalists and climate change activists are putting pressure on government and businesses to accelerate the energy transition to ensure sustainability of the environment. Trade unions, on the other hand, are adamant that the energy transition should be just and not leave anyone behind including the workforce and communities. Government is trying to find the best way to implement the transition while meeting SDGs and business is exploring opportunities of exploiting current hydrocarbon resources while forging a path for the transition to ensure future profitability and business sustainability. The application of Ralf Dahrendorf's conflict theory suggests that conflict is normal and may assist in identifying the various conflicts that may arise due to the energy transition and to help identify opportunities to guide so that it becomes a positive contributor to the transition while ascribing responsibility to relevant parties (Kühne, Parush, Shmueli, & Jenal, 2022b).

At the Paris Climate Conference in 2015, The Paris Agreement was signed, a commitment made by 195 countries globally as a voluntary pledge to reduce greenhouse gas emissions (GHG) (Seo, 2017). Studies by Bogdanov et al., (2021) present that an energy transition will accelerate the achievement of SDGs such as ensuring ''universal access to clean and affordable energy…'' and ''decreasing water scarcity'' by significantly reducing the use of freshwater currently used in coal fired plants.

Lawrie, Potter, Menzies, and Wilmot (2020) argue that global energy demand will continue to grow for the next couple of decades, with oil and gas being the domineering source. The challenge with decarbonising will, however, be approached differently by each country based on individual emission profiles, access to energy and consumption patterns, developmental requirements and GDP (Lawrie et al., 2020). South Africa has a two-fold GHG emission challenge; emissions from coal plants and synfuel (Coal-To-Liquids (CTL) and GTL) sector emissions (Joubert, 2016). The country is also faced with the challenge of direct emissions from energy consumption and non-industrial operations as well as process emissions, that will include fuel inputs like feedstock (PMR, 2015).

2.3.1 *Liquid Fuels energy transition*

The National Greenhouse Gas Inventory Report (2015) of South Africa recorded the country's aggregate GHG emissions to be approximately 541 Megatonne Carbon Dioxide Equivalent (Mt CO2-eq) with the energy sector accounting for 70.5% of emissions. The electricity generation and liquid fuels production sectors were responsible for 60.4% of energy sector emissions as well as in the region of around 50% of the country's aggregate emissions (DFFE, 2020). De Bijl and Fourie (2019) present that the energy transition required novel solutions for sustainable energy production, storage and consumption. This is due to challenges associated with the energy transition such as new technologies, integration of new energy into current systems, economic feasibility of required infrastructure and potential impact on the labour market (De Bijl & Fourie, 2019). Lawrie et al. (2020) argue that South Africa's innovation and technological landscape is not yet established enough to compel noteworthy change in the liquid fuel's energy transition between the years 2021 and 2026.

Cherp, Vinichenko, Jewell, Brutschin, and Sovacool (2018) argue that energy transitions that occur at a national level are mostly characterised by policies that would regulate the energy environment, energy production and technological changes required to support the transition. These characteristics inform perspectives on energy transitions; political, techno-economical and socio-technical. Cherp et al. (2018)

employed a meta-theoretical framework to look at energy transitions through the lens of the three (3) characteristics of policy, energy production and technology.

In South Africa, the energy transition within the liquid fuels sector has primarily been focused on regulation for Clean Fuels I/ II with a lack of enthusiasm from the South African oil majors because of the high capital costs associated with investing in the country's ageing refineries (SAPIA, 2020). According to Mahotas (2019) the need for clean fuels was aligned to the country's policy framework and was in response to the clarion call to mitigate against climate change, health concerns, promotion of international trade as well as security of supply owing to the reality that South Africa's clean fuels were imported. Clean Fuels would also permit the operation of more efficient vehicle technology and allow for certainty in terms of policy and the sector (Mahotas, 2019).

The country's clean fuels initiative began in 2006 under the Petroleum Products Act of 1977, with the objective of amending the requirements for both petrol and diesel grades as per the South Africa National Standards (SANS). Regulations for Clean Fuels I (CFI), the new fuel requirement that was equivalent to Euro 2 emissions standard, proscribed the inclusion of lead in all petrol grades and the reduction of sulphur content from 3000 parts per million (ppm) to 500 ppm for diesel (DOE, 2011). Mathee (2014) indicates that in 1984, South Africa was among the leading countries with the highest lead content in petrol grades globally.

In 2011, the Minister of Energy published for commentary a discussion document on the review of final fuel specifications and standards. The document suggested the country transition from CF1 to Clean Fuels II (CF2) that would ensure CF1 requirements and standards were reinforced. CF2 that was compatible with Euro 5 emissions standard would ensure benzene, and aromatic levels in petrol grades were reduced from 5% to 1% and 50% to 35% respectively. Sulphur would further be reduced in petrol and diesel grades from 500ppm to 10ppm. The total capital investment that would be required to upgrade the country's ageing refineries and to make the transition to CF2 was approximated at $3.7 billion for the South African liquid fuels sector (with 40% accuracy) quenching CF2 appetite of oil majors (DOE, 2011).

In 2017, government withdrew all CF2 regulations and there was no other communication regarding resuscitation of the initiative until 2021 (Venter, 2020).

In September 2021, the South African government announced the publication of regulations that would require the reduction of sulphur in diesel fuel by September 2023. The vending of diesel would only be allowed for grades that meet the 10ppm spec; rekindling discussions of refinery upgrades to meet the petroleum products regulatory requirement. The existing South African refineries would need to either upgrade refinery equipment to more modern configurations or change to terminals with clean fuel importing capabilities, posing a financial challenge to oil majors (Bloemberg, 2021). With sufficient support, this could present an opportunity for entrepreneurs that can build clean fuel-importing capabilities.

Bio-energy opportunities have also been identified as part of climate change mitigation in the liquid fuels sector through the Biofuels Industrial Strategy of the Republic of South Africa which had proposals of 2% biofuel requirements as part of the country's liquid fuel supply. Although a regulatory framework was established to support petrol and diesel blending with biofuels, the strategy had not yet been executed in 2020 (DFFE, 2020). The use of Bio-energy will be a costly exercise in the beginning while bio-energy plants are being established (Lundqvist, 2020). According to Li, Edwards, Hosseini, and Costin (2020), biomass from waste landfills, agricultural waste and forest plantations can be used to produce liquid fuels. In China's first phase energy transition strategy for city developments, renewable fuels such as biomass liquid fuel, biodiesel and ethanol fuel were a priority to ensure the reduction of carbon emissions (Yuan, Lyu, Wang, Liu, & Wu, 2018); (Lundqvist, 2020). This could significantly reduce reliance on carbon-based feedstock and reduce emissions contribution as well as present an opportunity for black entrepreneurs in the supply of biomass.

Al-Baghdadi (2021) proposes that hydrogen be considered as an alternative fuel to hydrocarbon based liquid fuels. It is argued that hydrogen, although not a primary source of energy, is one of the cleanest energy carriers that are sustainable with the potential to increase energy security as reduce reliance on fossil fuels (Al-Baghdadi, 2021). Eljack and Kazi (2020) state that there are three (3) types of hydrogen determined by the source of production; green hydrogen, produced from renewable

energy sources; blue hydrogen, produced from fossil fuels and nuclear and grey hydrogen, produced from fossil fuels. The hydrogen type with the least carbon emissions and is referred to as carbon neutral is green hydrogen. Hydrogen can be produced from fossil fuels like natural gas, renewable sources such as solar, wind and biomass (Data, 2017). The prospect of hydrogen being considered an alternative fuel proceeds from the element's inherent ability to power fuel cells and internal combustion engines (ICE)s. Although there has been global interest in the possibility of hydrogen being used as an alternative fuel and a key ingredient in decarbonisation, Eljack and Kazi (2020) indicate that cited challenges with regards to hydrogen distribution, storage and handling require synergetic efforts between multiple sectors for production, storage, distribution and associated transportation of hydrogen. These cited challenges present an opportunity for entrepreneurs in the hydrogen value chain, renewable power, hydrogen production, hydrogen logistics, storage, pressurising, transportation, and infrastructure development amongst others.

Further analysis of the country's liquid fuels demand reveals the key driver as transportation, and this draws attention to the relationship between the liquid fuels demand of the country and the engine technology of vehicles.

2.3.2 *Electric vehicles*

A lot of automobile manufacturers globally, are investing in EV technology and battery factories in a bid to reduce emissions that come from ICEs (Lawrie et al., 2020). EVs are inclusive of battery electric vehicles (BEV) that are powered by a traction battery and have no emissions as no hydrocarbon fuel source is used during operation. There are also hybrid electric vehicles (HEV) that use a combination of ICE and an electric propulsion mechanism. The advantage of HEVs is a lower fuel economy but not necessarily significant reduction in emissions as the use of fuel oil is still prevalent in operation. Lastly, the EV family also includes fuel cell electric vehicles (FCEV) that use fuel cells for powering vehicles (Sun, Li, Wang, & Li, 2020).

Dane, Wright, and Montmasson-Clair (2019) note that South Africa would greatly benefit from EVs in urban areas due to expected improvements in air quality, health improvements and progress made towards the national climate change agenda. Zhao

(2017) previously argued that the human nature of fulfilling demand as well as current transport infrastructure is in favour of liquid fuels and not alternative options such as batteries, electricity, or hydrogen. The disadvantages of EVs as highlighted in the studies of Dane et al. (2019) include reduced demand for petrol and diesel which may affect secondary distribution and the entrepreneurs involved in the transportation of these final elements to customers as well as possible closure of filling stations. An opportunity is presented in terms of converting current service station infrastructure to charging stations for these EVs. The reduced demand may also require the closure or upgrade of traditional refineries to a more modern refinery that will have capabilities of producing CF2 and other products such as solvents (Dane et al., 2019).

This opportunity can be used to partner with Black entrepreneurial businesses that are already in the liquid fuels sector to be part owners of the refinery infrastructure and charging stations and in building capabilities in the build up to the transition ensuring justice in the transition.

2.3.3 *"Just" Energy Transition*

According to Hirsch, Mattheß, and Fünfgelt (2017), the Paris Climate Agreement of 2015 and the SDGs emphasise the need for a transition towards a zero-carbon future that is globally sustainable and climate friendly. Although it is a concept that is not yet globally embraced, a just energy transition is a vision that is aimed at making the process of moving from fossil fuels to low carbon energy sources more focused on dialogue and to be as just and equitable as possible, leaving no one behind (Pellegrini-Masini, Pirni, Maran, & Klöckner, 2020). A just energy transition is about employing the standards of justice to an energy transition with the aim of protecting possible victims of the transition, facilitating co-ownership of infrastructure, providing social equity and promotion of partnerships between stakeholders (Halsey et al., 2019). A myriad of challenges have been cited when deliberating on the transition from fossil-fuels to low/zero-carbon energy sources such as renewable energy sources including storage, access to energy, repercussion on the labour market, business enablement and technology transfers (Hirsch et al., 2017).

Halsey et al. (2019) explained that a JET is not only premised on the objective of the requirement to address global change and environmental pollution, but on the protection of communities and workers in the energy sector that will be affected by the transition and the concept of rebuilding the economy. It is argued that the JET could be instrumental in addressing issues of unemployment, poverty, and social inequality. A JET is signified by energy security to address SDGs, ownership of resources and infrastructure, availability and accessibility of equity, inclusive economic growth and decarbonisation (Halsey et al., 2019); (PWC, 2021).

In South Africa, the National Development Plan (NDP) provides an outline of the desired future state of the country that embraces a reduction in reliance on fossil fuels and sets out aims of achieving climate change objectives together with socio-economic goals such as curtailing inequality and associated poverty and limiting unemployment (PWC, 2021). It also states that the business community has a key role to play in facilitating change for a JET and ensuring job creation.

Eitan, Rosen, Herman, and Fishhendler (2020) point out that the business sector has capabilities to ensure vulnerable communities and workers affected by the energy transition are properly skilled and subsequently employed as entrepreneurs. As crucial economic vehicles, at the helm of providing various goods and services through novel means, a combination of social, financial and sustainably oriented entrepreneurs will ensure the creation of employment with new energy sources, socio-economic improvements and advancements of climate change agenda while generating financial profits (Eitan et al., 2020).

In a study focused on business opportunities that can help facilitate justice in the energy transition, Semelane, Nwulu, Kambule, and Tazvinga (2021) assert that business opportunities in affected value chains can ensure justice in the energy transition. The business community and in particular entrepreneurs can therefore be seen as part of the affected population to ensure justice in the transition.

2.4 Identify the barriers to entrepreneurial participation in LF sector

This section has a specific focus on the barriers to entrepreneurial participation in the LF sector. The Free Dictionary defines barriers as "…anything that prevents or obstructs passage, access or progress…" while enablers are defined as those who "...provides with adequate power, means, opportunity or authority to do something…" (Farlex, 2003).

2.4.1 *Barriers of entry to entrepreneurial participation in LF sector*

The barriers of entry in the LF sector are primarily of a structural nature and are distinct to the context of the industry. The LF sector has high capital requirements in order to enable the purchasing of fixed assets, building up of stock, increasing credit for clients as well as economies of scale (Sihlobo, 2017). Sitharam and Hoque (2016) argued that South Africa had one of the lowest business establishment and survival rates and that the phenomenon was ascribed to lack of access to finance. Lack of access to finance was found to be one of the biggest contributors to entrepreneurial failure. Fatoki and David (2010) reported that lack of access to credit was another barrier that contributed to entrepreneurs not being able to participate successfully in business as they were unable to pursue certain opportunities due to the unavailability of credit that would allow them to trade even without having the cash at hand.

Investopedia (2020) identifies the barriers of entry as high research and development costs as well as capital costs in the upstream for production (supply side). Capital costs would also be exacerbated by regulatory requirements that require capital to ensure compliance, further disadvantaging eager entrepreneurs. Studies on entry barriers for Black-owned businesses identify some of these as access to finance and markets, scale economies and vertical integration which require massive amounts of capital (Vilakazi & Bosiu, 2021).

A study by Baadjie, Chiloane-Phetla, and Mmako (2021) provides interesting view on the issue of access to markets. The study asserts that entrepreneurs operating in the downstream value chain were not only customers to the oil majors but were also

competitors, competing for the same market, raising concerns on the fairness of competition considering that entrepreneurs may not be able to compete with these vertically integrated entities.

Companies that manage to overcome the barriers of capital costs are then challenged with access to technology and infrastructure as ownership lies with current incumbents. Globally, oil majors represented in the LF value chain have over time acquired technologies and capabilities that new entrants cannot compete with, that not only enforce market power upstream but establish dominance in downstream fuel supply (Nkhonjera 2015). In South Africa, where crude oil is imported, entrepreneurs are further marginalised as importing requires a healthy balance sheet and cash flow leading to an absolute cost advantage for oil majors (Bain, 1956); (Paelo et al., 2014).

The barriers of entry are not only structural but are both from a demand and supply side because of the high demand for LF.

Downstream, the costs of entry are high for entrepreneurs that would like to operate as independent distributors. Before purchasing the fuel, entrepreneurs will require access to land, tanks, transporter capacity and to fulfil environmental compliance requirements. Retailing would also require an average capital amount of approximately R5 million and these opportunities are marred with great scepticism from financial institutions in financing new entrants (Sihlobo, 2017). Although wholesaling as an agent has lower costs of entry, the access to supply is still controlled by oil majors (Paelo et al., 2014). Access is also prioritised for established companies with higher volumes, further disadvantaging smaller businesses (Paelo et al., 2017).

Paelo et al. (2014) further indicate that other barriers were access to supply, market access, regulatory environment, the response of oil majors and skills and training. This notion is further supported by Sihlobo (2017) who indicated that vertical integration limited access to infrastructure for entrepreneurs, manifesting in unequal access to storage terminals, refineries, pipelines and so forth was a barrier to entry for new entrepreneurs. Additional barriers of entry include access to infrastructure, competitive advantage access to product and customers, inequalities in terms of distribution channel access as well as a pricing model that favours incumbents (Sihlobo, 2017).

Roberts (2017) notes that access to infrastructure is key to ensuring sustainability of entrepreneurs and small firms as new entrants.

According to Sihlobo (2017), barriers to entry and participation are paramount in ensuring that existing oil majors have a competitive edge over novices in the LF sector and are instigators in the advancement of the market power of incumbent firms.

2.4.2 *Determine the skills requirement to enable an ET in the LF value chain*

South Africa, although full of possibilities, is a country that has a skills challenge and the same trend is prevalent in the liquid fuels sector. DMRE (2000), notes that the labour market in the country does not have sufficient skills that are necessary for the development of the liquid fuel sector. Further, new entrants require skills in upstream oil and gas exploration, refining, management of depots and storage tanks. A study by Politis and Gabrielsson (2005) raised an interesting dynamic when it comes to the pursuit of entrepreneurial ventures, indicating that prior experience assisted entrepreneurs in being able to manage business risks as well as increases the probability of being able to identify opportunities. This study is corroborated by Staniewski (2016) who identified previous management experience as one of the factors that may be used to prognosticate the future success of an entrepreneur.

According to Paelo et al. (2014), entrants into the liquid fuels sector required cash flow management skills as well as have an understanding of regulation relating to health and safety, refining, licensing, storage and the vending of fuel. Ngxongo (2018) argued that cash flow management was necessary for the survival and sustainability of entrepreneurs in business. This is further corroborated by Paelo et al. (2017) who maintain that the management of finances is an important skill that is required and yet deficient from entrepreneurs in the sector.

Although financial skills are core to success in the industry, Maseko (2014) asserts that capabilities that are required include skills in upstream manufacturing, product supply as well as trading. It is also very important to note entrepreneurial opportunities that may become available for expansion of infrastructure, renovations and refurbishments if businesses are able to commercialise skills for artisans. Ngxongo

(2018), supported by Malatsi (2018), confirmed that business skills were a necessary requirement for entrepreneurs in the liquid fuels sector. The study by Malatsi (2018) further articulates that business skills within the liquid fuels sector must be fostered in order to enable capabilities like contract negotiations. Although the liquid fuels sector is one of the largest in the country, Kapdi (2017) presented that in order to successfully operate in the sector, lack of technical skills was a barrier to entry for new entrants.

2.5 Conclusion of Literature Review

Chapter 2 lays out a review of the literature and provides a background of the LF sector in the context of the South African environment, including the evolution of regulations affecting the sector. The chapter then establishes the significance of the global energy transition and further explains the energy transition within the liquid fuels sector including concepts such as clean fuels, bioenergy, hydrogen and EVs. Chapter 2 concludes with a discussion on barriers to entrepreneurial entry and participation in the LF sector including possible entrepreneurial opportunities and the skills required to ensure participation.

Table 1. Consistency table: research questions and propositions

RQ #	Objective	Prop / hyp #	State Proposition or Hypothesis
1.	Identify the activities that signify the Energy Transition in South Africa	1.	South Africa has a two-fold GHG emission challenge; emissions from coal plants and synfuel (Coal-To-Liquids (CTL) and GTL) sector emissions. Liquid Fuels transition needs to consider clean fuels, bioenergy, hydrogen and EVs. The energy transition within the liquid fuels sector has primarily been focused on regulation for Clean Fuels I/ II.

RQ #	Objective	Prop / hyp #	State Proposition or Hypothesis
2	Identify the barriers to entrepreneurial participation in LF sector	2	Barriers to entrepreneurial participation in the LF sector include high capital costs, lack of skills and training, access to supply, market access, regulatory environment, the response of oil majors and access to infrastructure.
3	Determine the skills requirement to enable an ET in the LF value chain	3	Skills required in the LF sector include cash flow management, financial management, prior business experience, regulation relating to health and safety, upstream manufacturing, storage, product supply, trading, artisanship, and business skills.
4	Identify opportunities for entrepreneurs in the LF ET	4	Identified opportunities include bioenergy, hydrogen value chain (logistics, storage, production, pressurising, transportation, infrastructure development), CF refinery infrastructure development, EV charging stations

CHAPTER 3. RESEARCH METHODOLOGY

3.1 Introduction

This study's examination into how the Energy Transition (ET) can be leveraged for greater Black entrepreneurial participation in the liquid fuels sector in South Africa has explored the background of the sector including regulatory considerations, the energy transition, barriers to entry and participation, skills requirements for successful participation in the sector and possible opportunities in the sector.

The primary objective of the study was to examine how the Energy Transition in South Africa can be leveraged for greater Black entrepreneurial participation in the country's Liquid Fuels (LF) sector. To address this objective, a literature review and empirical research were administered. Chapter 3 therefore brings attention to the research methodology by elaborating on the research approach, research design, data collection methods, population, sample, research instrument, procedure of data collection as well as data analysis and interpretation.

The secondary objectives formulated from the primary objective that were introduced in Chapter 1 are stated again:

To conduct an empirical study that will accomplish the following:

a) Identify the activities that signify the Energy Transition in South Africa

b) Identify the barriers to entrepreneurial participation in LF sector

c) Determine the skills requirement to enable an ET in the LF value chain

d) Identify opportunities for entrepreneurs in the LF ET

3.2 Research approach

A research approach relates to the roadmap that will be undertaken to conduct research (Williams, 2007). Williams (2007) makes reference to the three (3) most common types of research approaches being mixed methods, quantitative and qualitative research.

This study made use of a qualitative research approach as the research questions for the study required textural data. Hennink, Hutter, and Bailey (2020) assert that a qualitative research approach entails the collection and analysis of textural and multimedia data so that the varied encounters, ideas and opinions shared can be taken into account. Hammarberg, Kirkman, and de Lacey (2016) explained that qualitative research was pivotal when seeking responses on experiences, frame of reference and meaning.

A qualitative research approach was appropriate for this study due to the intentional focus on the experiences of the participants. A qualitative research approach enabled the research participants to be studied in their natural environment and sought to understand the associated contextual influences. The research approach further enabled matters of concern to be determined from the vantage point of the participants while gaining intimate understanding of the various interpretations attributed to events, behaviours and objects (Hennink et al., 2020).

