Implications of the energy transition for employees in the South African Oil and Gas Industry

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Abstract

In recent years, the world has been experiencing increasing cases of severe climate change in the form of floods, heat waves, rising sea levels, and other extreme weather conditions. Scientists have attributed this change to excessive greenhouse gas emissions, with carbon dioxide being the dominant greenhouse gas. The major contributor to the emission of this gas is the energy industry through the burning of fossil fuels. In 2016, South Africa signed the Paris Agreement that mandates countries to undergo a transition away from a carbon-intensive economy to cleaner and renewable energy forms. The main objective of the Paris Agreement is to limit the global temperature increase to below 2^0C.

The oil and gas industry in South Africa is of prime focus in undertaking a transition towards cleaner and renewable energy. This is an industry that contributes almost 4% of direct employment in South Africa, a country characterized by high unemployment rates.

This study aimed to establish the implications of this energy transition for employees in the oil and gas industry in South Africa.

The study method used was a qualitative exploratory approach in which thirteen participants that are currently employed in the oil and gas industry were interviewed. The objective was to establish whether the energy transition is being perceived as inclusive and equitable, i.e., ensuring that workers' jobs and livelihoods are considered and accommodated in the process.

The outcomes from this study were mainly a view that the transition is likely to result in increased unemployment rates in the country, especially amongst front-line workers. The other outcome was that some organizations were perceived to have more transparent and inclusive transition strategies than others. Lastly, the study indicated some optimism about the clean and renewable energy space but a lack of clarity and confidence on how the new opportunities are going to be realized.

Keywords

Just transition, oil and gas, energy transition, renewable energy, decarbonization, employment, skills transfer

Declaration

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

Signed

Date

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Chapter 1 : Definition of Problem and Purpose

1.1 Introduction

With the ever-increasing dangers of climate change, there is an urgent need for countries to undertake a transition process away from fossil fuel-derived energy sources to cleaner and lower carbon sources (Healy & Barry, 2017). Lower carbon energy sources lead to a reduction in greenhouse gas emissions that are at the core of climate change. The transition to lower-carbon energy sources requires new infrastructure, new policies and new scientific technologies.

Approximately 65% of the energy in South Africa is generated from coal, while 21% is generated from oil and gas (The South African Energy Sector Report, 2021). Figure 1.1.1 indicates the largest contributor to greenhouse gas emissions is the energy sector at 73.2%. This places industries like oil and gas at the heart of an energy transition away from fossil fuel based energy.

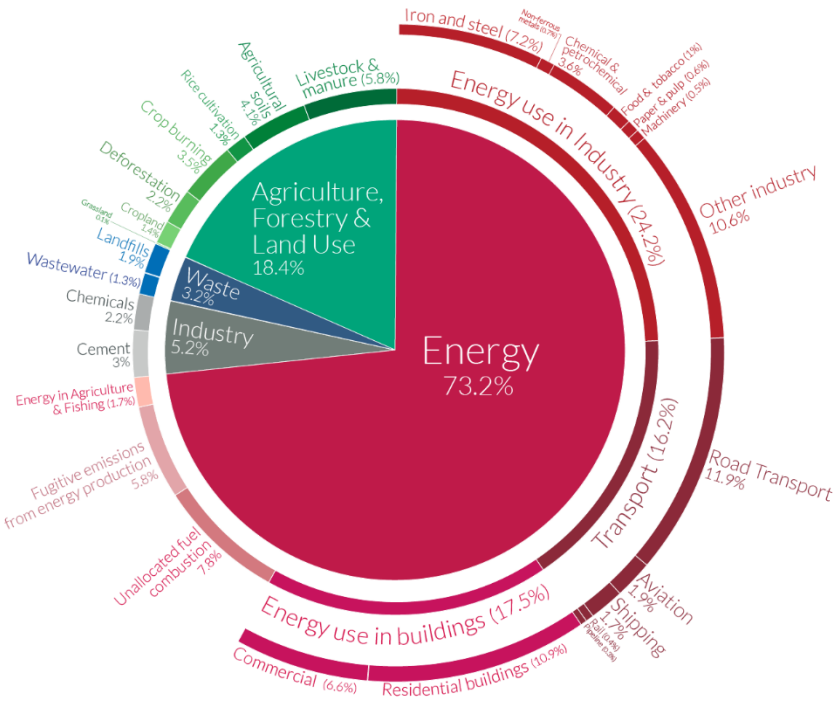


Figure 1.1.1 Global greenhouse gas emissions by sector in 2016 (Source: Our world in data)

The oil and gas industry alone supplies almost 4% of employment in South Africa (South African Petroleum Industry Association-SAPIA, 2021). South Africa is a country characterized by high inequality, with almost half of the population living in poverty (Francis and Webster, 2019). As such, any attempts to reduce the amount of greenhouse gas emissions from the South African energy industry need to address potential injustices and minimize the socio-economic impacts of such an energy transition.