In conducting qualitative research, the aim was to gather accurate and extensive insight into the research problem drawn from the unique perspectives of the respondents (Hennink et al., 2020). The intention was to get information from explanations and collected data while learning from the respondents of the study without anticipating specific findings (Walters, 2001).

3.3 Research design

The research design is meant to provide a framework for the research study that comprises of specific techniques that have been carefully selected (Sileyew, 2019). Research design is a comprehensive strategy that details the collection,

measurement, analysis and interpretation of data in order to solve the research problem efficiently while ensuring minimal expenditure in terms of invested time, money and human effort (Kothari, 2017).

Kothari (2017) categorises research designs as exploratory, descriptive, and experimental. This research study employs exploratory research design, making use of an experience survey.

An exploratory research design is adopted with the aim of gaining greater comprehension of the existing research problem and is mostly employed where the research area is fairly new (McDaniel Jr & Gates, 2020).

An exploratory research design was employed because the concept of an Energy Transition is fairly new within the LF sector similarly to the concept of justice including entrepreneurs as part of the affected population for an inclusive energy transition (Mahajan & Bandyopadhyay, 2021).

Kothari (2017) argued that the objective of experience surveys was to gain understanding of the association between existing and new ideas regarding the research problem. Experience surveys are therefore conducted with participants that have "…practical experience..." with the research problem. McDaniel Jr and Gates (2020) further expressed that experience surveys required the engagement of stakeholders that were both internal and external to an organisation who possessed relevant knowledge and experience on the research problem.

In using experience surveys, the aim was to engage participants that formed part of the liquid fuels value chain at the time of conducting the study as well as those that were not yet part of the value chain to gain insights from individual practical experiences. The experience survey also allowed the flexibility to be able to accommodate questions or concerns that were not initially considered. Experience surveys however required a lot of time investment due to the allowable flexibility (Kothari, 2017).

3.4 Data collection methods

The process of data collection is concerned with the gathering of data for the purposes of responding to the research question (Kothari, 2017). There are different research instruments that can be utilised in the process of data gathering including interviews, questionnaires, observation, schedules and so forth (Saunders & Lewis, 2017).

This study made use of semi-structured interviews to allow having a set of pre-determined questions while also having the flexibility to be able to add supplementary questions and so forth. Semi-structured interviews allowed for the collection of open-ended data of a qualitative nature, to be able to get depth from participant responses as well as exploration of participant thoughts, emotions and beliefs about the research topic (McGrath, Palmgren, & Liljedahl, 2019). Semi-structured interviews allowed for the preparation of some questions in advance that assisted in keeping participants on topic. The disadvantages of semi-structured interviews as a data collection method is greater amount of time investment in conducting interviews due to open ended questions and some bias if there is no caution applied to ensure leading questions are not asked (Adams, 2015). The method enabled the gathering of in-depth information on how the ET may lower barriers of entry or participation for Black entrepreneurs in the LF sector among others.

3.5 Population and sampling

A target population refers to a group of individuals that a sample for a study may be drawn from while a sample is concerned with the individuals that take part in the study (Maxwell, 2021). The target population of this study included members of the National Energy Wholesalers Association of South Africa (NAEWASA), members of the South Africa Petroleum Industry Association of South Africa (SAPIA) and former and active business executives of the liquid fuels sector. NAEWASA is a registered Non-Profit Company (NPC) that serves as a representative of business people within the energy sector value chain (upstream, midstream, downstream) by ensuring market access through pro-active research and stakeholder engagement. NAEWASA is an organisation that looks after the interests of new entrants as well as existing

businesses in the form of energy wholesalers, independent power producers and businesses in the renewable energy value chain (NAEWASA, 2018). SAPIA is a liquid fuels industry body that was established with the objective of being a representative of the South African liquid fuels sector's common interests. SAPIA plays a pivotal role in confronting matters related to "…refining, distribution and marketing and petroleum products…" and being a spokesperson for the progress made in other aspects of the industry (SAPIA, 2014). Other participants were identified through snowballing; a non-probability technique where new participants were referred by the initial participants that were interviewed (Saunders & Lewis, 2018).

3.5.1 *Population*

The primary target population of this study was Black entrepreneurs that were members of the National Energy Wholesalers Association (NAEWASA) and the South Africa Petroleum Industry Association of South Africa (SAPIA) at the time of conducting the study. The entrepreneurs were selected by consideration of active membership in either NAEWASA or SAPIA. The reason for choosing Black entrepreneurs that are members of NAEWASA is because the organisation represented the interest of entrepreneurs that have been in the LF sector for some time; focusing on the entire value chain as well as those that were trying to participate in the sector (NAEWASA, 2018). The reason for choosing Black entrepreneurs that were members of SAPIA is because the association represented the common interests of the liquid fuels sector (SAPIA, 2014). The target population included active and former business executives of the liquid fuels sector that were selected to provide a business perspective to the research problem. The population was selected as participants would be able to provide in-depth information that would address the research questions. Additional participants were identified through snowballing from the NAEWASA and SAPIA population.

3.5.2 *Sample and sampling method*

Sampling is a defined procedure of making a selection of a study's participants from the defined population (Berndt, 2020). The target sample for this study was selected

using non-probability sampling and in particular purposive sampling where subjective judgement will be used in sample selection in preference to random selection (Omeihe, 2021). Purposive sampling is commonly used to identify information rich cases by selecting a group of individuals that possess a breadth of knowledge in the research problem (Etikan, Musa, & Alkassim, 2016). As a form of purposive sampling, homogenous sampling will be applied; as a specific set of participants will be identified (Campbell et al., 2020). According to Mason (2010), in qualitative studies, a sample size of 15 is the average in qualitative studies, whereas the most widely applied sample sizes are between 15 and 50. From the population of NAEWASA members, a sample of 5 members who are either struggling to participate or have limited participation in the liquid fuels sector was chosen. From the population of SAPIA members, a sample of 3 members was selected to gain insights from those that are already successfully operating in the sector. 6 participants were then selected using the snowballing method from the NAEWASA and SAPIA members. Then a sample of 2 active business executives and 2 former business executives was selected to gain business insights from executives that have an internal view of the sector. This was a total of 18 interviews of a purposively selected expert sample as saturation occurred. Table 2. provides the profile of respondents. The selected sample provided insight into the research questions.

Table 2: Profile of respondents (by position or context and not name)

Description of respondent type	**Number to be sampled**
Participant of LF sector (NAEWASA)	5
NAEWASA Referral	4
Participant of LF sector (SAPIA)	3
SAPIA referral	2
Active Business executives	2
Former Business Executives	2
TOTAL number of respondents	18

Source: Author's adaptation (2021)

3.6 The research instrument

The research instrument used in this study was an interview protocol that can be defined as an instrument of enquiry that assists in guiding the interview as well as ensuring that specific questions related to the objectives of the study are asked (Castillo-Montoya, 2016). Interviews can be described as conversations involving one or more individuals with the purpose of asking concise questions, listening attentively and establishing rapport (King, Horrocks, & Brooks, 2018).

The interview questions included in the interview protocol guided the interviews. An interview guide was formulated to ensure the discussion is guided and covers topics relevant to the study. It was imperative to ensure that the interview questions aligned with the objectives of the study. The interviews were conducted in English as the most common medium of communication in South Africa. The research guide was accompanied by a covering letter to participants explaining the purpose of the

research, the rights of participants and the use of the data collected. See Appendix (A) for the Participant information sheet and Appendix (B) for interview guide.

The themes identified for the study included:

- LF sector and role – Describe the LF sector and your role?
- ET – What is your understanding of the Energy Transition?
- Barriers of LF participation – What are the barriers of entrepreneurial participation in the LF sector?
- Skills requirements for participation in LF sector – What are the skills requirements for entrepreneurs to participate in the LF sector?
- Opportunities for Entrepreneurs in LF sector – What do you think are the opportunities for entrepreneurs in the LF ET?

Although some questions were structured, they were open ended to allow participants room to explain. This also provided opportunity to be able to probe for clarity.

3.7 Procedure for data collection

Participants in the research study were accessed by first approaching NAEWASA and SAPIA to gain permission to the database of members including contact details (See Appendix (D)). Once permission was granted by NAEWASA and SAPIA (See Appendix (E)), then all the members that were deemed relevant to the study were called. Members of NAEWASA and SAPIA also recommended participants for the study who were also called after gaining permission. Introductions were done of the researcher; the study being undertaken and request for participation in the study as well as an appointment for an interview. Business Executives were accessed via referral. An email invitation was then sent to the potential participants for participation in the study. The email invitation highlighted the objectives of the research study as well as criteria of eligibility while also indicating that the researcher can be contacted where there are enquiries on the interview or participation with communicated dates. The eligibility criteria included having being part of the LF sector, knowledge of the ET and the LF sector's entrepreneurial opportunities. The email also included the interview protocol so that participants could adequately prepare for the interview and

a consent form that indicated the rights of the participants and agreement to recording of the interview. The consent form was adapted from Saunders and Lewis (2018) and TCD (2021). See Appendix (C).

The in-depth interviews were conducted as one-on-one and, due to the impact of COVID-19, interviews were held either face-to-face, via the Zoom virtual platform or Microsoft Teams virtual platform. Two (2) of the interviews were concluded via mobile phone because of load shedding. Each participant was allocated a maximum of one hour per interview.

The seven (7) step process by Raworth (2019) was employed to guide the process of setting up the interview:

- Introduction of researcher and research purpose while managing expectations of participants on expected changes the research is anticipated to bring to the sector
- Establishment of consent and agreement on the level of confidentiality of responses, options for clarification questions, withdrawal from the research and the use of results
- Ensuring the location is convenient for the participant
- The timing of interviews was around the availability of the participant and a time commitment on the duration was made and adhered to
- Participants that required the services of a translator were allowed one and the translator was to be used as a channel that will be communicated through (None of the participants of this study required the services of a translator)
- Record the interview with participant consent rather than take comprehensive notes as that may be time consuming and distracting to the participants. Only important notes were jotted down.

In addition to the seven (7) steps, participants were provided with an opportunity to ask questions before the commencement of the interview. The structure of the interview and topics that would be covered were communicated to the participants as well as sharing of contact details should participants have any questions post the interview (McNamara, 1999).

The research protocol was used that would guide the questions and probing questions were administered to get more depth from participants.

3.8 Data analysis and interpretation

Once data was collected through semi-structured interviews, the qualitative data was prepared into text data.

The process of data preparation involved the preservation of confidentiality by ascribing pseudonyms to the participants. The naming convention used was Participant 1, 2, 3 and so forth and Business Executive 1, 2, 3 and 4. Permission was received from all research participants to audio record the interviews so transcription of the recordings was conducted for a verbatim account of the interviews (Saunders & Lewis, 2017). Some research participants articulated themselves in English as well as using home languages (Setswana and isiZulu) which the researcher was fluent in. Where vernacular instead of English was used, translation into English was done. Each transcript was meticulously checked for accuracy by comparing audio recordings with verbatim transcriptions. This was done to improve the confirmability of the data by ensuring that participant responses were accurately captured (Korstjens & Moser, 2018).

Once verbatim transcriptions were completed and the raw data was prepared, a computer aided qualitative data analysis software program (CAQDAS) called Atlas.ti was then used to assist with analysing the data. A new project was created in Atlas.ti and the data sets were added. Data was analysed per transcribed document and the software was used to also assist with organisation and management of data.

The next step after data preparation was to then carefully review the data. This data was read through individually and multiple times in order to get a general sense of the information contained in each transcript and to evaluate comprehensiveness. The raw data was read until there was understanding and familiarity (Nowell, Norris, White, & Moules, 2017).

The data was analysed using thematic analysis, "…a qualitative data analysis method that involves reading through data sets and identifying patterns in meaning through data sets…" (Delve, 2021). Thematic analysis allows researchers the flexibility to be able to generate codes and themes from the data collected through a systematic course of action (Braun & Clarke, 2019). Thematic analysis was appropriate as it allowed for thorough probing of the various perspectives represented by research participants, enhancing unexpected insights while drawing parallels and contrasts.

The process of coding was then done by coding individual interview transcripts, where similarities were identified from the raw data and appropriately descriptive codes were constructed and ascribed. The process of coding was a reflective one that allowed for sections of text to be identified and labels to be assigned to them for indexing relative to a theme (Nowell et al., 2017). This research study made use of Atlas.ti to organise and manage data, while coding and comparing different codes. The use of a software program was systematic in ensuring effective facilitation of the coding process. The codes were then reviewed to identify similarities and determine code groups that would be categorised under various relevant themes. The process of thematic analysis was reflective and enabled valuable insights to be drawn from the data (Kiger & Varpio, 2020).

Data analysis was conducted using a six phase approach that further strengthened the trustworthiness of the study (Nowell et al., 2017). The steps followed are:

STEP 1 - Establish familiarity with the data through constant engagement, triangulation, documentation, and storage of data

STEP 2 - Produce initial codes

STEP 3 - Explore various themes

STEP 4 - Review themes and sub-themes

STEP 5 - Define and identify themes

STEP 6 - Generate the final report or manuscript

There were initially 62 codes identified. Table 3 is an example of some of the identified codes.

Table 3: Extract of initial identified codes

Name	Grounded
Access to credit facilities can support entrepreneurial participation	6
Access to infrastructure can support entrepreneurial participation	1
Access to infrastructure is a barrier to entrepreneurial participation	2
Access to markets is a barrier to entrepreneurial participation	4
Access to molecule can enable entrepreneurial participation	2
Access to product is a barrier to entrepreneurial participation	1
Access to storage is a barrier to entrepreneurial participation	8
Access to supply is a barrier to entrepreneurial participation	1
Access to working capital can enable entrepreneurial participation	10
Building relationships are a skills requirement for successsful participation	6
Business acumen is a required skill for successful participation	3
Business experience is a rquired skill for successful participation	2
Business management and understanding of the markets is a sills require...	2
Capacity development in an enabler for successful participation	2
Capital Funding is a barrier to entrepreneurial participation	31
Cash Flow management is a required skill for successfull participation	8
Character traits for entreprenurial participation	2
Collaboration between oil majors, entrepreneurs and government	1
Commitment of supply from oil majors is a barrier for entrepreneurial parti...	1

Source: Atlas.ti

3.9 Limitations and challenges of the study

The limitations of a research study are factors that may affect the study's reliability (Abutabenjeh & Jaradat, 2018). A limitation to the study was the small sample size and the limited time within which to conduct the study. Purposive sampling and snowballing limited the perspectives gained from the research as they are subjective and dependent on the networks of the researcher and referring participants for the participants. Access to entrepreneurs was limited to initially the National African Energy Wholesalers Association of South Africa (NAEWASA) and the South African

Petroleum Industry Association (SAPIA). The research was conducted during the global Covid-19 pandemic and this possibly impacted some of the participant insights.

The entrepreneurs and business executives that participated in the study were sometimes unavailable for interviews due to busy travel schedules which led to challenges in collecting data. Some of the entrepreneurs that were interviewed had financial challenges and did not have data for Zoom or Microsoft Teams interviews resulting in delays in conducting interviews. The Zoom or Microsoft interviews were also sometimes interrupted due to load-shedding and had to be rescheduled or continued over telephone.

The energy transition in South Africa is a fairly new area of research and this presented a limitation as there are limited studies that have been conducted on the topic.

3.10 Trustworthiness

The trustworthiness of a research study is concerned about the degree to which the methods used to collect data give an accurate measure of what was intended and the findings of the research are accurate (Saunders & Lewis, 2018). The most common criteria of trustworthiness includes transferability, credibility, confirmability and dependability (Connelly, 2016).

3.10.1 *Transferability*

Transferability in this study was established by the inclusion criteria that was used to define the population studied in the research. The recruitment and selection of the sample was based on the knowledge and expertise of the participants. Delimitations of the research have been clearly defined as well as the context of the study suggesting that findings made in this study can provide valuable lessons in contexts of a similar nature (Daniel, 2019).

3.10.2 *Credibility*

In this study, credibility was improved by following study protocol to ensure consistency in the administration of the research process (Saunders & Lewis, 2018). To further ensure credibility, diligent record keeping, and verbatim descriptions of participant experiences and responses was recorded. During the interview process, member checking was conducted where information was re-stated as provided by participants and accuracy determined through questions (Korstjens & Moser, 2018). In analysing the data, distinctions were identified as well as commonalities from responses so that the various frames of references would be represented (Flick, 2018). To reduce researcher bias, other researchers were consulted (Smith & Noble, 2014).

3.10.3 *Dependability*

The semi-structured interview questions were founded on a deep understanding of the literature and the questions were tested to ensure they are understood as intended to ensure dependability. The dependability of the study was further enhanced by making use of a digital voice recorder with the permission of the participants as well as ensuring that accurate transcription of the data occurs (Creswell & Poth, 2016). Dependability was also enhanced by ensuring the analysis is reviewed by a third party.

3.10.4 *Confirmability*

To ensure the research study meets the confirmability criteria of transparency, a complete documentation of the research process occurred and records kept to provide an audit trail including notes, meeting minutes and so forth (Korstjens & Moser, 2018).

3.11 Ethical considerations

According to Hasan, Rana, Chowdhury, Dola, and Rony (2021), ethical considerations are a set of guiding principles that ensure adherence to a code of conduct when collecting data, that will not only protect participants' rights but ensure research integrity and validity.

Varkey (2021) argues that the four (4) principles of ethical consideration are autonomy, justice, non-maleficence, and beneficence. In this study, to ensure that the rights of participants were respected, no-one was compelled to take part in the study, but all were voluntary participants through written consent. The identity of participants was kept confidential while making participants aware that they possess the right to choose whether they would like to withdraw from participating in the study to ensure autonomy. Before collecting data, this study was guided by the Wits Business School (WBS) ethical clearance process.

Justice was ensured by selecting participants based on the requirements of the study. The research protocol provided guidance so that fairness could be exercised, and equal treatment given to all participants. To achieve non-maleficence and beneficence, the participants were not exposed to any harm or risk because of participation in the study and participants were aware that the result of the study may not directly be of benefit to them but may have indirect benefits if recommendations are adopted.

The names of the participants as well as the companies represented were not included in the presentation of results.

Table 4. Consistency table: research questions, p, data collection and data analysis

RQ #	Objective	Prop / hyp #	State Proposition or Hypothesis	Data collection detail	Data analysis method
1.	Identify the activities that signify the Energy Transition in South Africa	1.	South Africa has a two-fold GHG emission challenge; emissions from coal plants and synfuel (Coal-To-Liquids (CTL) and GTL) sector emissions. Liquid Fuels transition needs to consider clean fuels, bioenergy, hydrogen and EVs. The energy transition within the liquid fuels sector has primarily been focused on regulation for Clean Fuels I/ II	Interview guide questions 3.1; 3.2	Thematic analysis
2	Identify the barriers to entrepreneurial participation in LF sector	2	Barriers to entrepreneurial participation include high capital costs, lack of skills and training, access to supply, market access, regulatory environment, the	Interview guide questions 4.1, 4.2,4.3,4.4	Thematic analysis

RQ #	Objective	Prop / hyp #	State Proposition or Hypothesis	Data collection detail	Data analysis method
			response of oil majors and access to infrastructure.		
3	Determine the skills requirement to enable a ET in the LF value chain	3	Skills required include cash flow management, financial management, regulation relating to health and safety, upstream manufacturing, storage, product supply as well as trading and artisanship	Interview guide question 5	Thematic analysis
4	Identify opportunities for entrepreneurs in the LF ET	4	Possible entrepreneurial opportunities in Bioenergy (Biomass production, biomass liquid fuels, ethanol fuel. Other opportunities are presented in the hydrogen value chain (renewable power, hydrogen (production, fuels, logistics, storage, pressurising, logistics	Interview guide questions 6	Thematic analysis

RQ #	Objective	Prop / hyp #	State Proposition or Hypothesis	Data collection detail	Data analysis method
			infrastructure development). Some opportunities are in clean fuel refinery development and EV charging stations		

CHAPTER 4. PRESENTATION OF FINDINGS

4.1 Introduction

This chapter presents the findings of the study attained from semi-structured face to face and online interviews with the aim of addressing the objectives identified in Chapter 1. The findings were gathered from 14 entrepreneurs participating in the liquid fuels sector and four (4) business executives that were active or had been part of the liquid fuels sector. The data was analysed using Atlas.ti, a computer aided qualitative analysis software. The results submitted underwent a process of coding and code grouping into themes in alignment with addressing the objectives. The findings are presented without interpretation or partiality.

4.2 Results pertaining to Objective 1

Objective 1: Identify the activities that signify the Energy Transition in South Africa

This objective was to confirm the activities that signified the energy transition in South Africa and to understand how participants perceived the move from fossil fuels to cleaner fuels. Participants were asked what their understanding of the energy transition was. Participants were also asked what was perceived to be the role of entrepreneurs in the liquid fuels energy transition to try and establish whether it was part of their vision. Table 4.1 presents the summary of themes.

Table 4.1 Objective 1: Themes

Code	Code Groups
• Understanding of the Energy Transition • What the Energy Transition looks like	Entrepreneurs in the liquid fuels sector have a perspective on what signifies an energy transition
• South Africa is not ready for the Energy Transition • South African's are not aware of the Energy Transition • South Africa has unique challenges	Entrepreneurs in the liquid fuels sector believe the country is not ready for an energy transition
• The energy transition will repeat the cycle of entrepreneurs not getting opportunities • Value of Energy Transition must be balanced with the cost • Energy transition participation requires huge capital investment	Entrepreneurs in the liquid fuels sector perceive the capital costs of the energy transition to be high

Source: Author's own

4.2.1 *Theme 1: Entrepreneurs and Business Executives in the liquid fuels sector have a perspective on what signifies an energy transition*

Most participants had a perspective on the activities that signified an energy transition. There was also a general understanding of the fact that the transition signified changes in the types of energies even though most entrepreneurs believed it would not materialize soon.

One participant expressed that the energy transition was about introducing new energies where the energy is generated using biomass. The participant also identified electric cars as part of the transition.

…these new energies of making energy with garbage and all. And then there are these cars that don't use petrol or diesel that use electricity... (Participant 3)

Another participant narrated how because they were near a water source like the river, they could consider hydropower as part of the energy transition and that they had begun the process of conducting research on solar power as it was within their proximity.

Like I can do the hydropower one because I'm next to the big river where we can utilize river water to to have energy and so on and so on (Participant 13)

…I'm already doing my own research on the solar cause the solar, I'm close to it, you know, I've got friends that are already doing solar (Participant 13).

Another entrepreneur related how they had had plans to build a bio-fuel plant when asked about their understanding of the energy transition.

...*initially I wanted to set up the biofuel plant...* (Participant 5)

Participant 14 identified the energy transition as a move from carbon heavy fuels to more carbon light fuels.

…Um, It's the transition of um, using traditional fuels that are heavy in carbon emissions to fuels that are um, environmentally friendly and emit less carbon emissions. This transition for example, involves the use of biofuels, solar and LNG (Participant 14)

Business Executive 1 explained that in the case of South Africa, the energy transition needed to be just.

…And in our case it has to be just it has to be inclusive, it must not leave anybody behind. It must not exacerbate poverty. It must not exacerbate inequality. We're very clear on that… (Business Executive 1)

Business Executive 2 argued that a lot of businesses in South Africa were based on fossil fuels and that the energy transition is a transition to green energy with gas as a transition feedstock.

…I think South Africa is mostly based on the fossil fuel and the energy transition. We are trying to really transition into the green energy….. We use your wind mill we use…your hydro you use…yeah, your hydrogen. …And then although for example, for some of the petrochemical industry, before maybe we can actually go into green, we will use also gas as a transition feedstock…. (Business Executive 2)

Another Business Executive supported that the energy transition was a move from carbon-based fuels to cleaner sources of energy.

…so when we talk about the energy transition, it's, um, it's obviously the kind of, um, move away from a carbon based sources of energy, basically to, to, um,

either less carbon intensive sources of energy or to carbon free forms of energy (Business Executive 3)

Business executive 4 highlighted that the energy transition is driven by a two-fold problem that emanates from the environmental impact of fossil fuels and resource depletion.

…One is the environmental impact of fossil fuels, because usually on liquid, uh, fuels, it's dominated by, uh, fossil fuels…. So the, uh, environmental impact, that environmental footprint that leaves that, that it leave, uh, creates a problem which needs to be addressed, uh, as it leads to, uh, global warming. But on other side as well, there is an issue of, um, resource depletion that, um, the resources are…Uh, infinite…. (Business Executive 4).

4.2.2 *Theme 2: Entrepreneurs in the liquid fuels sector believe the country is not ready for an energy transition. Business executives believe the energy transition should be paced for each nation.*

The notion that South Africa was not ready for the energy transition was a recurring theme in the data set. Most participants narrated that South Africa was still dealing with a lot of issues and that the energy transition should not be front and centre due to those challenges. Some of the challenges mentioned were poverty, energy security, high unemployment rate and rising public debt. The participants expressed that the country should not be attempting to compete with first world countries as South African dynamics were different.

…Whereas African countries like ourselves, we are burdened with debt. We have other structural challenges. That kind of means that the energy transition moving to cleaner fuels is not as top a priority for us as say our unemployment at 43% (Participant 11)

…I'm not oblivious to, um, our reality as, as Africans, um, like you said, we are, we are still dealing with very real issues or we're still dealing with poverty (Participant 11)

Participant 8 indicated that the country is currently dealing with the crisis of having a shortage of diesel and electricity.

Right now we have a shortage of diesel, for example, and we are not even talking cleaner fuels. We've got a shortage of, of power for that matter. Electricity (Participant 8)

Another participant explained that the conversion of cars to electric cars will take some time in South Africa because the country is challenged with load shedding.

Because if you take if you see most, to convert all the engine cars to biofuels, to electric cars, and especially the electric car, we have an issue of load shedding. So it's something that we will take a while in our country (Participant 7).

Although in support of the energy transition, one participant narrated that South Africa, unlike the first world countries is still dealing with issues of energy security and that the focus should be on ensuring energy security in the current status quo. They felt that focusing on the energy transition was premature for South Africa.

…I think as South Africans, we like things, as a country we do not even have energy security with the old rules or the old specifications. Then now we want to jump into something because the Europeans are saying that, uh, it's what we need to do to transition to cleaner fuels. Yes, I'm not opposed to cleaner fuels, but energy security should be the first concern. Then once we've got security then, we can transition to cleaner forms of fuel (Participant 8)

Other participants attributed the predicted delays in transitioning to cleaner fuels to the lack of public awareness on the energy transition and the associated benefits.

And I don't think South Africans even understand that... uh, we are in an energy transition, uh, period (Participant 9)

One participant indicated that people still do not understand why there was a move to diesel types with lower sulphur content, highlighting the public ignorance that exists towards the energy transition.

… like now there's still people that want Diesel 500 and you have to explain to them what the diesel 500, does not refer to the strength or to whatever and, but rather to the, uh, carbon content of the product (Participant 6)

Participant 9 explained that the government had not done enough to educate communities on the energy transition because it is in itself still a new phenomenon.

…because it's all new for South Africa, uh, the government has not shown much of an interest, um, in, uh, the, um, renewable energy sector or, you know, this, uh, transition (Participant 9)

Business executive 1 argued that the path to net zero emissions should be determined by each country and should not be determined by the Western world on behalf of all countries.

…the pathway to net zero should not be determined by the Western world and have a blanket approach for everyone. It should be determined by each and every country looking at their optimal energy mix. And in that way be able to move at their own pace towards that, so you must determine your pathway and determine your pace (Business Executive 1)

Business executive 4 narrated that for developing countries to transition to new energies, funding from international institutions like the International Monetary Fund (IMF) will be required because of the capital gap in these countries as well as to compensate for loss of economic activities during the transition from fossil fuels.

…So you are looking at, uh, institutions like, uh, IMF, uh, uh, coming up with some sort of, uh, tax uh, structures that they will then be transferred to, uh,

developing countries because without the support from the developed heads, it's almost impossible… (Business Executive 4)

In fact, it's suicidal for developing countries to actually consider, um, transitioning. Because it's not only the fact that they will not be able to afford them. There's going to be a lot of people that are going to be losing jobs…. (Business Executive 4)

4.2.3 *Theme 3: Entrepreneurs in the liquid fuels sector perceive the capital costs of the energy transition to be high*

Besides the general perception that South Africa was not ready for the energy transition and the public ignorance around it, most participants felt that participation in the energy transition would require high capital costs and if there were no changes to the status quo in the industry then they would still be marginalized.

Will they give us space to operate there or ...uh, otherwise, uh, what is happening, is still going to happen (Participant 3)

Several participants made reference to the high capital costs that are required to start operating in clean fuels as manufacturers.

… I'm saying if you even look at these renewable projects, the costs, even if you are going to look at, uh, biofuels, you, you must have a source of producing that biofuel and that requires massive investments (Participant 8)

…it's expensive for our company say as a small company as we are now, uh, to be first mover in terms of the energy transition (Participant 9)

Um, because transition takes so much in terms of financial resources. Um, and unfortunately when you look at black owned businesses, that does come with a very large price tag of being able to access capital or having, uh, at least, uh, an investor bankrolling you in order for you to make that initial investment (Participant 11)

Another participant made an interesting statement on the value of the energy transition, that it must be balanced with the cost thereof and if the benefits are not clearly expressed and entrepreneurs and communities do not believe the benefits outweigh the costs then there will be very little buy in.

…And the only, the only time where this, let's say energy or the energy transition will get, uh, uh will get, uh, pushback is only if the guys are not going to win (Participant 6)

4.3 Conclusion of objective 1

Narrations highlight that most participants understood the energy transition as well as the activities that signify an energy transition. The data also confirmed that most participants perceived that South Africa was not ready for an energy transition due to structural challenges such as poverty, energy security, unemployment, and rising government debt. Most participants expressed that the energy transition should not be a central focus for the country while the other issues were still pending. The business view presented a different perspective and argued that each country should determine their own pace of transitioning based on the most optimal energy mix and that in South Africa, focus should be on ensuring justice and inclusivity.

Business was of the view that in order for developing countries to transition from fossil fuels, international funding institutions such as the IMF need to play a critical role in funding the transition as well as assisting countries with the economic loss of job reductions in fossil fuels. The data also indicated that there is a general ignorance regarding the energy transition among communities and that the costs of participation are currently a barrier for entrepreneurs because of high capital requirements.

4.4 Results pertaining to Objective 2

Objective 2: Identify the barriers to entrepreneurial participation in the LF sector

Objective 2 was to establish an understanding of the barriers to entrepreneurial participation in the liquid fuels sector. Participants were asked to indicate the barriers that they believed existed in the sector as well as those that had impeded success. Participants were further asked how the current barriers could be lowered and what the enablers for entrepreneurial participation were. Table 4.2 presents the summary of themes for objective 2.

Table 4.2 Objective 2: Themes

Code	Code Groups
• Capital Funding is a barrier to entrepreneurial participation	Entrepreneurs in the liquid fuels sector perceive lack of access to finance to be a barrier to participation
• Customers requiring Credit facilities are a barrier to entrepreneurial participation	
• Access to working capital is a barrier to entrepreneurial participation	
• Financial Systems can support entrepreneurial participation	
• Government funding is inaccessible	
• Stakeholder support	
• Access to supply is a barrier to entrepreneurial participation	Entrepreneurs in the liquid fuels sector perceive lack of access to supply to be a barrier to participation
• Commitment of supply from oil majors is a barrier for entrepreneurial participation	
• Complete reliance on oil majors for supply is a barrier to entrepreneurial participation	
• Stability of supply is a barrier to entrepreneurial participation	
• Access to infrastructure is a barrier to entrepreneurial participation	Entrepreneurs in the liquid fuels sector perceive lack of access to infrastructure to be a barrier to entrepreneurial participation
• Access to storage is a barrier to entrepreneurial participation	
• Access to markets is a barrier to entrepreneurial participation	Entrepreneurs in the liquid fuels sector perceive lack of access to markets to be a barrier to entrepreneurial participation
• Unfair competition is a barrier to entreprenurial participation	
• There are unscrupulous business people in the industry that prey on entrepreneurs	
• The absence of a business model is barrier to entrepreneurial participation	
• Pricing structure is not competitive for entreprenurial participation	Entrepreneurs in the liquid fuels sector perceive lack of access to competitive pricing structures to be a barrier to entrepreneurial
• Pricing structure is not favourable to entrepreneurs	
• Lower regulatory barriers can support entrepreneurial participation	Entrepreneurs in the liquid fuels sector perceive lack of access to lower regulatory requirements to be a barrier to entrepreneurial participation

Source: Author's own

4.4.1 *Theme 1: Entrepreneurs and business executives in the liquid fuels sector perceive lack of access to finance to be a barrier to participation.*

Lack of access to finance was a recurring theme in the data set. Most participants indicated that capital funding was a major barrier in the entrepreneurial journey, and some recalled how this has contributed to not being able to either participate in the sector or fully participate as some opportunities were foregone due to the lack of capital funding. Business expressed a similar view of capital funding being a barrier to entrepreneurial participation.

Capital is a massive, massive, massive player in there. Um, I see the skills, I see this, I see. Whatever. So essentially, if you don't have the money to develop the business or you don't have backing from banks otherwise you, you are unable to enter the space. There is nothing you can do… (Participant 6).

…the capital costs alone will set you back hundreds of millions, if not billions. So we really, at this point in time, a black company struggles to even get, um, I'll say funding to finance 30days credit with the customer (Participant 8)

Yeah, financing. Because one load is about, um, 900 and, uh, R908,000 currently. You know. That's, that's, that's not, uh, that's not, um, um, easy money, you know? So they'll tell you, you know, you going, you go and get, uh, the, uh, load and then once you give me the shipment number, then I'll pay, you know, and then the discussion is over right there (Participant 9)

Um, access to, to capital, I would say are the main barriers, uh, for us (Participant 12)

In our business, uhm uhm, finance was the challenge and as directors we had to take loans (Participant 14)

Business Executive 2 argued that entrepreneurs required capital to sustain businesses.

…The capital to really sustain the business. I think the marketplace has changed after covid. The marketplace is changing currently under this transition. So the, the capital to really sustain them is one issue… (Business Executive 2)

Business Executive 4 explained how the biggest challenge for entrepreneurs was access to capital due to the requirement of investment into research for new industries that will be formed with the cleaner energies.

…the biggest, uh, I would think that the biggest, uh, challenges will be access to capital…

We now going to be spending a lot of money on research because it's new, uh, industries that are being created without, uh, immediate returns. Mm. So if you don't have access to funding, don't have, uh, big pockets, then you might actually struggle (Business Executive 4)

The lack of capital was raised as a barrier to participation in the upstream value chain.

…I think that has kept a lot of the, um, at least local entrepreneurs from the…upstream side of the liquid fuels value chain, like refining; owning refineries is the capital intensity that ownership requires, you know, you have to invest a lot of capital…. (Business Executive 3)

One participant narrated how securing supply with the oil majors required entrepreneurs to pay cash upfront whereas the market or clients serviced want to work on cash on delivery payment terms while others indicated that their client base requires them to offer credit facilities in order to do business with them.

But you can't just, Well, when you go to the customer and say that I'm able to, uh, sell to you at this price, the first thing they'll say is that, um, no, you go and buy the product and then I'll pay COD (Participant 9).

A lot of guys, don't want to do cash. On their side, they have the cash but they don't want to release cash. For me to go and buy fuel, I need to have cash. It's just like going to a filling station, you can't get fuel on credit at the fuel station. For smaller guys like us, they give us the run around, to say No, give me on credit. But whereas I'm buying cash, that means I need to save up enough money to sustain another business so that they can get the credit. Which is not sustainable in the sense (Participant 7).

…your commercial customers, they want 30 days credit. If someone is consuming a million rands, sorry, a million liters a month, that's easily 25 million rands. So if they say they're gonna pay you on 30 days, you're looking at really having about, uh, 42 million rands that is sitting in debtors. A lot of us can't afford that. A lot of entrepreneurs, especially black, can't afford that (Participant 8)

This participant expressed that access to working capital was one of the barriers to them successfully participating in the industry and that some clients, for example mines, required 30-day payment terms and an entrepreneur would require working capital to be able to service the mine for a month without receiving payment.

…mines, they pay, they give you 30 days uhm to pay, to pay. So for smaller companies to carry a mine, with a million liters for 30 days, it's not sustainable (Participant 7)

For another participant, the day to day running of the business was challenging without access to working capital as one had to spend money to try and secure business.

...You can have websites and advertise for yourself but you are not making money and you are still spending on the investment. You are making loans, making phone calls and travelling. It's a challenge (Participant 2)

Additionally, some participants detailed how the process of government funding took too long and the funding they applied for from government institutions has not materialized giving the impression that government funding is inaccessible. The participants indicated that there are various government institutions that offer funding to entrepreneurs, but the process is laborious with endless delays.

And now I'm saying if with my company, with my expertise and the business, the contracts that we have in place, were not able to raise 15 million rands from NEF. How many black companies can raise 5 million rands from NEF? (Participant 8).

Participants indicated that by the time one completes the funding application process for government funding, they would have lost the business.

You know SETA or a government, um, uh, uh, institution to raise funds, uh, by the time you come back that you know their product is, uh, that that order is no longer valid (Participant 11).

Although most participants indicated having challenges with access to financing, there was consensus that there needs to be financial systems that support entrepreneurs. They expressed that financial systems should include among others, specialized lending systems, credit facilities, refund facilities and bank guarantees such as escrow accounts and less demanding processes.

I need to have, uh, some sort of credit record as a business in order to access, uh, funds. I also need to have audited financial statements. Mind you, I don't even have an accountant when I'm starting off for the first few years… (Participant 11).

And when you have your money with them, it's going to take maybe 25, 21 days to refund. So we know we just keep quiet. We just leave it, just wait for another order. Then you tell us your credit, but you'll never get a refund in time.
(Participant 13)

We don't get the support and we don't have the infrastructure that other countries have for small businesses, like in for example, Malaysia. Um, when Singapore, they've got a very different lending system for smaller business than they have for larger businesses. We are having to compete with infrastructurally sound, financially stable entities and provide the same level of documentation, the same level of security as those entities, but we are still trying to break, uh, you know, the bread line basically (Participant 11)

The model that I've seen works, uh, that's if you really, uh, get the, uh, the favor, uh, it's when you have like an external kind of account on an enterprise development basis... (Participant 9)

Other entrepreneurs narrated that different financial support structures could be explored by government to assist new entrants and entrepreneurs operating in the sector.

So government is one stakeholder, for example, that I believe should be supporting entrepreneurs, um, in their venture, especially in the liquid fuel sector. So some of the support initiatives could be, Uh, access to capital (Participant 12)

Another entrepreneur explained that the government support that could be offered does not need to be in the form of cash but in the form of guarantees.

…They must just give us a guarantee with the suppliers and say, supply this guy with so many loads (Participant 12)

Business Executive 1 indicated that capital was a barrier to entry in the liquid fuels industry.

…. I mean barriers to entry with them getting their lease from ACCSA, getting a 1 billion Rand. Which uhm insurance? Just to get into ACCSA. Just because in case the aeroplane crashed…. (Business Executive 1)

Business Executive 4 shared an interesting perspective that capital should not be contextualised into only issuing funding but that there is a need for specialised vehicles to assist emerging players to fund clean fuel investments.

… it's those specialized vehicles that need to be, uh, created, that people are not going to be expected, uh, to, uh, to start repaying, uh, those loans immediate… (Business Executive 4)

4.4.2 *Theme 2: Entrepreneurs in the liquid fuels sector perceive lack of access to supply to be a barrier to participation*

Several participants narrated that one of the major barriers to being able to participate in the sector was access to supply. Interestingly, to these entrepreneurs, the complete reliance on oil majors for supply, affected the value proposition of their businesses as they were unable to offer security of supply to clients because sometimes oil majors were non-committal on supply especially for new entrants.

*So, um, the second one is really access to, um, to the products itself. You know, where you actually have to now go and apply from the likes of *oil major 1, the likes of oil major 2*, you know, to have an account with them. You know, most of the time I'll be very honest and open with you. You really have to run after people, you have to beg, you know, Um, it's not easy at all. Everything is super difficult (Participant 9)*

So if you know, Oil Major 1 decides today that they are going to go on strike and everything is shutting down, what's your, what's your plan? (Participant 4)*

One participant indicated that one of the oil majors had not supplied spot customers (customers that do not have formal contracts and are mostly black new entrants) for an extended period of time. They commented that the lack of supply from this oil major has resulted in foregone business opportunities.

… if I remember well, Oil Major 1 has not been able to supply spot customers in more than a year now……so if there's no molecule to be traded to spot, then there is no....opportunity for them to trade… (Participant 8)*

Uh, as I'm saying, as a, as a new entrant, I must be able to have access to molecules. Uh, without being told to go buy from existing, um, non-black entities that are contracted (Participant 8)

…access to product, because of guarantees requested by majors in South Africa (Participant 14)

4.4.3 *Theme 3: Entrepreneurs and business executives in the liquid fuels sector perceive lack of access to infrastructure to be a barrier to entrepreneurial participation*

While participants understand that their trading licenses allowed them access to industry infrastructure such as refineries, pipelines, railways and storage tanks among others, some participants indicated that there are still challenges in accessing this infrastructure. Business shared a similar view. These challenges have therefore created a barrier for entrepreneurial participation.

So I think mostly, uh, it would be infrastructure, access to infrastructure (Participant 12).

One participant narrated that they attempted to collaborate with importers in importing diesel but were challenged with the high costs of storage making it inaccessible to entrepreneurs.

uh, some time we tried talking to importers*, uh, uh, to see if maybe if we can bring a diesel, uh, but you have, uh, firstly you have to have storage (Participant 3)*

Uhk. Uhm...it must be stored in Durban or PE or whatever.... And then, uh, a storage. They can charge you, uh, uh, maybe, uh, 50 cents per litre per day. So if you're buying the diesel of 50 metric tons at uh, uh, a 50 cpl of storage per day. How much money is that? (Participant 3)

Participant 4 detailed that South Africa is challenged with the fact that storage facilities have been owned by oil majors for some time.

…we've got our own challenges in South Africa in terms of storage itself, where it's been owned for years by the majors as well (Participant 4).

Participant 8 related how the alternative use of independent storage has a cashflow and cost disadvantage due to the high costs as well as the short payment period required by The South African Revenue Services (SARS).

Vopak is expensive, almost 3 times the price that oil majors pay. With Vopak you have to pay SARS duties within 14 days of discharge because it is not a bonded facility, with TNPA tanks, you pay duties when the product is moved out of the tank. So there is a cash flow and cost disadvantage when using independent storage (Participant 8).

One participant referred to pipeline costs. The participant indicated that in addition to the financing costs that are required to secure product, the use of pipelines to move product will require additional capital to cover the storage costs. The participant indicated that due to the high capital costs of infrastructure, one is therefore limited in terms of where they can play.

That pipeline aspect as well. It needs capital. You need to pay for it as storage… (Participant 4)

Business executive 1 argued that access to infrastructure in liquid fuels is a barrier to entry for entrepreneurial participation.

…all the regulations relating to storage…Uh, facilities, we argued, and finally got the third-party access because we didn't have uhm refineries. We didn't have depots, so we pushed hard to get third party access to depots and then we pushed hard to get refineries to accept us as part of operating. So the the barriers to entry are twofold. One is the infrastructure that is there in especially in the liquid fields side….

Business Executive 4 narrated that access to infrastructure was one of the biggest barriers to participation for entrepreneurs in the liquid fuels sector.