This research will focus on the employee perspective and experience of the energy transition. The major oil and gas companies in South Africa are Astron Energy, BP, Engen, PetroSA, Sasol, Shell and Total (SAPIA, 2022). These companies have major fossil fuel-based manufacturing operations in KwaZulu Natal, Gauteng, Free State, Western Cape and Mpumalanga. This research will seek to cover operations in all these provinces where possible.

1.2 Background

In 2016, South Africa signed the Paris Agreement (South African Department of Fishery, Forestry and Environment (DFFE), 2016). The main objective of the Paris Agreement is to limit the global temperature increase to below 2^0C. The agreement is a framework aimed at guiding countries on the steps to take in their journey to reducing greenhouse gas emissions and climate change (United Nations Climate Change, UNCC). The ultimate objective is to reduce the amount of carbon dioxide emissions by half by 2050 (Wentworth, 2014). Carbon dioxide is the primary pollutant considered in this objective; it lasts for at least hundreds of years in the atmosphere and is considered the main cause of global warming (Rogelj, Geden, Cowie and Reisinger, 2021).

It is produced in energy industries like electricity generation and petroleum industries, with the final product being electricity used to power the country and various fuels used for transportation (Cha, 2020). As a result, the energy sector is considered greatly essential for conducting the transition to cleaner, and more environmentally friendly forms of energy.

As a result, the South African National Development Plan (NDP) indicates the necessity to undertake upgrades to South African oil refineries to meet new fuel specifications that contribute to the reduction in greenhouse gas emissions (NDP 2030). Without the necessary funding to upgrade these oil refineries, they will be forced to shut down permanently. Closure of these refineries would have negative consequences for job security for employees that

depend on this industry for employment. In Durban, the Engen Refinery was permanently shut down (South African government, 2020). In early 2022, the Shell and BP Refinery in Durban communicated its plans to pause operations while conducting a review of its shareholding status (BP Southern Africa, 2022). The latter followed an announcement by Royal Dutch Shell of its plans to reduce its Oil and Gas portfolio as a means to transition to renewable energy, with the main objective being to reduce greenhouse gas emissions significantly by 2050 (Hydrocarbon Processing, 2021).

1.3 Research Problem

The research problem deals with the impact of the energy transition on employment opportunities for individuals in the South African Oil and Gas industry, an industry earmarked for the transition to lower-carbon energy sources. The industry provides close to 4% of direct employment in South Africa (SAPIA, 2020). Transitioning to cleaner, lower-carbon energy systems has so far entailed the closure of manufacturing sites in various parts of South Africa. The energy transition is critical to ensure the preservation of the earth to support future generations.

However, energy transitions have often resulted in “winners and losers”. This disparity has lasted way past the duration of the transition (Cha, 2020).

The unemployment rate in South Africa is currently sitting at 34.5% as of June 2022 (Statistics South Africa, 2022. It is therefore critical to ensure the energy transition increases employment opportunities rather than reducing them. This research aimed to establish the process that is being followed in the industry to enable a just transition.

There is a significant number of countries that have pledged to phase out vehicles using fossil fuels by 2030; this is as early as 2023 for some individual cities in these countries (Dane, Wright and Montmasson-Clair, 2019).

Given that South Africa is closely integrated with the international market for the export of coal and other commodities, the energy transition in the country is likely to be very dependent on international partnerships as opposed to local policies (Huxham, Anwar and Nelson, 2019). The energy transition is therefore looming, requiring ensuring a smooth transition for workers and communities affected directly by the transition.

This research study aimed to establish the views and experiences of employees currently in this industry as the transition is starting. The Paris agreement outlines emissions reduction

milestones for the years 2030 and 2050 (Wentworth, 2014); as best as possible, this study aimed to establish how employees plan to navigate their careers and livelihoods leading up to these timeframes.