… the biggest barrier is access to infrastructure. Mm-hmm. Um, because you are looking at, from the supply chain point of view, you are looking at access to feedstock…. So you need to own mining rights…you're looking at marine logistics, looking at, um, pipeline infrastructure that actually brings the product, uh, from source to, to refineries…. And then looking at, uh, the refineries themselves… (Business executive 4)

4.4.4 *Theme 4: Entrepreneurs in the liquid fuels sector perceive lack of access to markets to be a barrier to entrepreneurial participation*

For some entrepreneurs, participation in the liquid fuels sector was hindered by the lack of access to markets. Entrepreneurs expressed that the playing field was not level in that they were targeting the same customers as the oil majors making competition unfair. Participants sometimes felt like there is no incentive for customers to do business with entrepreneurs making participation difficult.

And even the Big 5s that I am telling you about, they approach mines, like we supposed to be servicing mines and stuff and whatever. So they go to the mines and take the business that we as small players are supposed to be playing in (Participant 3)

If you go to mines you find that they already have agreements with oil major 1, oil major 2*, you name them oil major 3*. They are also getting directly from where we are getting and at a better price. As a result, it becomes a challenge to penetrate the market (Participant 2).*

The issues narrated regarding access to markets indicated an uneven playing field, which according to Participant 3, is further exacerbated by corruption in the sector where the awarding of tenders is for the politically connected who seek bribes for entrepreneurs to participate. This raises the barriers participation even higher for entrepreneurs.

If you're not an ANC member, you're not getting anything and those tenders if you have a license they ask for bribes to facilitate meetings with tender issuers. These are some of the things that hinder us from playing fairly (Participant 3)

Business Executive 2 explained that corruption was one of the barriers to participation in South Africa.

They do talk about that they do understand that corruption is a barrier for South Africa… (Business Executive 2)

Another participant narrated that the inability to access markets was as a result of entrepreneurs not having a business model. The participant expressed that the structure that is used by entrepreneurs is one of distribution to the same customer base that has direct access to the oil major where one is also sourcing product.

You don't have a business model, so you are, you know, essentially, uh, redistributing. You know, and you are distributing to already all to an end user who is, you know, who's had a relationship with the major… (Participant 4).

4.4.5 Theme 5: Entrepreneurs in the liquid fuels sector perceive lack of access to competitive pricing structures to be a barrier to entrepreneurial participation

The lack of competitive pricing was a recurring theme in the data set. Participants indicated that pricing favoured more established businesses as opposed to new entrants or entrepreneurs, making it challenging to exploit opportunities.

…you come across, uh, barriers, uh, where you now understand, you know, you are dealing with pricing, you are dealing with competency of price. That's the biggest issue (Participant 4)

So price as well, maybe they are buying it for five rands and then they add up all those levies, you know, and then from there at the end of the day, they can sell it to the mine at 17 rands. I can't sell it to the mine at 17 rands if the grid price is 23 rands. So price is a problem and it's because of the oil majors. (Participant 1)

Participant 2 related that pricing is a major barrier as companies that are selling more volumes would get better prices and as a result better margins from the oil majors. It was explained that companies getting a price that is far more favourable than the pricing received by entrepreneurs, disadvantages entrepreneurs from participation.

…The person that sells the 20million litres sells at a price that even your price that you buy for is more than what they sell it for so there is no way you can compete. They get at R10, you get from R12 and they sell for R11. You sell for more. There is no way you can compete (Participant 2)

4.4.6 Theme 6: Entrepreneurs and business executives in the liquid fuels sector perceive onerous regulatory requirements to be a barrier to entrepreneurial participation

One of the barriers of participation that was cited by the participants is high regulatory requirements in the sector. Participants narrated how entry into the sector was challenging due to the pre-requisites for acquiring a license. It was further related that the amount of red tape in the industry is prohibitive for entrepreneurs to be able to participate.

To get into retailing and wholesaling space, regulation has been skewed as well as, let's say, I want to say, I wanna say government, but maybe also let's say private (Participant 6)

…I think there's too many uhm red tapes when it comes to smaller companies entering the fuel space (Participant 7)

Some participants commented that the process of acquiring a license was challenging for entrepreneurs because of the required documentation and related costs.

…getting that, uh, that, um, wholesaling license, you know, uh, from the, uh, DOE, you know, that that is a major, major milestone, you know, on its own. Because,

um, I don't think the government really makes it easy, uh, for small entrepreneurs to really acquire the license (Participant 9)

The regulations are just too steep for smaller guys to to actually tap into into the space. Yes, which is dangerous, because it it opens the door for for for illegal operators to enter the space (Participant 7)

…in South Africa, you ask yourself, how come we don't get, um, you know, the kind of regulatory that is in other countries where you can actually set up without any, any problem? (Participant 5)

… licensing and the period it takes… (Participant 14)

One participant explained that besides the onerous process of application, that requires items like financial projections, bureaucracy within the DOE contributed to the pain points experienced during the process. The participant indicated that they were assisted by their networks in removing some of the bottlenecks otherwise it would have taken them much longer to acquire the license.

Um, yeah, it's quite expensive, you know, So, um, you really have to hustle, expand your networks, uh, you know, on the financing side because they also want you to, um, to, to give them some financial projections, you know? Um, so you really have to understand the industry thoroughly, you know, if, uh, you have to, um, fill in the form, just the forms part. You know, uh, to acquire the license, you know, and then, uh, there's, yeah, bureaucracy as well, you know, within the DOE um, in terms of, uh, you know, just doing things with speed, you know, So if I didn't have like, um, friends that could help me, you know, it probably could, could have taken me a year (Participant 9)

Participant 11 further elaborated that they would like to expand their business into biofuels are unable to do so because regulation in the industry is not enabling entrepreneurs.

*It's just that regulations within SA at the moment to support, um, especially small to medium enterprises in that space um, it's not quite as, um, let's say progressive as you would want it to be at this point in time (*Participant 11)

Business Executive 1 argued that regulation, legislation and policy are barriers to entry for entrepreneurs in the liquid fuels sector.

…I mean, it's just massive, so it's regulatory and it is a legislation and and and its policy… Uh, so the barriers still continues to be the regulatory and and and and legislative (Business Executive 1)

Business executive 2 explained that in order to lower the barriers of participation for entrepreneurs, entrepreneurial policy is required.

Policies, entrepreneurship policy. I think it needs a policy (Business Executive 2)

Business also presented that government needs to create a conducive environment for entrepreneurs to be able to participate in the liquid fuels industry by enabling through regulation.

…as government, you need to create conditions that are conducive, which is basically enable through regulation, enable partnerships, uh, between big and small players, make finance available, and then, you know, make it easy for entrepreneurs… (Business Executive 3)

4.5 Conclusion of objective 2

The data set confirms that most entrepreneurs experienced barriers to participation in the liquid fuels industry. Most participants perceived the barriers to be lack of access to finance that translated into capital funding and access to working capital. Business shared a similar view that capital was a barrier to participation for entrepreneurs as well as corruption. It was further stated that government funding was perceived to be inaccessible further exacerbating the issue of not being able to play in the sector. There was acknowledgement that stakeholder support in terms of guarantees, escrow accounts, credit facilities,

capital vehicles and so forth could go a long way in enabling participation. Regulation and policy were also identified as an enabler to entrepreneurial participation. Other barriers identified included lack of access to supply, infrastructure, markets and competitive pricing.

4.6 Results pertaining to Objective 3

Objective 3 - Determine the skills requirement to enable an ET in the LF value chain

This objective was to affirm the skills requirements to enable an energy transition in the LF value chain. Participants were asked what they perceived to be the skills requirements to participate in the liquid fuels sector. Table 4.3 presents the summary of themes.

Table 4.3 Objective 3: Themes

Code	Code Groups
• Cash Flow management is a required skill for successfull participation	Entrepreneurs in the liquid fuels sector perceived cash flow management as a required skill to enable participation in the LF value chain
• Building relationships are a skills requirement for successsful participation	Entrepreneurs in the liquid fuels sector perceived interpersonal skills as a required skill to enable participation in the LF value chain
• People skills are a requirement for successful participation	
• Stakeholder engagement is a a required skill for entrepreneurial participation	
• Communication is a required skill for sucessfull participation	
• Business acumen is a required skill for successful participation	Entrepreneurs in the liquid fuels sector perceived business accumen as a required skill to enable participation in the LF value chain
• Business management and understanding of the markets is a skill requirement for successful participation	
• Innovation is a capability required for entrepreneurial participation	
• Risk management is a required skill for sucessful participation	
• Business experience is a required skill for successful participation	Entrepreneurs in the liquid fuels sector perceived business experience as a required skill to enable participation in the LF value
• Industry experience is a required capability for successful participation	
• Safety Training is a required skill for entrepreneurial participation	
• Sales is a skills requirement for successfull participation	
• Daily operational business understanding is a required skill for successfull participation	Entrepreneurs in the liquid fuels sector perceived knowledge of the sector as a required skill to enable participation in the LF value chain
• Knowledge of sector trends is a skills requirement for successfull participation	
• Knowledge of the sector is a skills requirement for successful participation	
• Environmental scanning for opportunities is a required skill for entrepreneurial participation	
• Establishing processes and procedures is a required skill for sucessful participation	

Source: Author's Own

4.6.1 *Theme 1: Entrepreneurs in the liquid fuels sector perceive cash flow management as a required skill to enable ET participation in the LF value chain*

Cash flow management was found to be a recurring theme in the data collated. Most participants indicated that it is a required skill for successful participation in the liquid fuels sector.

Uh, being able to manage money, cash flows is, is very important. A lot of people are not going ahead. They're very profitable on paper, but cash flows are not there (Participant 8)

Um, so there's a lot of cash flow and money management skills that you have. A lot of people run, run into trouble, um, because of the fact that they cannot look after, uh, every litre (Participant 10)

One participant narrated that cash flow management was a skill that was required in order for one to succeed in the sector and further explained that there are a lot of educated individuals who do not have the skill, so it is something that needs to be taught.

Literally like there's a lot of people, and I'm talking learned people, people, people with honours qualification who don't know how to handle money and that in itself, is a barrier even though it comes after the fact (Participant 6)

Participant 13 explained that overall financial acumen was an important skill to have in business.

So somebody's got a financial acumen, is appropriate person to be within this industry. Because I can tell you now during Covid that everybody was crying. I think my sales went up by probably 500% (Participant 13)

4.6.2 *Theme 2: Entrepreneurs in the liquid fuels sector perceive interpersonal skills as a requirement to enable ET participation in the LF value chain*

One of the skills perceived to be a requirement in the LF value chain is interpersonal skills. The participants of the study related that relationship building was an important aspect of operating in the sector and it therefore required good people skills.

I think the, the, the, the thing is more engaging with, uh, these stakeholders to understand, you know, you know, what is, what are the bottlenecks, you know, and how can you assist (Participant 4)

Participant 8 narrated the importance of having people skills and highlighted the benefit as being able to tap into the knowledge of others especially in areas where entrepreneurs fall short.

So if you've got good people skills, uh, you should be able to go far because what you don't know, you can learn. Because what you don't know you can learn. And uh, you can also consult from someone else (Participant 8)

One of the participants explained that building relationships was a critical part of their business in the sector while another participant related that their business is dependent on the relationships that they have built with their client base.

Because, you know, the cornerstone of wholesaling, really, it's, uh, relationships, you know, building relationships (Participant 9)

A lot of, uh, the, the, the business we do have is based on relationships with clients (Participant 10)

Some participants indicated that the nature of the industry is to exchange large sums of money and that requires that one be able to read people.

Now that does go a long way if you're going to be exchanging billions, um, between one person and another, there needs to be some, um, ability to be able

to read an individual and see, and basically, um, it's not just about, uh, your gut feeling whether someone is trustworthy... (Participant 10)

Financial acumen and interpersonal skills? Because within the industry, you get to communicate with people that you've never met. You can exchange 10 million for 12 months, but you've never met each other (Participant 12)

Business Executive 2 argued that customer centricity and having an understanding of the customer in order to be able to customise energy solutions is an important selling point for entrepreneurs.

…entrepreneurship needs to really master customization of their businesses, because now I want really something that is customized to really fit my lifestyle, to fit what I want is a, is a, as a customer. So customer centric is very important going forward because that's what is selling currently…

4.6.3 *Theme 3: Entrepreneurs and business executives in the liquid fuels sector perceived business acumen as a requirement to enable ET participation in the LF value chain*

Some of the participants explained that business acumen was an important skill to have in the sector and that one needed to be business savvy or have an understanding of business.

Um, so yes, so that is, um, I don't know what qualification you get for that. Um, being a business savvy to be able to, you know, have, and that's only experience I believe (Participant 10)

Other participants narrated how it was important for individuals operating in the sector to understand how to run a business and the business environment.

I think business management, they need to know how to… basics actually, how to run the business, they need to understand how the market works (Participant 7)

…definitely business and operation management depending on which part of the value chain they want to operate in (Participant 14).

One Business Executive explained that negotiation and an understanding of the macro-economic levers as part of business acumen is important.

…business acumen is very important. The negotiation… So you need those people that really understand the business skills, the business acumen, as well as your macroeconomic drivers and the levers that are really pulling businesses… (Business Executive 2)

Business Executive 3 argued that business skills were imperative to entrepreneurial participation in the liquid fuels sector.

… business skills are always required to run a business… (Business Executive 3)

Another skills requirement or rather capability that was indicated as part of the factors that are critical to the success of the business is innovation.

What are you going to bring, uh, on, on, on, on, on the market? What's new? You know? So now you have to go and be innovative to say, Okay, I'm also in refining wholesaler, but what am I bringing? Into the market. I'm not inventing anything. I am not, you know, but can I come up with a better system? (Participant 4)

Last year, the year before I read an article about, um, an individual somewhere in Gauteng, a rural area who was busy. He was, um, making his own biofuel, biodiesel, Uh, I don't recall what he was using, but it was, he's on a farm somewhere. He asked someone if he could use the leftover, um, uh, of a certain crop and he started making his own biodiesel and the, the people in the community were buying it from him. So from that perspective, as South Africans, we are natural innovators (Participant 11).

An interesting perspective was presented by some participants that explained that due to the nature of the liquid fuels industry, being able to manage risk was a critical skill. He explained that the industry is cut-throat and that it is very easy

for one to lose money, therefore being able to manage and mitigate against risk becomes very important as part of business management.

…risk management must be a core orientation within your business…. (Participant 10)

So being able to conduct sound risk analysis, so assessing whether a transaction or party that you're about to transact, transact with, uh, is actually going to honour their commitment to the sale or is actually going to, um, proceed with payment (Participant 11)

One participant explained how the risk is also amplified once you start expanding into imports as you are transacting with people that you have never met.

You are buying from a person you have never met and they are saying you must transfer 1million rands into their account. Its risky (Participant 3)

Business Executive 2 argued that technical skills are a requirement to ensure a smooth energy transition.

…And as well as the skills, I think a major, major issue is the skills that, uh, our country is a shortage of skills for. Technical skills that are really required to run some businesses. And then, although we have like top skills and lower skill, but we don't have technical skills that are required to really make sure that this transition goes smoothly… Business Executive 2

Business Executive 4 argued that it was about entrepreneurs having the appetite from a business perspective to be able to manage the clean energy projects and project management skills.

It's actually having appetite and and the Yeah. Um, And Yeah, and conviction actually see this, uh, uh, projects through… (Business Executive 4)

4.6.4 *Theme 4: Entrepreneurs in the liquid fuels sector perceived business experience as a requirement to enable ET participation in the LF value chain*

One of the themes that kept appearing in the data set is the aspect of business experience. Participants expressed that having prior business experience will equip you with the required skills for operating in the sector. It was also expressed that industry relevant experience was important to give one an understanding of how the sector operates including the necessary compliance skills such as safety. As part of the business experience required to enable participation in the sector, participants also indicated that sales is a critical skill. In general, participants indicated that experience would enable one to be able to critically assess opportunities.

*Experience gives you the gut feeling to be able to see whether a deal over and above, as I said, doing a due diligence. There still needs to be an engagement where you can see whether something makes sense to you. (*Participant 10)

Another participant related that their previous experience in business helped them understand how a business operates.

No, my first business was a transport brokering business, meaning I had to... I got a client that needed a product to be moved, which was grain from Free State to Gauteng. So my job I was a broker, so I had to get transporters to do transport for me and then the client pays me (Participant 13)

Another participant stated that participants in the sector are oblivious to the way things work and indicates that business knowledge is critical.

This is how you have to send an email, how to capture stock on your side. This is how you must capture it when you are doing books for the purposes to read, for the purposes of tax income tax or company tax and all of these things. This is what you must do, this is what you can claim. This is… our people don't know that. All they see is just starting a business in the sector and they thinking all we need to pay is for our fuel and expenses, and then we are done (Participant 6)

One other aspect that was presented by participants of this study was that in addition to business experience, a critical requirement to enable participation in the sector was liquid fuels industry experience. This experience, they explain, helps with an understanding of the sector, industry relationships and knowledge of how to navigate the business with the oil majors.

So, and that's why I'm, I say that, um, you really have to have some, a little bit of experience in this thing. Or else? You're going to lose a lot of money (Participant 9)

It does help but to have, um, experience, uh, because, uh, you can also help the oil majors in, um, in attaining some of this, um, um, aspirations in terms of ESD (Participant 9)

Participant 5 also mentioned that safety training is a required skill to be able to successfully participate in the sector because of how technical the value chain is.

…basic things like, you know, how do you check, um, um, enquiring for safety, how you know the industry operates if they can have maybe on, on an ongoing basis, maybe three months, uh, of capacity development because the industry is highly technical (Participant 5)

Another documented skills requirement that participants cited is important in running a successful business is Sales.

…entrepreneurs in general need to have a few skills, I believe, uh, one of them being sales (Participant 12)

The skills. Uh, skills. The skills are not an issue, I mean uh, selling something is not a difficult thing. Some of us, uh, we from, uh, this, um, Marketing (Participant 3)

Business executive 1 indicated that as part of business acumen, entrepreneurs required an eye to be able to identify opportunities and that this skill is especially critical with the energy transition.

…the business eye to see the opportunities is critical right now. You know, whenever there is transition or there is chaos or there's crisis, there's opportunities that are there (Business Executive 1)

It was further narrated that part of the entrepreneurial role is being able to identify opportunities in the liquid fuels value chain.

… that's really where the role of entrepreneurs, you know, comes in, is sporting the opportunities created by the change…. (Business Executive 3)

Business Executive 2 gave an interesting view that business experience in technical skills such as in the maintenance of smart technology and sales were important for participation especially in the energy transition.

…they'll need to be maintained... they will need to be serviced.…the batteries and everything, all those things needs to really have that…technical skillset that we need, and the salespeople, I mean, in the, in, in, in terms of entrepreneurship, you need to know how to really sell these things to, to people and as well as ensure that they, they, they, they integrated, understand the technology because we are now going to be smart technology (Business Executive 2).

Business Executive 3 highlighted that technical capabilities in the handling of hydrogen in order to exploit opportunities are important for entrepreneurial participation.

…So there's a lot of, uh, technical, um, Um, uh, capability that's required… (Business Executive 3)

4.6.5 *Theme 5: Entrepreneurs in the liquid fuels sector perceived knowledge of the sector as a requirement to enable ET participation in the LF value chain*

Most participants perceive knowledge of the sector as a requirement to enable participation in the sector. Participants stated that an understanding of the daily operations of the business as well as understanding the trends in the sector was

critical to enabling successful participation. In addition, an understanding of the sector will help one to be able to constantly scan for opportunities as well as put in place the required administrative processes and procedures to assist with your business.

You need to have some form of basic training in terms of, uh, the, the products themselves. In terms of the industry in itself. Understanding, um, understanding, say the buying patterns (Participant 9)

Uh, education, not education written in books, Education about what happens on the ground (Participant 10)

Knowledge of knowledge of this, this business, knowledge of this business, and also the product because now there's this new thing and they're mixing the product, you know, so, um, paraffin and diesel… (Participant 1)

One participant narrated that the liquid fuels sector has many wholesale license holders that are not operating because they do not have an understanding of the sector.

People have wholesale licenses, and they don't understand the petroleum industry (Participant 2)

Participant 8 related that knowledge of the sector will assist in being able to scan the environment for opportunities and knowing how to take advantage of the opportunities.

Because with the knowledge, you'll also be able to identify where are the opportunities and how best to capitalize on those opportunities (Participant 8)

One participant expressed the importance of acquiring knowledge on sector trends and understanding how the sector is progressing in terms of the energy transition.

And, yeah, just just, it's just educating ourselves more on the industry, and know what's happening in the market like now, we know that the market, the fuel space,

they want to move into biofuels, they're moving into solar, they're moving into renewable energy (Participant 7)

The ability to be able to establish policies and procedures that will govern your business was indicated as an important skill that one should learn with an understanding of the sector.

So when it comes to having an infrastructure from that perspective, processes, procedures quite well established within your business, that is a, a skill that you cannot neglect within liquid fuels else you will make losses… (Participant 11)

Business Executive 2 narrated that having an understanding of the liquid fuels value chain as well as being clear on the area of participation is critical to entrepreneurial participation in the sector.

…So the skillset that entrepreneurs really need in there, I think, is in terms of, to the, the, the entrepreneurs need to understand the value chain. The whole value chain and where they want to really play a role because I cannot be an entrepreneur for the whole energy sector value chain…

Business Executive 4 argued that knowledge is an important requirement to successful participation in the industry and the pursuit thereof requires intentional investment in research.

Um, but I think the biggest one is access to knowledge, and that's why in research, Um, comes in and research costs money. Yes. So that's, that's where actually, um, manage the tool that you need money to actually conduct research (Business Executive 4)

It was further narrated that the liquid fuels industry, being highly technical requires an individual that has knowledge of the sector.

… people who are already in, involved in the liquid fuel…should have some knowledge of how the sector work works. That would be useful in the transition… Cause… it is a sector that requires a lot of technical understanding…. (Business Executive 3)

4.7 Conclusion of objective 3

Data affirms the skills requirements for entrepreneurial participation in the LF sector. Most participants perceived cash flow management as a required skill that will assist entrepreneurs to become profitable and build sustainable businesses. Participants also recognized interpersonal skills and customer centricity as requirements and explained that the success of businesses in the sector was based on relationships and good communication. It was interesting to note that business acumen was also identified as a required skill where participants narrated that a general understanding of how a business operates and a knack for innovation will help in mitigating against business risk. Further to business acumen, business experience and technical skills were cited as critical skills. Participants related how experience in the industry is instrumental in helping one to navigate the industry as well as rely on already established networks. Industry experience helps with an understanding of required skills like safety and sales. It was further articulated that knowledge of the sector was a required skill to enable participation in the sector. Participants expressed that knowledge of the daily operations of the value chain, knowledge of the sector and trends are necessary to help with scanning of opportunities and establishing process and procedures relevant to one's business. In addition, business argued that knowledge was a critical skill that is required in the industry and more so with the cleaner energies.

4.8 Results pertaining to Objective 4

Objective 4 - Identify opportunities for entrepreneurs in the LF ET

This objective was to identify the opportunities for entrepreneurs in the LF ET. Participants were asked about the opportunities they thought existed for entrepreneurs in the LF ET. They were further asked about the support they felt they required to successfully participate in the sector. Table 4.4 presents the summary of themes for objective 4.

Table 4.4 Objective 4: Themes

Code	Code Groups
Opportunities in Bio- Mass	Entrepreneurs in the LF sector identified opportunities in cleaner fuels
Opportunities in Bio- Fuel	
Opportunities in cleaner/lower sulphur fuels	
Opportunities in electric cars and charging stations	Entrepreneurs in the LF sector identified opportunities in retail stations
Opportunities in Retail stations	
Opportunities in Solar	
Opportunities in upstream	Entrepreneurs in the LF sector identified opportunities in upstream activities
Opportunities in importing	
Opportunities in storage	
Opportunities in logistics	
Opportunities in solar technology	Entrepreneurs in the LF sector identified opportunities in clean technology
Opportunities in hydrogen technology	
Opportunities in Enterprise Supplier Development	Entrepreneurs in the LF sector identified opportunities for capacity building
Opportunities in Training entreprenurs on ET	

Source: Author's own

4.8.1 *Theme 1: Entrepreneurs and Business executives in the liquid fuels sector identified opportunities in clean fuels*

The data indicates that participants are aware of opportunities in the LF ET and that some had already started to explore how to exploit them given the challenges of lack of capital funding.

*I think there's plenty opportunities, like there is, there's massive and plenty opportunities. Because when you look at the fuel sector, uhm almost every industry uses fuel. It's a matter of positioning on entrepreneurs to see which which which role do you want to play? (*Participant 7)

One participant when asked about opportunities in the liquid fuels energy transition mentioned that the entrepreneur of the future will need to diversify from liquid fuels and extend their focus to alternative energies.

…the entrepreneur of the future in this sector is, is one, not too focused on just your liquid fuels, uh, but diversifying into, you know, your alternate fuels, uh, as well or alternate energy... (Participant 12)

Some participants identified opportunities in biomass. The recurring theme was in using the biomass to produce an alternative cleaner fuel in the form of biofuel. Selected participants expressed the desire to establish biofuel plants to produce and supply biofuel to the market.

Like I was telling you, um, initially I wanted to set up the biofuel plant, but then apart from the biofuel plant, we have, you know, interest in setting up a depot (Participant 5)

But if we had access to capital, we would already, within our business plan as at 2019, we had already picked out in the next five to 10 years how we would want to move into biofuel (Participant 11)

Participant 14 provided the view that although there were opportunities available to entrepreneurs such as in solar farms, bio-oils making and hump seed oil, fracking, these were unattainable without funding.

At this point I don't see opportunity attained if funding or finance is still a challenge. The opportunities for entrepreneurs with finance are endless. Such as involvement in solar farms, bio-oils making and hump seed oil, fracking in the Karoo; can open up many opportunities (Participant 14).

Business Executive 4 indicated that there were opportunities in biofuels as well farming of feedstock for biofuel production.

… you can look at, um, biofuels. Yeah. And so there's an opportunity for farming if you can actually farm, uh, the feedstock, uh, to produce biofuels… (Business Executive 4)

Another Business Executive argued that every change presents an opportunity for entrepreneurs but that they need to be enabled in order to be able to capitalise on the opportunities presented by the change that comes with the energy transition.

…when there's a, a, um, let's call it a a, a discontinuous change…] from, um, kind of one form of energy to another, clearly that creates opportunity...so the

opportunity has to be there, but also you need entrepreneurs that are enabled, um, with, with the wherewithal to be able to, um, uh, exploit those opportunities… (Business Executive 3)

4.8.2 *Theme 2: Entrepreneurs in the liquid fuels sector identified opportunities in retail stations*

Some participants referred to opportunities in retail stations under the existing franchising business model that is operated by the oil majors.

So the retail part of it, there's still an opportunity out there where the oil majors have actually said, we have, um, existing, uh, uh, uh, uh, fuel stations that actually have been leased out… (Participant 4)

One participant identified an opportunity in charging stations.

Like those, um, your electric cars where you can park and charge and do whatever (Participant 6).

Participant 6 identified an opportunity of installing solar panels at retail service stations as part of promoting their use of clean energy.

On the N4 to Rustenburg I passed those two Shells over there, I think they've got a solar plant on top or some, there's a station that's got a solar plant… (Participant 6)

But also you are going green, Are you not? Also going green by virtue of installing these panels (Participant 6)

4.8.3 *Theme 3: Entrepreneurs and Business executives in the liquid fuels sector identified opportunities in upstream activities*

Some participants expressed that in the immediate horizon, the opportunity that they are building capabilities for is the import of refined fuel that will then be sold locally or supplied to the oil majors.

So the imports have more than doubled in terms of, so we are trying to see if we can participate in that purely from a margin point of view, number one, and also from an opportunity (Participant 8)

…I'm still on that journey to, to be on the upstream, you know, like to maybe bring product from a UAE or, Russia and then a sell it to the oil majors (Participant 1).

Other participants in the current LF environment identified opportunities of storage which may be relevant for the ET.

Because in this industry, it's very important to have storage (Participant 7)

If I were to mention one of the projects that were, that was in the pipeline, we wanted to build a storage … (Participant 1).

Some participants explained the opportunities that they identified in logistics and transportation.

..if I, you just have wholesaling unit, and you are unable to do to do transport, uh, you, there's a bit of value leakage (Participant 9)

Business Executive 4 explained that other opportunities exist in the development of supply chains for clean energy.

…There's also, uh, an opportunity, uh, supply chain part cause you're now going to be creating new supply chains….also in terms of, uh, materials and, um, to, to create those, uh, factories and, and refineries… (Business Executive 4)

An interesting perspective was argued on the urgency of the transition that entrepreneurs may not be ready to move at the speed that is required to meet net zero emissions.

…getting to net zero is a marathon and if I'm still finding my place in the business and I'm not having those, because when I come as an entrepreneur, they'll say like, have you done this? .... the risk is too high to take you on…and the urgency of transitioning is really fast …

…So to balance the two, the urgency and the risk, I don't think is something that the government has an appetite for or the corporate has an appetite for… (Business Executive 2)

Entrepreneurs may not have the first mover advantage because they do not have capabilities that will allow the liquid fuels sector to transition at the speed that is required.

They currently don't have the capabilities and then where maybe they can be there the first movers, I think, in communities, but in the liquid fuel industry, I doubt it (Business Executive 2).

4.8.4 *Theme 4: Entrepreneurs in the liquid fuels sector identified opportunities in clean technology*

Some participants identified opportunities in clean technology that can be used across the energy sector. There are participants that identified an opportunity in solar farms and renewable energy plants.

And we do say maybe Uhm farms for them, solar farms, or we do renewable energy plants… (Participant 7)

…like doing installations even and further entrenching ourselves in, in, in, in the market (Participant 12)

Another participant made reference to technologies in the hydrogen space, Liquefied Natural Gas (LNG) as well as Compressed Natural Gas (CNG).

Uh, it opens up, uh, the, the opportunity for alternatives. Uh, if, for example, our local industry is not necessarily adopting, uh, certain technologies, let's say you're hydrogen as an example, Uh, we can look to, uh, markets that are currently offering that and, uh, maybe, uh, be a leader in that locally and, uh, possibly develop local infrastructure to assist to that. You know, um, one example maybe is, you know, your, your LNG. Um, the oil majors are currently leaders in that at the moment. Uh, so the conversion of that product to your CNG (Participant 12)

Another opportunity was identified in the manufacturing of electric engines as well as charging stations.

… if we are moving from a, uh, combustion engine to a battery based engine or an electric engine, um, Where are these engines going to be manufactured, right? Uh, who are the manufacturers? Uh, is there an opportunity for some of these, maybe for example, Battery based engines are a lot simpler than, you know, from a technical point of view (Business Executive 3)

And then you could then look at the, the recharging now, which is more, a lot simpler (Business Executive 3)

4.8.5 *Theme 5: Entrepreneurs and Business Executives in the liquid fuels sector identified opportunities for capacity building in the sector*

Although most participants narrated the opportunities that were presented by the energy transition, they also expressed that capacity building was required for entrepreneurs in the sector as well as affected communities so that they can capitalize on the opportunities.

…I think we can actually revolutionize, you know, our townships and rural areas with the same just transition if we just do it in a responsible way where we get the same ordinary citizens, um, participating in those projects (Participant 5)

One participant indicated that capacity could be built through collaboration with oil majors through Enterprise Supplier Development (ESD) programs.

You know, that's where the opportunity is in terms of enterprise supplier development, you know (Participant 9).

Some participants narrated that training could help build capacity if government could intervene through skills development of entrepreneurs.

…and the government actually helps to bring in the necessary skills to actually run those projects, just to make sure the project takes off (Participant 7)

One participant indicated that capacity could be built by equipping entrepreneurs with capabilities for renewable energy plants inclusive of funding.

…rather than saying, we are taking 20 wholesalers or 20 Small companies that are in the fuel space, and we 'klap' them. And we do say maybe Uhm farms for them, solar farms, or we do renewable energy plants, or biofuel, biofuels, plants, because if you do it as individuals, we won't be able to because we don't have the capital to do it (Participant 7)

Business Executive 4 expressed that there could be opportunities in exploration and research.

… but opportunities... that are opening up, uh, for…Uh, entrepreneurs that, uh, in, in both in explorations and research. So you can actually have someone who actually focuses on the research part…. (Business Executive 4)

4.9 Conclusion of objective 4

The results of the study revealed that entrepreneurs and business executives identified opportunities within the energy transition. Opportunities were identified in clean fuels such as biomass, clean technology for LNG and CNG, retail stations such as solar opportunities, upstream activities such as storage and importing of clean fuels as well as capacity building in ESD programs among others.

4.10 Summary of the findings

Chapter 4 gave a report of the narrations of the study participants in relation to the questions in the interview guide that were presented. The questions that the participants were interviewed on, were constructed with the objective of achieving the research objectives. The findings from the study were detailed based on the verbatim accounts of the participants. New insights that were shared by the participants in relation to the study were also documented. Chapter 5 will present a discussion of the results in relation to the literature reviewed in this study.

4.11 Comparison of literature review and own findings

Table 4.5 Comparison of literature review and findings

RQ #	**State Research Question or Objective**	**Prop / hyp #**	**State Proposition or Hypothesis** (literature review response to RQ)	**Findings from own study**
1.	Identify the activities that signify the Energy Transition in South Africa	1.	South Africa has a two-fold GHG emission challenge; emissions from coal plants and synfuel (Coal-To-Liquids (CTL) and GTL) sector emissions. Liquid Fuels transition needs to consider clean fuels, bioenergy, hydrogen and EVs. The energy transition within the liquid fuels sector has primarily been focused on regulation for Clean Fuels I/ II	Similarities on activities that signify the ET in SA include biomass/biofuel, electric vehicles and charging stations, hydropower, solar power. ET is inevitable but needs to be paced for every nation New insight: SA is not ready for ET due to structural challenges such as poverty, energy security, high public debt and unemployment rate
2	Identify the barriers to entrepreneurial participation in LF sector	2	Barriers to entrepreneurial participation include high capital costs, lack of skills and training, access to supply, market access, regulatory environment, the response of oil	Barriers from the results include lack of access to finance, lack of access to supply, lack of access to infrastructure, lack of access to markets, lack of access to lower regulatory requirements and lack of access to competitive pricing (new)

RQ #	State Research Question or Objective	Prop / hyp #	State Proposition or Hypothesis (literature review response to RQ)	Findings from own study
			majors and access to infrastructure.	
3	Determine the skills requirement to enable an ET in the LF value chain	3	Skills required to enable an ET include cash flow management, financial management, regulation relating to health and safety, upstream manufacturing, storage, product supply as well as trading and artisanship	Skills required from the results include cash flow management including financial acumen, interpersonal skills (new), business acumen including innovation and risk management (new), business experience including safety and sales (new), knowledge of the sector including trends, scanning for opportunities, and establishing processes (new)
4	Identify opportunities for entrepreneurs in the LF ET	4	Possible entrepreneurial opportunities in Bioenergy (Biomass production, biomass liquid fuels, ethanol fuel. Other opportunities are presented in the hydrogen value chain (renewable power, hydrogen (production, fuels, logistics, storage, pressurising,	Identified opportunities in cleaner fuels (Biomass/ Biofuels), Retail stations – solar and charging stations, upstream activities (importing, storage and logistics, clean technology (solar, hydrogen, LNG and CNG), capacity building (new)

RQ #	State Research Question or Objective	Prop / hyp #	State Proposition or Hypothesis (literature review response to RQ)	Findings from own study
			logistics infrastructure development). Some opportunities are in clean fuel refinery development and EV charging stations	

CHAPTER 5. DISCUSSION OF THE FINDINGS

5.1 Introduction

The purpose of this study was to examine how the Energy Transition can be leveraged for greater Black entrepreneurial participation in the liquid fuels sector in South Africa. Additionally, the study aimed to identify barriers to participation, possible entrepreneurial opportunities in the liquid fuels value chain as well as evaluate the skills required for entrepreneurs to operate successfully in the sector. In Chapter 5 the results of the study were presented based on the responses received from the participants in relation to the four (4) research objectives identified in Chapter 1. This Chapter focused on presenting the discussion of the documented findings and interpretation of the significance of the results in relation to relevant literature regarding the topic.

5.2 Demographic profile of respondents

Before delving into the discussion of the results, it is imperative that a description of the participants of the research be given. This qualitative study engaged 14 Black entrepreneurs that have been participating in the liquid fuels sector as well as four (4) active and former Business Executives.

The value chain participation of the entrepreneurs is primarily in bulk fuel wholesaling, fuel management services, storage of liquid fuels, brokering and sourcing of business for wholesalers, liquid fuels transportation, LPG bottling, importing of refined fuel, commercial reselling, coal production and fuel depots. The years of experience in business range from 0 years to 19 years, with two (2) participants having no experience in business but with 14 years and 27 years of liquid fuels industry experience as employees. The years of business in the liquid fuels industry range from 1 year 6 months to 14 years. It was interesting to interview participants that had recently entered the industry versus the ones that had been in the industry for some time. The experience of the business executives in the liquid fuels industry ranges from 12 years to 31 years with

experience that spans across from crude supply, upstream processes, refinery planning, retail strategy, strategic planning, commercial and business to business, marketing, research and development, capacity development, international business, climate change planning, policy making, safety health and environment, corporate affairs, government relations, supply chain and logistics, and enterprise development. Table 5 presents a summary of the participants.

Table 5 Summary of participants

Participants	Race	Value chain participation	Duration in Business (Years)	Duration in Liquid Fuels Business (Years)
1	Black	Bulk Fuel Wholesaler	10	9
2	Black	Wholesaling	14	14
3	Black	Wholesaling	14	14
4	Black	Fuel Management Services, Storage of Liquid Fuels, Wholesaling	13	6
5	Black	Brokering and sourcing for wholesalers	0 with 14 years liquid fuels industry experience	7
6	Black	LPG Plant, Wholesaling, Liquid Fuels Transportation	8	8
7	Black	Wholesaling, Storage of Liquid Fuels, Liquid Fuels Transportation	10	8
8	Black	Importing, Wholesaling, Commercial Reselling, Liquid Fuels Transportation	15	18 months
9	Black	Wholesaling and Liquid Fuels Transportation	0 with 27 years liquid fuels industry experience	3
10	Black	Wholesaling and Coal Plant	19	9
11	Black	Wholesaling and Coal Plant	0	9
12	Black	Wholesaling , Marketing and Liquid Fuels Transportation	9	5
13	Black	Fuel Depot, Wholesaling, Liquid Fuels Transportation	9	7
14	Black	Fuel Depot, Wholesaling, Liquid Fuels Transportation	9	7
BE 1	Black	Safety health and environment, corporate affairs, Government relations, Marketing, International business, enterprise development.	31	31
BE 2	Black	Research and Development, Capacity development, Climate change planning, Policy making	0	15
BE 3	Black	Refinery planning, Retail strategy, Strategic planning, Commercial and Business to business	26	12
BE 4	Black	Crude Supply, Upstream processes, Refinery planning, supply chain and logistics	0	25

Source: Author's own

5.3 Discussion pertaining to Objective 1

The study revealed the activities that signified the energy transition in South Africa. Participants expressed an understanding that the energy transition was a move from 'old' energies to 'new energies'. Moreover, the study showed that

biomass is one of the energies identified as part of the energy transition. Participants detailed that biomass; the use of waste and natural materials could be used as a renewable energy source such as biofuel with results indicating an interest among entrepreneurs for pursuing bio-fuel plants and biodiesel. Solar power was also identified as one of the new energies that signify an energy transition as well as electric cars. Further reference was also made to power that can be generated through water sources like rivers, hydropower.

These findings were consistent with the study of York & Bell (2019) who referred to the energy transition as a move away from one energy source to another. This was further confirmed by Edomah (2020) who explained that an energy transition is a shift away from hydrocarbon sources. The findings of the study further affirm the results of the study by Li, et.al (2020) that liquid fuels can be manufactured using biomass that can be sourced from various types of waste such as from farming and landfills. The findings are further supported by Yuan, et.al (2018) who purported that biomass liquid fuels were one of the key strategies that was used by China for the establishment of low carbon cities.

The studies of Lawrie et.al (2020) also confirmed the use of electric vehicles as one of the factors signifying an energy transition. The study continues to state that EV technology has attracted massive global investment as part of the commitment to lower carbon emissions that emanate from ICEs.

This study revealed that entrepreneurs had a view that the energy transition in South Africa was premature. Participants explained that South Africa was faced with unique third (3rd) world challenges such as poverty, energy security, high unemployment rate and high government debt among others. The findings indicate that strong views were shared that the country should not attempt to compete with first world countries on trying to transition to new energies at the same time due to the structural challenges that are being dealt with. The findings however revealed that business viewed the energy transition as inevitable but that it needed to be executed differently for each country. It was further revealed that there is very little awareness of the energy transition in communities and

among entrepreneurs which will lead to further delays in transitioning and supporting the notion that the country is not read for an energy transition.

The studies of Lawrie et al. (2020) support the notion that South Africa was not ready for an energy transition. The studies argue that the landscape of the country from a technological and innovation capability perspective will not be in a position to make any major strides in the liquid fuels' energy transition up to the year 2026. The findings of the study however contradict those presented by the study of Bognadov et al. (2021) that proposed that the institution of the energy transition would expedite the realisation of SDGs like universal access to clean and affordable energy and reduction of water scarcity.

In the study it was found that the energy transition was because of a two-fold problem of the environmental impact of fossil fuels as well as resource depletion. These findings were supported by Edomah (2020) who argued that fossil fuels were finite but further explained that the main reason to transition was due to the threat posed to the environment by fossil fuels (Edomah, 2020).

The findings of the study also revealed that there was a concern among the entrepreneurs on the high capital costs of the energy transition. Entrepreneurs that had researched and explored the establishment of biofuel plants, narrated that financial muscle was required for infrastructure and market development. The sentiment was the same for other forms of energy. The findings gave a strong indication that due to the perceived high capital costs of the energy transition, if not addressed and entrepreneurial support systems are not put in place, then the energy transition would repeat the cycle of entrepreneurs not getting opportunities. A study by the DOE (2011), referencing the transition to CF2 reported that oil majors were reluctant to transition to CF2 as the requirements for infrastructure upgrades were estimated at around $3.7 billion. A study by Lundqvist (2020) also supported the view that bio-energy required huge capital investment. The studies of Lawrie et al. (2020) further argue that the decarbonisation approach must be different for every country based on profiles of emissions, trends of energy consumption, GDP, energy access and development agendas as highlighted in the findings by business

An interesting perspective was also presented through the results where participants indicated that the value of the energy transition must be balanced with the costs of the transition failing which, the results will be a lack of adoption and support from communities and entrepreneurs. Ralf Dahrendorf's conflict theory that is presented in the study by Kühne et al. (2022b) supports that the energy transition may give rise to social conflict. The study further proposes that Ralf Dahrendorf's conflict theory may be useful in assisting in the identification of opportunities to align all stakeholders including communities and entrepreneurs so that related conflicts may be used to stimulate positive contributions to the transition (Kühne et al., 2022b).

The issue of justice in the energy transition was also expressed in the findings where participants, particularly Business Executives expressed that the energy transition should be inclusive and not leave anyone behind. The results indicated that there was a desire for the energy transition to be just although there was a concern on whether entrepreneurs had capabilities to immediately support the transition at the required speed of change. This is consistent with the study of Halsey et al. (2019) that argued that for the energy transition to be just, the inclusion of the protection of communities and energy sector workers would be required, in rebuilding the economy through co-ownership of infrastructure, social equity and stakeholder partnerships. This argument was supported by Eitan et al. (2020) who argued that business possessed the required capabilities to ensure vulnerable communities and workers are skilled to negate the negative effects of the ET.

The study therefore proposes:

Proposition 1: Black entrepreneurs and Business Executives in the Liquid Fuels Sector are aware of the ET and activities that signify an ET (move from old to new energies, clean fuels, bioenergy, hydropower, hydrogen, EVs, retail stations – solar and charging stations, upstream activities (importing, storage and logistics, clean technology (solar, hydrogen, LNG and CNG), capacity building)

5.4 Discussion pertaining to Objective 2

The results of the study identify the barriers to entrepreneurial participation in the LF sector. The participants of the study indicated that one of the main barriers to entrepreneurial participation was lack of access to finance. Additionally, participants indicated that one of the ways that the lack of access to finance gave expression was through capital funding, working capital and access to credit facilities. Participants revealed that access to finance was a major contributor to being able to either participate, partially participate, or fully participate and that they were not able to take advantage of some opportunities as a result. This finding is consistent with the arguments presented by Bain (1956) and Paelo et al. (2014) who presented that in South Africa, entrepreneurs were disadvantaged in the upstream value chain as it required thriving cash flows and balance sheets. Mokoena and Lloyd (2005) and Sitharam and Hoque (2016) support that access to capital is one of the economic barriers to entry in the sector.

Mokoena and Lloyd (2005) explain that access to capital is mainly propelled by the massive capital outlays required in logistics and infrastructure. Fatoki and David (2010) add that within the requirement of access to finance is access to credit and argued that lack of access to credit impedes on entrepreneurial participation. The study of Sihlobo (2017) is in support of the argument that the liquid fuels sector had high financing requirements and further details that financial institutions were highly sceptical of financing new entrants that did not have sufficient financial history, further perpetuating the issues of access to financing. This notion is supported by Vilakazi and Bosiu (2021) who argue that the liquid fuel industry is capital intensive and this poses a barrier of entry for Black owned businesses.

The findings of this study also revealed that lack of access to liquid fuels supply was identified as a barrier to entrepreneurial participation in the sector. Participants narrated that not being able to get access to supply as well as inconsistent supply from the oil majors affected value propositions to clients thereby suffocating or limiting participation. Additionally, the oil majors were in control of supply and the complete reliance on them posed a major limitation to

entrepreneurs as supply could not be guaranteed to customers. These results are corroborated by Paelo et al. (2014) who reasoned that access to supply is governed by the oil majors and is therefore a barrier to entrepreneurs. The results also indicated that oil majors favoured more established companies in terms of supply over new entrants or smaller entrepreneurs due to the size of volumes, disadvantaging entrepreneurs in the market. A later study by Paelo et al. (2017) confirmed that small businesses in the liquid fuels sector were marginalized from supply over bigger companies with higher volumes.

In addition to lack of access to finance and lack of access to supply, the results of the study detailed that lack of access to infrastructure was another identified barrier to entrepreneurial participation in the liquid fuels sector. Participants acknowledged that trading licenses gave access to industry infrastructure such as pipelines, rail wagons, storage tanks and refineries. Participants further detailed that accessing this infrastructure was challenging for entrepreneurs as it is mostly either owned or controlled by the oil majors. Entrepreneurs expressed that the high costs of accessing infrastructure like pipeline and storage tanks made them inaccessible to entrepreneurs as some opportunities were repudiated due to the lack of access; confirming that it is a barrier to participation.

The study by Sihlobo (2017) confirms that there is inequitable access to infrastructure for entrepreneurs operating in the LF sector. Sihlobo (2017) argues that access to infrastructure is challenging for entrepreneurs in the sector due to the vertical integration of oil majors. This is further reinforced by Roberts (2017) who posits that in order for entrepreneurs to build sustainable businesses in the LF sector, it is critical that they get equal access to infrastructure.

The study further determined that lack of access to markets was a barrier to entrepreneurial participation in the sector. The challenges that were related by the participants of the study included not being able to access business opportunities. The results of the study presented that unfair competition was prevalent in the sector and participants related how they were competing with oil majors for the same market opportunities. This challenge was expressed as unfair competition as the oil majors had more resources to offer the market.

The study that was conducted by Vilakazi and Bosiu (2021) supported the narration that entrepreneurs in the liquid fuels sector were challenged with being able to access business opportunities. This was found to be consonant with the study by Baadjie et al. (2021) who further explain that the relationship between downstream entrepreneurs and oil majors is skewed towards favouring the oil majors as they not only act as suppliers but as rivals as well when it comes to bidding for contracts.

The study also found that entrepreneurs in the liquid fuels sector viewed the pricing structure in the sector as a barrier to participation. Participants expressed that the pricing structure was not favourable towards entrepreneurs and favoured more established businesses that would get better pricing from oil majors. When trying to compete for business, the pricing offered by the more established businesses as well as oil majors to the market is far below what entrepreneurs are able to offer resulting in them either not being able to compete or pursuing business at negative margins. The findings were aligned with those of Sihlobo (2017) whose study determined the barriers of entry include pricing models. The study affirms that pricing models that are favourable to current oil majors pose a barrier to entrepreneurs.

It was also found that onerous regulatory requirements were a barrier to entrepreneurial participation in the liquid fuels sector. It was revealed that the industry had high regulatory barriers that were referred to as “red tape”, making it proscriptive for entrepreneurs to participate. Participants indicated that the licensing process was challenging and costly for entrepreneurs; further explaining that the process required financial projections which were not feasible for an entrepreneur who did not yet have access to resources that can assist with those. It was interesting to note that the steep regulatory requirements created an opportunity for illegal traders in the market. These findings are supported and contradicted by the studies of Paelo et al. (2017). The study supports the notion that high regulatory barriers which are prevalent in the liquid fuels sector are a barrier to entrepreneurs. The same study however contradicts the argument posed that the wholesaling portion of the sector had lower costs of entry. This is

in contravention with the results of the study where participants indicated that administrative as well as financial costs of entering the sector are high. Another revelation of the study was that although regulation was clear and supportive of entrepreneurial participation there is no enforcement of sectoral regulation to ensure that the percentages and access requirements as stipulated in the sectoral regulations and policies are achieved. Malatsi (2018) supports that one of the challenges experienced by entrepreneurs was the poor enforcement of regulation.

This study therefore proposes the following:

Proposition 2: Black entrepreneurs and Business executives in the liquid fuels sector of South Africa experience barriers to participation (lack of access to finance, lack of access to supply, lack of access to infrastructure, lack of access to markets, lack of access to lower regulatory requirements and lack of access to competitive pricing)

5.5 Discussion pertaining to Objective 3

This study revealed that entrepreneurs in the liquid fuels sector identified the skills requirements to enable participation in the LF value chain. Participants indicated that cash flow management was a critical skill to enable successful participation in the sector. Insight was given into the fact that a lot of individuals have had failed businesses in the sector due to lack of cash flow management while there were great successes narrated due to healthy cash flows. Paelo et al. (2017) supported this view and indicated that entrants into the sector lacked the required cash flow management as well as general financial acumen to successfully participate in the sector. The study confirms the findings of Ngxongo (2018) that cash flow management is imperative to the life span of entrepreneurial businesses.

The study also provided insights that interpersonal skills were a required skill in the industry. Participants indicated that industry success was based on building relationships and customer centricity. It was further narrated that good people

skills help close the learning gap as entrepreneurs can learn from those, they have built relationships with. The business view was in contradiction to the entrepreneurial view as it argued that technical skills were important for participation in the sector. The results from entrepreneurs are in contradiction with the study Kapdi (2017) but in support of the business view that theorised that technical skills were the barrier for entrepreneurs, as well as the study of Maseko (2014) that purported that entrepreneurs required skills in upstream manufacturing, product supply and trading while the results indicated soft skills such as interpersonal skills as a requirement.

The results of the study found that entrepreneurs in the liquid fuels sector perceived business acumen as a required skill to enable participation in the LF value chain. Participants explained that understanding business administration as well as comprehension of the markets were key to participation. It was further explained that due to the nature of the industry and the fact that dominant players were established oil majors that were vertically integrated, to enable entrepreneurs to participate in the sector, innovation as a capability was required. Participants also referred to risk management as a skill that was required as part of having business acumen, citing that the liquid fuels sector required constant risk management and mitigation, the absence of which gives rise to losses and failed business opportunities.

The findings of this study support the postulations of Malatsi (2018) and Ngxongo (2018) that business acumen is vital for the viability of entrepreneurial business in the liquid fuels sector as entrepreneurs will have an understanding of a myriad of business scenarios and related issues. Paelo, et.al. (2017), supports that the barriers that hinder entrepreneurs result in lack of innovation and the stifling of creativity.

The study identified business experience as a requirement for entrepreneurial participation in the liquid fuels sector. The entrepreneurs indicated that having prior business experience before venturing into the liquid fuels business was pivotal to participation, detailing that this prior business experience gave entrepreneurs an advantage of understanding how a business is run or operated.

Additionally, entrepreneurs and business executives cited that industry experience was crucial to participation as one would enter the sector understanding how the various value chains work, as well as required processes and procedures and relevant contact people. Experience in the sector would give one an advantage of having built key relationships that would assist in closing the knowledge gap, having a general understanding of how to navigate the sector, for example, where and how to source product and the various pricing structures. Prior experience in the sector would have also exposed entrepreneurs to key skills such as safety training and sales.

The view that prior business experience was imperative for entrepreneurial participation was supported by Politis and Gabrielsson (2005) that explained that entrepreneurs that had prior business experience had a higher probability of success than entrepreneurs that started the business with no prior experience as they had the proclivity to be able to identify opportunities. The study Politis and Gabrielsson (2005) further states that entrepreneurs with prior experience seemed to be able to identify as well as mitigate against business risk. In support, the study by Staniewski (2016) presents that prior experience in management was one of the factors that could be used to determine the probabilities of success for entrepreneurs.

The study therefore proposes:

Proposition 3: Black entrepreneurs in the Liquid Fuels Sector of South Africa require specific skills sets to enable participation in the sector (skills include cash flow management including financial acumen, interpersonal skills (new), business acumen including innovation and risk management (new), business experience including safety and sales (new), knowledge of the sector including trends, scanning for opportunities).

5.6 Discussion pertaining to Objective 4

In the study, it was discovered that entrepreneurs in the liquid fuels sector identified opportunities in the LF ET. The study presented opportunities in the clean fuels space with entrepreneurs referring to opportunities in biomass. Participants explained that biofuel, produced from biomass and biofuel plants were opportunities that existed in the LF ET and that were being explored. This is consistent with the studies of Yuan, et.al (2018) and Li, et.al (2020) who purported that biomass could be used to produce liquid fuels and that it presents a great alternative to fossil-based feedstock that could greatly contribute towards the reduction of carbon emissions.

The study also revealed that entrepreneurs in the LF sector identified opportunities in retail stations. The opportunities identified were with the progression of the availability of electric cars where charging stations would be a requirement for the charging of electric cars. Another opportunity that was identified is in running a retail station with cleaner fuels such as D10 with lower sulphur content. An interesting opportunity that was identified in the retail channel was the installation of solar power for retail stations to enable reliance on solar energy and contribute towards the green agenda. The results confirmed the study by Dane et al. (2019), that there is an opportunity for South Africa to capitalise on EVs especially in high density areas like cities due to the envisaged ameliorations in the general health of citizens and air quality. Similarly an article by Bloemberg (2021) that is in support of the notion that cleaner fuels presented an opportunity for entrepreneurs, reported that the South African government gave a deadline of September 2023 for the reduction of sulphur in diesel, indicating that only diesel grades that met the 10ppm specification would be allowed.

The study found that entrepreneurs in the LF sector identified opportunities in upstream activities. The entrepreneurs explained that opportunities were identified in the importing and storage of product as well as the related logistics. This study affirms the findings of Mahotas (2019) that confirmed that South Africa’s clean fuels were imported. The study by De Bijl and Fourie (2019) are also in support of this study and argues that there were potential opportunities

that came with the energy transition but that innovative solutions were required for energy generation, storage and usage.

The study revealed that entrepreneurs in the LF sector identified opportunities in clean technology. Participants explained that opportunities existed in hydrogen technology, solar technology, LNG and CNG technology. The results of the study are consistent with the findings of Al-Baghdadi (2021) who advanced the idea that hydrogen be regarded as a substitute for liquid fuels produced from fossil fuels. Eljack and Kazi (2020) present challenges in the production of hydrogen including new technologies, distribution, storage, handling, pressurising, and transportation that can indicate opportunities for entrepreneurs.

The study further revealed opportunities in capacity building. This was an interesting revelation as entrepreneurs expressed that the LF ET presents opportunities for oil majors to establish and strengthen ESD programmes to ensure that support is given to entrepreneurs to enable successful participation in the sector. Entrepreneurs narrated that well-constructed ESD programmes would be useful in helping entrepreneurs to build capabilities and capacity that would be required for participation in the new energy value chains. The support mentioned from ESD programmes includes training for entrepreneurs on the LF sector as well as financial support such as access to credit facilities and capital funding.

The study of Eitan et al. (2020) supports this narrative and further asserts that businesses have the capacity to be able to establish programmes that will ensure the upskilling and building of capabilities for communities and workers affected by the ET for entrepreneurship. Semelane et al. (2021) support that internationalising business opportunities in the value chains will ensure fairness in the ET.

The study therefore proposes:

Proposition 4: There are opportunities for black entrepreneurs in the LF ET of South Africa (opportunities in cleaner fuels (Biomass/ Biofuels), Retail stations –

solar and charging stations, upstream activities (importing, storage and logistics, clean technology (solar, hydrogen, LNG and CNG), capacity building)

5.7 Unexpected findings

The general findings that were determined from the verbatim accounts of the research participants were aligned with the literature review. However, the findings did reveal insights that were unexpected.

The literature found; on the skills requirements for entrepreneurs to operate in the liquid fuels industry is mostly limited to technical skills and business expertise as documented in the study of Maseko (2014) and Kapdi (2017) who advocate that skills required in the sector are those of a technical nature and include upstream manufacturing, product supply, trading and in artisanship. The results of the study however bring insight into soft skills such as interpersonal skills as well as innovation, risk management, customer centricity and understanding of the sector. The results of the study also found that entrepreneurs and business executives in the liquid fuels sector perceived knowledge of the sector as a required skill to enable entrepreneurial participation. The results revealed that an understanding of the sector, daily operations and liquid fuels sector trends is instrumental in enabling participation. It was narrated that an understanding of the sector will help one to be able to constantly scan for opportunities as well as put in place the required administrative processes and procedures to assist the business. These results were not reflected in the literature review.

5.8 Conclusion

This chapter submitted discussions of the research findings. This was done by reviewing the findings of the study against the literature found on the topic. Chapter 6 presents the conclusions of the study in relation to the objectives identified in chapter 1. The chapter also details the related recommendations as well as suggestions for future studies.

CHAPTER 6. CONCLUSIONS & RECOMMENDATIONS

6.1 Introduction

In this chapter the conclusions of the study will be submitted as established from the discussion of the findings presented in Chapter 5. The chapter will initially detail the conclusions in relation to the study's objectives. The study will thereafter present the theoretical and practical implications from the study. The chapter will then conclude with a presentation of the implications for relevant stakeholders and suggested future research recommendations.

The main objective of the study was to examine how the energy transition can be leveraged to enable greater entrepreneurial participation in the liquid fuels sector of South Africa. In Chapter 2 a review of existing literature was conducted, establishing the foundation of the research objectives. A qualitative research approach was employed to address the identified objectives in Chapter 1. Chapter 3 detailed the research methodology that was followed including data collection and analysis methods. Chapter 4 presented the results of the study in line with the verbatim accounts of the participants. In Chapter 5, a discussion of the results in parallel with the literature reviewed was undertaken. This chapter is therefore a presentation of the conclusions derived from the research objectives and recommendations for future studies.

6.2 Conclusions regarding research objective 1

A synopsis of the main findings of the research objectives is documented in this chapter. The study acknowledges that some of the results were not aligned to the literature, nevertheless, most of the findings detailed in Chapter 5 are aligned to the previous literature on the subject matter.

Objective 1 sought to identify the activities that signified an energy transition and to gauge the understanding of entrepreneurs on the energy transition.

Main findings

Black entrepreneurs in the liquid fuels sector of South Africa have a general understanding of the energy transition as well as the activities that signify the change. There is an awareness that the energy transition is a shift from current energies to new energies that are cleaner and friendlier to the environment. The use of biomass to produce biofuel is an identified activity in the energy transition as well as solar power and hydropower (which was not represented in the literature). Business executives in the liquid fuels sector of South Africa shared a similar view of the energy transition but expressed an insistence that there must be justice in the energy transition although there was concern on whether entrepreneurs have the capabilities to be able to support the speed that is required for the sector to transition to new forms of energy.

Black entrepreneurs in the liquid fuels sector of South Africa also perceive that South Africa's move to new energies may be premature. As a developing country, there are structural challenges that are not faced by developed countries or are not at the magnitude of what South Africa is faced with. Structural challenges faced by the country such as poverty, absence of energy security, high unemployment rate and towering levels of public debt are the main contributors to the perception that an energy transition in the country may be impulsive as some new energies required a certain level of structural development which the country was void of. Business presented a different view that the sector is transitioning out of necessity due to the environmental impacts of fossil fuels and the fact that raw materials were finite, so the country did not have much of a choice in delaying the energy transition to ensure sustainability.

There were additional concerns that the costs of the energy transition were high and fear that if the barriers that are prevalent in the sector were not addressed, then the energy transition would repeat the cycle of only a few dominant players participating while entrepreneurs are side lined.

Although supportive of the energy transition, there was consensus that the country still had a long way to go in not only addressing the structural challenges

but also raising awareness of the energy transition in communities and related advantages to increase buy in and collaboration with all stakeholders.

6.3 Conclusions regarding research objective 2

The second objective aimed to identify the barriers of entry and participation for black entrepreneurs in the liquid fuels sector. The barriers of entrepreneurial participation in the sector are lack of access to finance, lack of access to supply, lack of access to infrastructure, lack of access to competitive pricing structures and lack of access to lower regulatory requirements.

Opportunities in the sector are dependent on the ability to access capital funding, credit facilities and working capital. The structure of the industry dictates that entrepreneurs pay cash upfront when securing product from oil majors and on the other side of the coin make credit facilities as well as favourable (30-60 day) payment terms available to their clients. The government funding application is lengthy and when pursued does not bear positive outcomes making it inaccessible to entrepreneurs and although entrepreneurs in the sector largely attributed their inability to participate on the paucity of financing, there was acknowledgement that financial support systems from government, oil majors and financial institutions geared towards entrepreneurs were necessary. These financial support systems would be inclusive of credit and refund facilities, specialised lending systems, bank guarantees, escrow accounts and less challenging processes. Business provided a view that although capital was a barrier of participation, entrepreneurial vehicles that would equip and support entrepreneurs were a requirement in the sector.

In terms of lack of access to supply, Oil majors are in control of supply and are non-committal on supply for entrepreneurs while reserving volumes for more established businesses. This has a major impact on entrepreneurial businesses as they are completely reliant on oil majors and the administration of supply contracts greatly impedes participation as they are unable to offer reliability of supply to their client base, either discrediting or eliminating them from

participation. This holds true for access to infrastructure as well. Entrepreneurs have been given access to infrastructure such as pipelines, rail wagons, storage tanks and refineries but still experience lack of or limited access to the infrastructure. Infrastructure such as storage is still owned or controlled by the oil majors while the costs of using the storage and pipeline facilities pose a barrier to entrepreneurial participation. Additionally, entrepreneurs experience lack of access to markets as a barrier to entrepreneurial participation. The playing field is not even, and entrepreneurs find themselves competing with oil majors for customers rendering the market as inequitable. This is further exacerbated by corruption in the issuing of tenders where deserving entrepreneurs are further marginalised from participation, a common view between entrepreneurs and business. Contrary to previous studies, the lack of access to markets was also attributed to entrepreneurs not having a unique business model and value proposition that could be offered to clients, that is unique from the oil majors. Other challenges that pose as barriers to participate include pricing and high regulatory requirements which are not favourable towards entrepreneurs in the sector but towards more established businesses making it challenging to lay hold of opportunities.

6.4 Conclusions regarding research objective 3

Objective 3 was to determine the skills requirements for entrepreneurial participation in the LF sector.

Main findings

Black entrepreneurs in the liquid fuels sector of South Africa require certain skills set to be able to participate in the sector. The findings revealed that the required skills included cash flow management, interpersonal skills, business acumen including risk management and innovation, business experience including industry experience, safety training, sales skills, and knowledge of the sector. Other skills that were presented by business include research and development and project management.

It was interesting to note that the literature advocated for mostly technical skills as requirements for participation whereas the study revealed that soft skills such as interpersonal skills and capabilities like innovation, business experience, customer centricity and an understanding of the sector were critical for participation.

6.5 Conclusions regarding research objective 4

The purpose of this research objective was to identify opportunities for entrepreneurs in the LF ET of South Africa.

Main findings

Entrepreneurs and business executives in the LF sector identified opportunities in the LF ET. Fuel is a requirement in many sectors, presenting an opportunity for entrepreneurs to position themselves in their area of interest or strength. Opportunities identified include alternative energies and bio-energy opportunities, for the establishment of bio-fuel plants that would generate fuel using biomass as a feedstock. Entrepreneurs also identified opportunities in retail stations for conversion into charging stations for electric cars as well as installation of solar panels. Other opportunities were identified in the upstream value chain such as building capabilities in importing of clean fuels, storage, logistics and transportation. The study also revealed opportunities in clean technology such as in the hydrogen value chain, solar technology, LNG and CNG production and in the manufacturing and maintenance of energy technology. An interesting result that was not found in the literature reviewed was on the opportunity identified by entrepreneurs for capacity building for entrepreneurs and communities. Capacity can be built through ESD programmes offered by oil majors, skills development programmes offered by government and business capabilities including empowerment vehicles. Another interesting result was found in the opportunities identified by business in research and development, project management and customisation of offerings.

Table 6. Consistency table: research questions, conclusions and contribution to knowledge

RQ #	State Research Question or Objective	State literature-based proposition or hypothesis	State conclusion or answer based on own research	Highlight key differences between your initial propositions / hypotheses and your findings – this is your contribution to knowledge
1	Identify the activities that signify the Energy Transition in South Africa	South Africa has a two-fold GHG emission challenge; emissions from coal plants and synfuel (Coal-To-Liquids (CTL) and GTL) sector emissions. Liquid Fuels transition needs to consider clean fuels, bioenergy, hydrogen and EVs. The energy transition within the liquid fuels	Black entrepreneurs and Business Executives in the Liquid Fuels Sector are aware of the ET and activities that signify an ET (move from old to new energies, clean fuels, bioenergy, hydropower, hydrogen, EVs, retail stations – solar and charging stations, upstream activities (importing, storage and	Entrepreneurs had a view that the energy transition was premature for South Africa while Business viewed it as inevitable and that it needed to be just and paced for every nation. High Capital costs of Energy Transition highlighted with fears that if historical challenges of LF participation for Black entrepreneurs are not addressed – the cycle of limited participation would be perpetuated.

RQ #	State Research Question or Objective	State literature-based proposition or hypothesis	State conclusion or answer based on own research	Highlight key differences between your initial propositions / hypotheses and your findings – this is your contribution to knowledge
		sector has primarily been focused on regulation for Clean Fuels I/ II. Energy Transition would help with advancement of SDGs	logistics, clean technology (solar, hydrogen, LNG and CNG), capacity building) High Capital costs of the ET ET needs to be Just and inclusive	
2	Identify the barriers to entrepreneurial participation in LF sector	Barriers to entrepreneurial participation include high capital costs, lack of skills and training, access to supply, market access,	Black entrepreneurs and Business executives in the liquid fuels sector of South Africa experience barriers to participation (lack of access to finance, lack of	Administrative and financial costs of entering the LF sector are high across the value chain.

RQ #	State Research Question or Objective	State literature-based proposition or hypothesis	State conclusion or answer based on own research	Highlight key differences between your initial propositions / hypotheses and your findings – this is your contribution to knowledge
		regulatory environment, the response of oil majors and access to infrastructure.	access to supply, lack of access to infrastructure, lack of access to markets, onerous regulatory requirements, and lack of access to competitive pricing)	
3	Determine the skills requirement to enable an ET in the LF value chain	Skills required to enable an ET include cash flow management, financial management, regulation relating to health and safety, upstream manufacturing, storage,	Black entrepreneurs in the Liquid Fuels Sector of South Africa require specific skills sets to enable participation in the sector (skills include cash flow management including financial acumen,	The literature mostly highlighted technical skills as the most required, but the study referred to soft skills such as interpersonal skills and customer centricity as well as skills like risk management and innovation.

RQ #	State Research Question or Objective	State literature-based proposition or hypothesis	State conclusion or answer based on own research	Highlight key differences between your initial propositions / hypotheses and your findings – this is your contribution to knowledge
		product supply as well as trading and artisanship	interpersonal skills (new), business acumen including innovation and risk management (new), business experience including safety and sales (new), knowledge of the sector including trends, scanning for opportunities).	Prior business experience was found to be imperative in the results of the study as having the experience is said to assist in being able to scan for opportunities in the sector and enabling participation.
4	Identify opportunities for entrepreneurs in the LF ET	Possible entrepreneurial opportunities in Bioenergy (Biomass production, biomass liquid fuels, ethanol fuel. Other opportunities are	There are opportunities for black entrepreneurs in the LF ET of South Africa (opportunities in cleaner fuels (Biomass/ Biofuels), Retail stations – solar and	Opportunities in capacity building were identified for more comprehensive ESD programs offered by Oil Majors to enable successful and sustainable participation in the sector.

RQ #	State Research Question or Objective	State literature-based proposition or hypothesis	State conclusion or answer based on own research	Highlight key differences between your initial propositions / hypotheses and your findings – this is your contribution to knowledge
		presented in the hydrogen value chain (renewable power, hydrogen (production, fuels, logistics, storage, pressurising, logistics infrastructure development). Some opportunities are in clean fuel refinery development and EV charging stations	charging stations, upstream activities (importing, storage and logistics, clean technology (solar, hydrogen, LNG and CNG), capacity building)	

6.6 Recommendations

6.6.1 *Implications for Oil Majors/ Business*

Oil majors will be made aware of the barriers of participation still experienced by entrepreneurs in the sector so that participation can be made equitable through lowering of barriers. Additionally, entrepreneurial support programmes such as ESD, incubation programmes or specialised vehicles that offer financial support, energy transition research support, training and facilitation of access can also be established to enable greater participation. This can be in partnership with government and learning institutions.

6.6.2 *Implications for Government*

The study will help government to be aware that despite regulatory requirements for increased participation in the sector, black entrepreneurs are still battling to be active participants of the liquid fuels industry. Progress against the 25% black participation requirement in the liquid fuels charter needs to be reviewed. The study is a call for government to consider ways to enforce regulation and policies on entrepreneurial participation through legislation to create a conducive environment for participation while penalising transgressors. The process of government funding also needs to be reviewed to increase efficiency in the process that will reduce overall cycle time and enable access to financing. The administrative costs of wholesale licence applications must be reviewed, and the license issued with mandatory training on the industry, products and product sourcing, inventory management, pricing structures, and so forth as part of the empowerment agenda.

Additionally, the sector requires specific skills sets and collaboration is therefore recommended between government, Sector Education and Training Authorities (SETAs), oil majors and institutions of higher learning to offer training and courses related to the liquid fuels sector and more broadly the energy sector as a key sector to the economy to create a pipeline of relevant skills. Consideration can

also be given for entrepreneurial education to be part of the school curriculum. It is also recommended that Energy transition awareness sessions be facilitated with the business community as well as communities to increase awareness and explain the value of the transition versus the costs as well as the role that all stakeholders will play.

6.6.3 *Implications for Entrepreneurs*

Entrepreneurs will have an awareness of the direction of the sector in terms of the energy transition and the skills requirements for participation so that they can equip themselves with the necessary skills. Additionally, entrepreneurs will also be aware of the opportunities presented by the energy transition that can be leveraged for greater participation.

6.7 Suggestions for further research

The study focused on black entrepreneurs and black executives in the liquid fuels sector. It would be interesting to understand whether the dynamics are still the same for other racial groups that are operating in the sector. A longitudinal study is therefore suggested.

It was also interesting to note that entrepreneurs with prior experience in the sector were aware of support initiatives and gaps in the system that other entrepreneurs were not privy to. It is therefore recommended that in future, a thorough study on the entrepreneurial support programmes offered by both oil majors and government be conducted and to determine the success rate based on the success of the entrepreneurs incubated.

It is further recommended that a study on exploring green hydrogen and electric vehicle value chains as a solution for more entrepreneurial participation be considered for further research; with a focus on the Just Energy Investment Plan Opportunities.

REFERENCES

Abutabenjeh, S., & Jaradat, R. (2018). Clarification of research design, research methods, and research methodology: A guide for public administration researchers and practitioners. *Teaching Public Administration, 36*(3), 237-258.

Adams, W. C. (2015). Conducting semi-structured interviews. *Handbook of practical program evaluation, 4*, 492-505.

Al-Baghdadi, M. A. S. (2021). Green Hydrogen and the Beginning of a New Energy Era. *Journal homepage: www. IJEE. IEEFoundation. org, 12*(1), 1-18.

Baadjie, T. P., Chiloane-Phetla, G. E., & Mmako, N. (2021). Factors affecting firm growth for petroleum wholesalers in South Africa. *Journal of Contemporary Management, 18*(2), 297-322.

Bain, J. S. (1956). Advantages of the large firm: production, distribution, and sales promotion. *Journal of marketing, 20*(4), 336-346.

Berndt, A. E. (2020). Sampling methods. *Journal of Human Lactation, 36*(2), 224-226.

Bloemberg. (2021). South Africa sets rules to lower sulfur in diesel by 2023, Online. Retrieved from https://businesstech.co.za/news/energy/518524/south-africa-sets-rule-to-lower-sulfur-in-diesel-fuel-by-2023/

Bogdanov, D., Ram, M., Aghahosseini, A., Gulagi, A., Oyewo, A. S., Child, M., Barbosa, L. D. S. N. S. (2021). Low-cost renewable electricity as the key driver of the global energy transition towards sustainability. *Energy, 227*, 120467.

Booth, M. (2011). Chemistry in South Africa-a long-established industry. *Quest, 7*(1), 14-17.

Braun, V., & Clarke, V. (2019). Reflecting on reflexive thematic analysis. *Qualitative Research in Sport, Exercise and Health, 11*(4), 589-597.

Campbell, S., Greenwood, M., Prior, S., Shearer, T., Walkem, K., Young, S., . . . Walker, K. (2020). Purposive sampling: complex or simple? Research case examples. *Journal of Research in Nursing, 25*(8), 652-661.

Castillo-Montoya, M. (2016). Preparing for Interview Research: The Interview Protocol Refinement Framework. *Qualitative Report, 21*(5).

Cherp, A., Vinichenko, V., Jewell, J., Brutschin, E., & Sovacool, B. (2018). Integrating techno-economic, socio-technical and political perspectives on national energy transitions: A meta-theoretical framework. *Energy research & social science, 37*, 175-190.

Chiaramonti, D., Talluri, G., Scarlat, N., & Prussi, M. (2021). The challenge of forecasting the role of biofuel in EU transport decarbonisation at 2050: A meta-analysis review of published scenarios. *Renewable and Sustainable Energy Reviews, 139*, 110715.

Child, M., & Breyer, C. (2017). Transition and transformation: A review of the concept of change in the progress towards future sustainable energy systems. *Energy Policy, 107*, 11-26.

Connelly, L. M. (2016). Trustworthiness in qualitative research. *Medsurg Nursing, 25*(6), 435.

Creswell, J. W., & Poth, C. N. (2016). *Qualitative inquiry and research design: Choosing among five approaches*: Sage publications.

Crompton, R., Sing, M., Filter, V., & Msimango, N. (2020). Petrol price regulation in South Africa.

Dane, A., Wright, D., & Montmasson-Clair, G. (2019). Exploring the Policy Impacts of a Transition To Electric Vehicles in South Africa. *Pretoria: Trade & Industrial Policy Strategies*.

Daniel, B. K. (2019). *What constitutes a good qualitative research study? Fundamental dimensions and indicators of rigour in qualitative research: The TACT framework.* Paper presented at the Proceedings of the European Conference of Research Methods for Business & Management Studies.

Data, U. A. F. (2017). Hydrogen Basics." US Department of Energy, Alternative Fuels Data Center. In: U.S. Department of Energy.

De Bijl, P. W., & Fourie, H. (2019). The energy transition: Does ownership matter for realizing public interest objectives? *USE Working Paper series, 19*(24).

Delve. (2021). 6 Key steps for thematic analysis. Retrieved from https://delvetool.com/blog/thematicanalysis

DFFE. (2020). *South Africa's Low Emission Development Strategy 2050*

Pretoria: Department of Forestry, Fisheries & the Environment Retrieved from https://www.environment.gov.za/sites/default/files/docs/2020lowemission_developmentstrategy.pdf

DMRE. (2000). *Charter for the South African Petroleum and Liquid Fuels Industry: Empowering Historically Disadvantaged South Africans*. Pretoria: Hydrocarbons and Energy Planning Branch - Liquid Fuels

Dominković, D. F., Bačeković, I., Pedersen, A. S., & Krajačić, G. (2018). The future of transportation in sustainable energy systems: Opportunities and barriers in a clean energy transition. *Renewable and Sustainable Energy Reviews, 82*, 1823-1838.

Edomah, N. (2020). *Electricity and Energy Transition in Nigeria*: Routledge.

Edomah, N., Bazilian, M., & Sovacool, B. K. (2020). Sociotechnical typologies for national energy transitions. *Environmental Research Letters, 15*(11), 111001.

Eitan, A., Rosen, G., Herman, L., & Fishhendler, I. (2020). Renewable energy entrepreneurs: A conceptual framework. *Energies, 13*(10), 2554.

Eljack, F., & Kazi, M.-K. (2020). Prospects and Challenges of Green Hydrogen Economy via Multi-Sector Global Symbiosis in Qatar. *Frontiers in Sustainability, 1*, 14.

Etikan, I., Musa, S. A., & Alkassim, R. S. (2016). Comparison of convenience sampling and purposive sampling. *American journal of theoretical and applied statistics, 5*(1), 1-4.

Farlex. (Ed.) (2003) The Free Dictionary. Huntingdon Valley, Pennsylvania.: Farlex Inc.

Fatoki, O., & David, G. (2010). Obstacles to the growth of new SMEs in South Africa: A principal component analysis approach. *African journal of Business management, 4*(5), 729-738.

Flick, U. (2018). Triangulation in data collection. *The SAGE handbook of qualitative data collection*, 527-544.

Global, S. P. (2020). What is Energy Transition? Retrieved from https://www.spglobal.com/en/research-insights/articles/what-is-energy-transition

Halsey, R., Overy, N., Schubert, T., Appies, E., McDaid, L., & Kruyshaar, K. (2019). Remaking our energy future - Towards a Just energy transition. Retrieved from https://90by2030.org.za/wp-content/uploads/2019/09/A-Report-Remaking-our-Energy-Future.pdf.

Hammarberg, K., Kirkman, M., & de Lacey, S. (2016). Qualitative research methods: when to use them and how to judge them. *Human reproduction, 31*(3), 498-501.

Hasan, N., Rana, R. U., Chowdhury, S., Dola, A. J., & Rony, M. K. K. (2021). Ethical considerations in research. *Journal of Nursing Research, Patient Safety and Practise (JNRPSP) 2799-1210, 1*(01), 1-4.

Hassan, W. (2020). *Energy Transition: Evolution or Revolution?* Retrieved from Amsterdam: https://www.scottishlegal.com/uploads/CMS%20Oil%20%26%20Gas%20Energy%20Transition%20Report%20FINAL.PDF

Hennink, M., Hutter, I., & Bailey, A. (2020). *Qualitative research methods*: Sage.

Hirsch, T., Mattheß, M., & Fünfgelt, J. (2017). *Guiding principles & lessons learnt for a just energy transition in the global south*: Friedrich-Ebert-Stiftung, Global Policy and Development.

Investopedia. (2020). How strong are the barriers to entry in the oil and gas sector? Retrieved from https://www.investopedia.com/ask/answers/061115/how-strong-are-barriers-entry-oil-and-gas-sector.asp

Joubert, L. (2016). Turning carbon waste into liquid fuel. Retrieved from https://energytransition.org/2016/05/turning-carbon-waste-into-liquid-fuel/

Kapdi, M. (2017). Transformation in the liquid fuels sector of South Africa, viewed 18 August 2017. In.

Kiger, M. E., & Varpio, L. (2020). Thematic analysis of qualitative data: AMEE Guide No. 131. *Medical teacher, 42*(8), 846-854.

King, N., Horrocks, C., & Brooks, J. (2018). *Interviews in qualitative research*: Sage.

Korstjens, I., & Moser, A. (2018). Series: Practical guidance to qualitative research. Part 4: Trustworthiness and publishing. *European Journal of General Practice, 24*(1), 120-124.

Kothari, C. (2017). research methodology methods and techniques by CR Kothari. *Published by New Age International (P) Ltd., Publishers, 91*.

KPMG. (2016). *The petroleum industry's contribution to South Africa*. Retrieved from Johannesburg: https://www.sapia.org.za/doc/SAPIA_15_November_Final.pdf

Kühne, O. (2020). Landscape conflicts—a theoretical approach based on the three worlds theory of Karl Popper and the conflict theory of Ralf Dahrendorf, illustrated by the example of the energy system transformation in Germany. *Sustainability, 12*(17), 6772.

Kühne, O., Parush, D., Shmueli, D., & Jenal, C. (2022a). Conflicted Energy Transition—Conception of a Theoretical Framework for Its Investigation. *Land, 11*(1), 116.

Kühne, O., Parush, D., Shmueli, D., & Jenal, C. (2022b). Conflicted Energy Transition—Conception of a Theoretical Framework for Its Investigation. *Land, 11*(1), 116. Retrieved from https://www.mdpi.com/2073-445X/11/1/116

Lawrie, C., Potter, B., Menzies, L., & Wilmot, J. (2020). Energy Transition on South Africa. *FTI Consulting Report*, 18. Retrieved from https://www.fticonsulting.com/insights/reports/energy-transition-south-africa

Li, H. X., Edwards, D. J., Hosseini, M. R., & Costin, G. P. (2020). A review on renewable energy transition in Australia: An updated depiction. *Journal of Cleaner Production, 242*, 118475.

Lundqvist, A. (2020). Future development of bioenergy in South Africa: a study of increased use of available biomass for the future development of renewable energy in South Africa.

Mabena, N. (2005). *Operating The Worlds Largest GTL Facility (Natural Gas-to-Liquids).* Paper presented at the 18th World Petroleum Congress.

Mahajan, R., & Bandyopadhyay, K. R. (2021). Women entrepreneurship and sustainable development: select case studies from the sustainable energy sector. *Journal of Enterprising Communities: People and Places in the Global Economy*.

Mahotas, V. (2019). *Petroleum Regulation Hydrocarbons Policy - Clean Fuels Strategy*. Cape Town: Department of Energy

Majozi, T., & Veldhuizen, P. (2015). *The Chemicals Industry in South Africa*. Retrieved from

Makiva, M., Ile, I., & Fagbadebo, O. M. (2019). Evaluating transformation progress of historically disadvantaged South Africans: Programme perspective on the downstream petroleum industry. *African Evaluation Journal*.

Malatsi, T. (2018). *The impact of the Liquid Fuels Empowerment Charter (LFEC) on the South African petroleum retail sector.* University of Pretoria,

Maleka, E. M., Mashimbye, L., & Goyns, P. H. (2010). *South African energy synopsis 2010*: Department of Energy, South Africa.

Maseko, L. (2014). *Economic Transformation and Governance in the Oil Industry : Benefits of Liquid Fuels Charter*. Pretoria: Department of Energy Retrieved from

http://www.energy.gov.za/files/WomenInOilAndEnergy/Economic-Transformation-and-governance-in-Oil-Industry-Benefits-of-Liquid-Fuels-Charter.pdf

Mason, M. (2010). *Sample size and saturation in PhD studies using qualitative interviews.* Paper presented at the Forum qualitative Sozialforschung/Forum: qualitative social research.

Maxwell, J. A. (2021). Why qualitative methods are necessary for generalization. *Qualitative Psychology, 8*(1), 111.

McDaniel Jr, C., & Gates, R. (2020). *Marketing research*: John Wiley & Sons.

McGrath, C., Palmgren, P. J., & Liljedahl, M. (2019). Twelve tips for conducting qualitative research interviews. *Medical teacher, 41*(9), 1002-1006.

McNamara, C. (1999). General guidelines for conducting interviews. In: Minnesota.

Miles, D. A., & Scott, L. (2017). WORKSHOP: Confessions of a Dissertation Chair Part 1: The Six Mistakes Doctoral Students Make With the Dissertation.

Miller, S., & van Meelis, T. (2005). *Industrial relations in the oil industry in South Africa*: ILO.

Mokoena, J., & Lloyd, P. J. (2005). A business model to overcome barriers to entry in the South African downstream petroleum industry. *Journal of Energy in Southern Africa, 16*(2), 4-13.

Moloto, S. (2011). *PETROLEUM AND LIQUID FUELS CHARTER FINAL AUDIT REPORT* Retrieved from Pretoria:

Mondliwa, P., & Roberts, S. (2019). From a developmental to a regulatory state? Sasol and the conundrum of continued state support. *International Review of Applied Economics, 33*(1), 11-29.

NAEWASA. (2018). About us. Retrieved from http://www.naewasa.org/about.html

Nair, R. D., Mondliwa, P., & Roberts, S. (2015). The inter-relationships between regulation and competition enforcement in the South African liquid fuels industry. *Journal of Energy in Southern Africa, 26*(1), 11-19.

Ngxongo, T. (2018). *Transformation in the petroleum retail business: a case of African black women ownership of Engen service stations in KwaZulu-Natal, South Africa.*

Nkhonjera , M. (2015). New Energy in the region's fuel market: Puma Energy - Brent Oil Merger. Retrieved from https://www.competition.org.za/ccred-

blog-competition-review/2015/11/20/new-energy-in-the-regions-fuel-market-puma-energy-brent-oil-merger

Nowell, L. S., Norris, J. M., White, D. E., & Moules, N. J. (2017). Thematic analysis: Striving to meet the trustworthiness criteria. *International journal of qualitative methods, 16*(1), 1609406917733847.

O'Connor, P. (2010). Energy transitions. *The Pardee Papers, No. 12, November 2010*.

Omeihe, K. O. (2021). Non-Probability Sampling (Doctoral Colloquium). from British Academy of Management

Paelo, A., Robb, G., & Vilakazi, T. (2014). Study on barriers to entry in liquid fuel distribution in South Africa. *Centre for Competition, Regulation and Economic Development, University of Johannesburg, Johannesburg*.

Paelo, A., Robb, G., & Vilakazi, T. (2017). 7 Competition and incumbency in South Africa's liquid fuel value chain. *Competition Law and Economic Regulation*, 172.

Papadis, E., & Tsatsaronis, G. (2020). Challenges in the decarbonization of the energy sector. *Energy*, 118025.

PCC. (2022). *A Framework for a Just Transition in South Africa*. Johannesburg: PCC Retrieved from https://pccommissionflow.imgix.net/uploads/images/A-Just-Transition-Framework-for-South-Africa-2022.pdf

Pellegrini-Masini, G., Pirni, A., Maran, S., & Klöckner, C. A. (2020). Delivering a timely and Just Energy Transition: Which policy research priorities? *Environmental Policy and Governance, 30*(6), 293-305.

PMR. (2015). *South Africa - The Carbon Tax Policy Package*. Johannesburg: Partnership for Market Readiness Retrieved from https://www.thepmr.org/system/files/documents/South%20Africa%20Final%20MRP_16%20Feb%202015.pdf

Politis, D., & Gabrielsson, J. (2005). Exploring the role of experience in the process of entrepreneurial learning. *Lund Institute of Economic Research: Working Paper Series*.

PWC. (2021). *What a 'just transition' mean for jobs in South Africa*. Retrieved from Johannesburg: https://www.pwc.co.za/en/assets/pdf/what-a-just-transition-means-for-jobs-in-south-africa.pdf

Ratshomo, K. N., R. (2019). *The South African Energy Sector Report 2019*. Retrieved from Pretoria: http://www.energy.gov.za/files/media/explained/2019-South-African-Energy-Sector-Report.pdf

Raworth, K. (2019). Conducting semi-structured interviews. Retrieved from https://oxfamilibrary.openrepository.com/bitstream/handle/10546/252993/ml-guideline-conducting-semistructured-interviews-221112-en.pdf;jsessionid=480F76B6351CDF2154100CD639AF7925?sequence=13.

Roberts, S. (2017). Barriers to entry and implications for competition policy. *Competition Policy for the New Era–Insights from the BRICS Countries*.

SAPIA. (2014). *The first 20 years*. Retrieved from Sandton: https://www.sapia.org.za/LinkClick.aspx?fileticket=c2rbrWIeQ_Q%3D&portalid=0

SAPIA. (2020). Clean Fuels II. Retrieved from https://www.sapia.org.za/cleaner-fuels-ii/

Saunders, M., & Lewis, P. (2017). *Doing research in business and management*: Pearson.

Saunders, M., & Lewis, P. (2018). Doing research in business management 2nd edition. In: Pearson education. Harlow, Englanti.

Sekete, B. (2018). *Economic Transformation of the Petroleum Retail Industry in South Africa.*

Semelane, S., Nwulu, N., Kambule, N., & Tazvinga, H. (2021). Evaluating available solar photovoltaic business opportunities in coal phase-out regions–An energy transition case of Steve Tshwete local municipality in South Africa. *Energy Policy, 155*, 112333.

Seo, S. N. (2017). Beyond the Paris Agreement: Climate change policy negotiations and future directions. *Regional Science Policy & Practice, 9*(2), 121-140.

Shah, P. (2017). Green entrepreneurship-prospects in renewable energy.

Sihlobo, L. (2017). *Understanding barriers to entry into the vertically integrated oil industry and applying economic theories of entry into this industry.* University of Pretoria,

Sileyew, K. J. (2019). Research design and methodology. In *Cyberspace*: IntechOpen.

Simon, M. (2011). Assumptions, limitations and delimitations. In: Dissertation and scholarly research: Recipes for success.

Sitharam, S., & Hoque, M. (2016). Factors affecting the performance of small and medium enterprises in KwaZulu-Natal, South Africa. *Problems and perspectives in Management, 14*(2), 277-288.

Smith, J., & Noble, H. (2014). Bias in research. *Evidence-based nursing, 17*(4), 100-101.

Sparks, S. (2016). Between 'Artificial Economics' and the 'Discipline of the Market': Sasol from Parastatal to Privatisation. *Journal of Southern African Studies, 42*(4), 711-724.

Staniewski, M. W. (2016). The contribution of business experience and knowledge to successful entrepreneurship. *Journal of Business Research, 69*(11), 5147-5152.

Sun, X., Li, Z., Wang, X., & Li, C. (2020). Technology development of electric vehicles: A review. *Energies, 13*(1), 90.

TCD. (2021). Template for participant consent form. Retrieved from https://www.tcd.ie/swsp/assets/pdf/Participant%20consent%20form%20template.pdf.

Van Alstine, J. (2009). Governance from below: contesting corporate environmentalism in Durban, South Africa. *Business Strategy and the Environment, 18*(2), 108-121.

Varkey, B. (2021). Principles of clinical ethics and their application to practice. *Medical Principles and Practice, 30*(1), 17-28.

Vassiliou, M. S. (2018). *Historical dictionary of the petroleum industry*: Rowman & Littlefield.

Venter, I. (2020). New refinery offers hope on clean fuels; Toyota SA to start hybrid production in 2021 [Online]. *Engineering News*. Retrieved from https://www.engineeringnews.co.za/print-version/new-refinery-offers-hope-on-clean-fuels-toyota-sa-to-start-hybrid-production-in-2021-2020-06-12

Verbong, G., & Loorbach, D. (2012). *Governing the energy transition: reality, illusion or necessity?* : Routledge.

Verhoef, G. (2003). Innovation for globalisation or globalisation of innovation Sasol in the chemical industry during the 1990s. *South African journal of economic history, 18*(1-2), 188-212.

Vilakazi, T., & Bosiu, T. (2021). Black Economic Empowerment, Barriers to Entry, and Economic Transformation in South Africa. In *Structural Transformation in South Africa* (pp. 189-212): Oxford University Press.

Walters, C. H. (2001). Assumptions of qualitative research methods. *Perspectives in learning, 2*(1), 14.

Williams, C. (2007). Research methods. *Journal of Business & Economics Research (JBER), 5*(3).

Wright, D. J., & Calitz, J. (2020). *Setting up for the 2020s: Addressing South Africa's electricity crisis and getting ready for the next decade*. Retrieved from Pretoria: https://researchspace.csir.co.za/dspace/bitstream/handle/10204/11282/RS_Setting%20up%20for%202020.pdf%20version%201.1.pdf?sequence=3&isAllowed=y

York, R., & Bell, S. E. (2019). Energy transitions or additions?: Why a transition from fossil fuels requires more than the growth of renewable energy. *Energy research & social science, 51*, 40-43.

Yuan, X.-C., Lyu, Y.-J., Wang, B., Liu, Q.-H., & Wu, Q. (2018). China's energy transition strategy at the city level: The role of renewable energy. *Journal of Cleaner Production, 205*, 980-986.

Zhao, B. (2017). Why will dominant alternative transportation fuels be liquid fuels, not electricity or hydrogen? *Energy Policy, 108*, 712-714.

APPENDIX (A) Participant Information Sheet



Date

Dear Sir/Madam

Invitation to participate in an in-depth interview

My name is Dineo Tlou, A Master of Management on Energy Leadership student at the Wits Business School (WBS). One of the requirements of my studies is that I conduct research. I am therefore undertaking a research study that is aimed at examining how the Energy Transition (ET) can be leveraged for greater black entrepreneurial participation in the liquid fuels sector in South Africa.

As a result of your participation in the Liquid Fuels sector, knowledge of the sector including entrepreneurial opportunities and ET; you have been selected to participate in this study through an in-depth interview. The interview is expected to take approximately 40 minutes to 1 hour of your time and will take place on either Microsoft Teams/Zoom or a place that is convenient to you in Johannesburg.

Participation in the study is voluntary and there are no known risks associated with participating. I would also like to request your consent to make use of a digital device to record the interview.

Your participation in the study will contribute to a better understanding of how the Energy Transition (ET) can be leveraged for greater black entrepreneurial participation in the liquid fuels sector in South Africa.

There will be no personal costs as well as direct benefits to you if you participate in this project. There are no disadvantages or penalties if you do not choose to participate or if you withdraw from the study, which can be at any point of the study. Confidentiality and anonymity will be preserved during this process as no demographic information will be asked that may identify you. The information provided will be securely stored through password protection and not shared with anyone else. The use of codes will be employed to indicate your contribution to the study which will be presented as a research report.

The final research report will be made available through the university website.

With your permission the data collected from this research project may be used by other researchers in an anonymized format.

Should you have any questions or queries, please contact me or my supervisor on the contact details provided.

Yours Sincerely,

Dineo Tlou

Research Student

Wits Business School

Department: Business Management

Contact number: 074 143 3672

Email address: 915329@students.wits.ac.za

Supervisor details

Professor Milford Soko

Professor

Wits Business School

Contact number: 0117173585

Email address: Milford.Soko@wits.ac.za

APPENDIX (B) Research Instrument – Interview Guide

1. **Introductions**

- Researcher introduction
- Participant introduction
- Permission to record requested by researcher to participant

Are there any questions that you may have before we continue with the interview?

2. **Background**

- Describe your business and core activities in the LF sector
- How long have you been in business? In the LF sector?
- Describe the LF sector which part of the value chain your business operates?

3. **Energy Transition and Just Energy Transition**

- What is your understanding of the Energy Transition?
- What do you think is the role of entrepreneurs in the LF ET?

4. **Barriers and enablers of LF participation**

- What do you think are the barriers of entrepreneurial participation in the LF sector?
- What barriers have you experienced and how have they impeded your success?
- How do you think the barriers of entry can be lowered for greater entrepreneurial participation?
- What do you think are the enablers of entrepreneurial participation in the LF sector?

5. **Skills requirements for participation in LF sector**

- What are the skills requirements for entrepreneurs to participate in the LF sector?

6. Opportunities for Entrepreneurs in LF sector

- What do you think are the opportunities for entrepreneurs in the LF ET?

7. What type of support so you think entrepreneurs in the LF sector require to successfully participate in the sector?

Do you have any comments or questions on the topic?

Thank you for your participation and valued inputs.

APPENDIX (C) Participant Consent Form

Examining how the Energy Transition (ET) can be leveraged for greater black entrepreneurial participation in the liquid fuels sector in South Africa.

- I…… voluntarily agree to participate in this research study.

- I confirm that I understand what the research is about and that I have an opportunity to ask questions ☐

- I understand that I can withdraw participation at any point in the study or be unwilling to answer any question without any reason or consequences ☐

- I understand that I can withdraw permission to use data from my interview within two weeks after the interview and the data will be omitted from the study. ☐

- I understand that I will not benefit directly from participating in this research. ☐

- I consent to a digital device being used to audio/video-record my interview ☐

- I understand that all information I provide for this study will be treated confidentially. ☐

- I understand that a transcript of my interview in which all identifying information has been removed will be retained by the Wits Business school ☐

- I understand that I am free to contact any of the people involved in the research to seek further clarification and information. ☐

Signature of research participant

---------- ----------

Signature of participant Date

Signature of researcher

I believe the participant is giving informed consent to participate in this study

---------- ----------

Signature of researcher Date

APPENDIX (D) – Letters requesting permission to conduct research



University of the Witwatersrand,

Wits Business School

2 St David's Place

Parktown

+27 11 717 3727

25 March 2022

Secretary General

National African Energy Wholesalers Association of South Africa

292 Surrey Avenue,

Ferndale

Randburg

2194

Johannesburg

South Africa

Dear Sir/Madam,

Re: Permission to conduct research at the National African Energy Wholesalers Association of South Africa (NAEWASA)

My name is Dineo Tlou, a Master of Management on Energy Leadership student at the Wits Business School (WBS). As part of fulfilling the requirements of my studies, I am conducting research that is aimed at examining how the Energy Transition (ET) can be leveraged for greater black entrepreneurial participation in the liquid fuels sector in South Africa. I am seeking permission to conduct research at NAEWASA.

The study assesses the changes that are required to facilitate a successful participation of entrepreneurs in the liquid fuels industry, which has been historically dominated by multinational oil companies. In particular, the study sets out to identify the barriers of entry, possible entrepreneurial opportunities in the liquid fuels value chain as well as evaluate the skills required for entrepreneurs to operate successfully in the sector with the ET as a key driver.

The research will entail collecting data from Black entrepreneurs that are members of NAEWASA for the Liquid Fuels sector so that insights can be gained from those already in the sector and those that want to enter the sector. This will be a total of 20 interviews.

With your assistance and permission of the potential participants, I will invite individuals from your organisation to participate in this study. Once the invitation has been accepted by the potential participants, they will be asked to answer 6 categories of semi-structured interview questions (In-depth interviews). It will take them approximately 40 minutes to 60 minutes to answer the interview questions at their own convenience. While the option to audio or video record may be available, it is entirely up to the participant to choose how s/he wants the interview to be conducted.

Participants will be asked to give their written or verbal consent before the research begins. Their responses will be treated with confidentially, and identities (their names and the name of the organisation) will be anonymous unless otherwise expressly indicated. I will ensure privacy is maintained for all collected the data from the study. None of the participants will be remunerated for their participation in the study.

The results will be communicated through dissertations, academic journals and possibly academic conferences.

There are no anticipated risks in being part of the research study. Participants will not be forced into answering questions that they do not want to answer and will not be advantaged or disadvantaged in any way. They will be able to withdraw permission without being penalised.

All research data will be preserved anonymously for reuse by other researchers.

I therefore request permission in writing to conduct my research at your organisation. The permission letter should be on your organisation's letterhead, signed and dated, and specifically referring to myself by name and the title of my study.

Please let me know if you require any further information. I look forward to your response at your earliest convenience.

Yours sincerely,

Dineo Tlou

Contact number: +27 74 143 3672

Email Address: 915329@students.wits.ac.za

Professor Milford Soko

+27 11 717 3585

Milford.soko@wits.ac.za

Research Supervisor

University of the Witwatersrand,

Wits Business School

2 St David's Place

Parktown

+27 11 717 3727

South African Petroleum Industry Association

144 Katherine Street,

Building B Ground Floor,

Sandton

2146

Johannesburg

South Africa

01 September 2022

Dear Sir/Madam,

Re: Permission to conduct research at the South African Petroleum Industry Association (SAPIA)

My name is Dineo Tlou, a Master of Management on Energy Leadership student at the Wits Business School (WBS). As part of my studies, I am conducting research that is aimed at examining how the Energy Transition (ET) can be leveraged for greater black entrepreneurial participation in the liquid fuels sector in South Africa. I am seeking permission to conduct research at SAPIA.

The study assesses the changes that are required to facilitate a successful participation of entrepreneurs in the liquid fuels industry. In particular, the study sets out to identify the barriers of entry, possible entrepreneurial opportunities in the liquid fuels value chain as well as evaluate the skills required for entrepreneurs to operate successfully in the sector with the Energy Transition as a key driver.

The research will entail collecting data from Black entrepreneurs that are members of SAPIA so that insights can be gained from those already in the sector.

With your assistance and permission of the potential participants, I will invite individuals associated with your organisation to participate in this study. Once the invitation has been accepted by the potential participants, they will be asked to answer 6 categories of semi-structured interview questions (In-depth interviews). It will take them approximately 40 minutes to 60 minutes to answer the interview questions at their own convenience. While the option to audio or video record may be available, it is entirely up to the participant to choose how s/he wants the interview to be conducted.

Participants will be asked to give their written or verbal consent before the research begins. Their responses will be treated with confidentially, and identities (their names and the name of the organisation) will be anonymous unless otherwise expressly indicated. Individual privacy will be maintained in all published and written data resulting from the study.

The results will be communicated through dissertations, academic journals and possibly academic conferences.

The research participants will not be advantaged or disadvantaged in any way. They will be reassured that they can withdraw permission at any time during this project without any penalty. There are no foreseeable risks in participating in this study. The participants will not be paid for this study.

All research data will be preserved anonymously for reuse by other researchers.

I therefore request permission in writing to conduct my research at your organisation.

Please let me know if you require any further information. I look forward to your response at your earliest convenience.

Yours sincerely,

Dineo Tlou

Contact number: +27 74 143 3672

Email Address: 915329@students.wits.ac.za

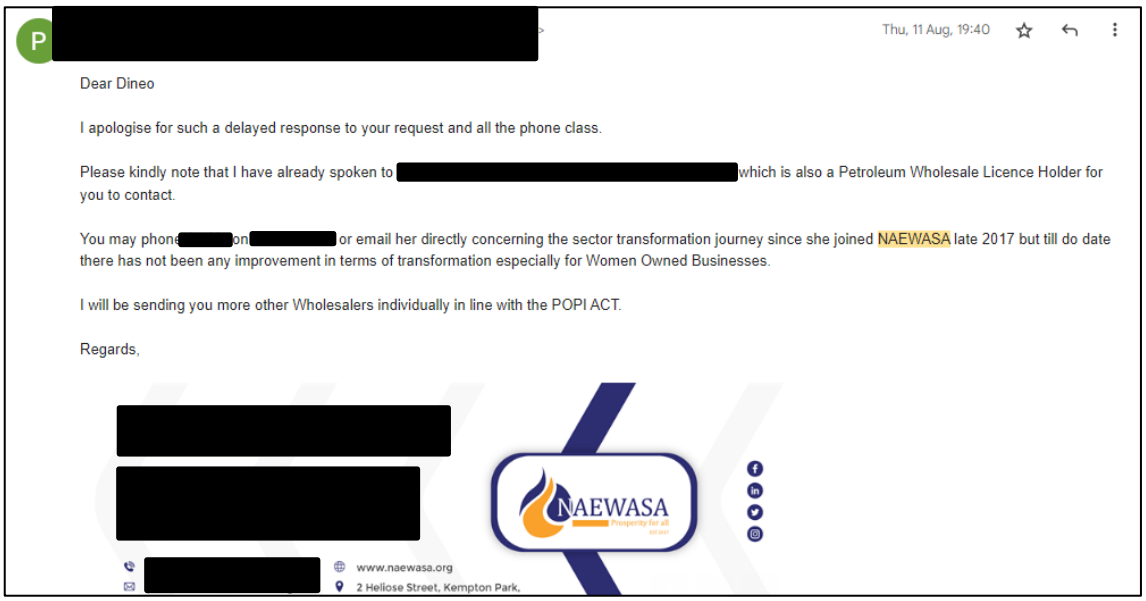
Professor Milford Soko

+27 11 717 3585

Milford.soko@wits.ac.za

Research Supervisor

APPENDIX (E) – Sample Letter approvals from NAEWASA and SAPIA to conduct Research



P [redacted] Thu, 11 Aug, 19:40

Dear Dineo

I apologise for such a delayed response to your request and all the phone class.

Please kindly note that I have already spoken to [redacted] which is also a Petroleum Wholesale Licence Holder for you to contact.

You may phone [redacted] on [redacted] or email her directly concerning the sector transformation journey since she joined NAEWASA late 2017 but till do date there has not been any improvement in terms of transformation especially for Women Owned Businesses.

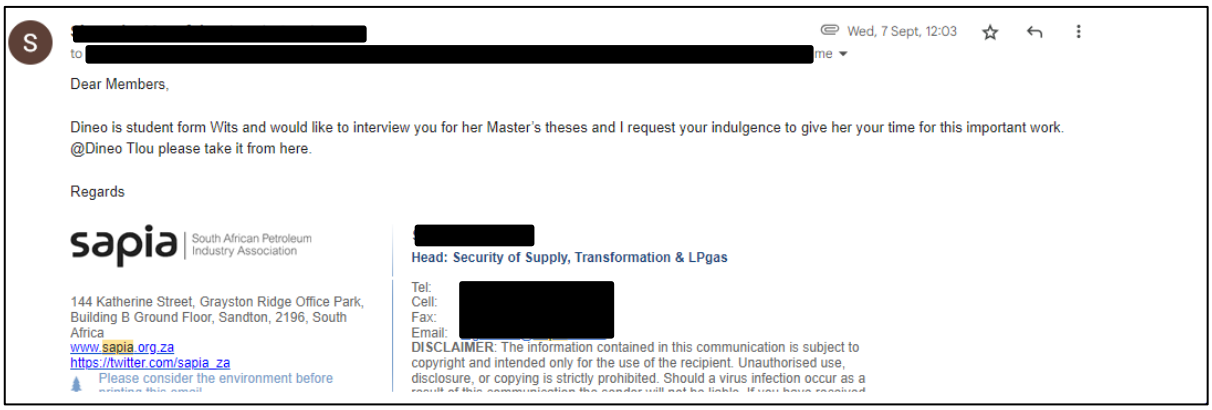
I will be sending you more other Wholesalers individually in line with the POPI ACT.

Regards,

[redacted]

NAEWASA

[redacted] www.naewasa.org 2 Heliose Street, Kempton Park,



S [redacted] Wed, 7 Sept, 12:03

to [redacted] me

Dear Members,

Dineo is student form Wits and would like to interview you for her Master's theses and I request your indulgence to give her your time for this important work. @Dineo Tlou please take it from here.

Regards

sapia | South African Petroleum Industry Association

144 Katherine Street, Grayston Ridge Office Park, Building B Ground Floor, Sandton, 2196, South Africa
www.sapia.org.za
https://twitter.com/sapia_za
Please consider the environment before

[redacted]
Head: Security of Supply, Transformation & LPgas

Tel:
Cell:
Fax:
Email: [redacted]

DISCLAIMER: The information contained in this communication is subject to copyright and intended only for the use of the recipient. Unauthorised use, disclosure, or copying is strictly prohibited. Should a virus infection occur as a

APPENDIX (F) – Ethics clearance certificate

Graduate School of Business Administration
University of the Witwatersrand, Johannesburg

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

Ethics Clearance Certificate

Ethics protocol number: WBS/EL915329/265

This certificate is only valid with a legitimate ethics protocol number and signed by the Researcher (below).

This certificate is only valid if accompanied by formal permission from the relevant stakeholder(s).

Project title	**Leveraging the energy transition for greater black entrepreneurial participation in the liquid fuels sector in South Africa**
Investigator / Researcher	**Ms Dineo Tlou**
Nature of Project	**MM (Energy Leadership)**
Decision of the Committee	**Approved, provided stakeholders and participants are guaranteed confidentialty.**
Issue Date of Certificate	**2022-05-24**
Expiry date	**Date of submission of the project / research report**
Chairperson	**Prof Anthony Stacey** ☎ **+27 11 717 3587** **+27 82 880 4531** **anthony.stacey@wits.ac.za**

Declaration by Researcher

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

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

Signature 25 May 2022 **Date:**