1.4 Motivation and Relevance of Research

While significant research has been conducted on the socio-economic implications of a gradual transition from coal to lower-carbon or renewable energy sources in South Africa and various other parts of the world, there is little to no research on the transition in the oil and gas industry in South Africa. The decision by a large multinational manufacturing company like Royal Dutch Shell, for example, to reduce its fossil fuel operations in supporting its energy transition imperatives, came into effect only in July 2020 (Hydrocarbon Processing, 2021). The industrialization of South Africa has always been catalysed by the use of fossil fuels like coal and oil and gas energy sources, with over 86% of the country's energy sourced from fossil fuels (The South African Energy Sector Report, 2021). A transition away from fossil fuels carries with it not only potential negative economic impacts but negative social impacts if the transition is not carried out equitably.

In September 2021, the presidency issued a media release statement entailing the requirement to ensure that the South African transition to cleaner energy is inclusive of all the workers and communities involved (South African government, 2021). With inequality continuing to rise in the country, national policies aimed at enabling the energy transition must be able to address any injustices and potential socio-economic impacts of the transition (Healy & Barry, 2017).

This research study will contribute to the Just Transition body of knowledge as it applies to the South African context in the oil and gas industry. The study sought to establish this understanding from the perspective of directly affected employees in the industry, which is slightly different to the majority of research that is from an outsider's viewpoint of such transitions.

1.5 Research scope

The participants of this study were employees in the oil and gas industry. The study sought to include views and experiences from employees in six of the oil majors operating in South Africa, viz. Astron Energy, BP, Engen, Sasol, Shell and Total. The outcome of this study will supplement existing studies on the characteristics of energy transitions in the coal industry in

South Africa and other parts of the world (Cha, 2020; Burke, Best and Jotzo, 2019; Cock, 2019; Bainton, Kemp, Lèbre, Owen and Marston, 2021). The study targeted different employee skill levels, with a specific focus on engineers and process/production technicians. The different skill levels were differentiated due to the need to attain a wide enough range of views across various skill level groups within the industry. Senior management-level employees were also included in the study as per their availability.

The desired outcome was that the insights obtained from the study would be information that business practitioners and human resource personnel in the industry can utilize in constructing just transition strategies towards the imminent lower carbon economy.

1.6 The purpose of the research

The overarching question that this research study sought to answer was the following:

What are the implications of the transition to cleaner energy for employees in the South African Oil and Gas industry?

The underlying research questions that needed to be answered were as follows:

1. What are the perspectives of employees on the current climate change crisis? Do they understand the urgent need for the transition?
2. What are the job implications and skills transfer prospects for the employee throughout this transition?
3. How have employees been sensitized and offered assistance by their employees during the transition process?

Chapter 2 : Theory and Literature Review

2.1 Introduction

This research sought to establish the implications of the transition to cleaner and lower carbon energy for employees in the South African Oil and Gas industry. A review of the existing literature revealed a large body of work on transitions from fossil fuel-based (i.e., carbon-intensive) to cleaner energy in various parts of the world. The term Just Transition is the common concept under which this body of work is categorized. Just Transition can be defined as a process of shifting towards a low-carbon economy in a manner that maintains climate-resilient economies and contributes to employment opportunities and an inclusive economy (Nedlac Report on Climate Change, n.d.; Climate Justice Alliance, 2018; Routledge, Cumbers and Derickson, 2018).

Krawchenko and Gordon (2022) further define 'just transition' as a way of managing energy transitions in a manner that ensures that workers and communities are not disproportionately disadvantaged as a result of the transition.

This study focuses on the energy industry in South Africa; an energy transition can best be described as a process of striking a new equilibrium by adopting renewable energy strategies that result in a more sustainable economy (Rugiero, 2019).

In their study on Just Transitions in the oil and gas industries of New Zealand, Scotland and Denmark, Krawchenko and Gordon (2022) outlined a common property of transitions as the gradual phase-out of carbon-intensive industries and replacement with newer, lower carbon industries. Furthermore, the oil and gas sector is a direct and major contributor to carbon emissions, making it the biggest industry at the forefront of an energy transformation.

Following the COVID-19 pandemic, a notable shift occurred in the security and desirability of particularly the oil refining industry. This shift arose after the pandemic resulted in the exposure of energy vulnerability and injustices in various parts of the world. As a result of unstable crude prices, this rendered the oil refining industry even more sensitive towards decarbonization imperatives as profit margins are considered slim and variable with crude prices (Griffiths Sovacool, Kim, Bazilian, and Uratani, 2022).

Building onto this, the oil company BP forecasts that the global demand for oil will slow down and eventually reach its lowest by 2030 as efficiency in the electric vehicle market booms (Nurdiawati and Urban, 2022). This is similar to the findings by Green Hadden, Hale and Mahdavi (2020) that assert that oil and gas firms acknowledge the future decline of oil and gas demand and how it is resulting in pressure to adopt decarbonization strategies.

A number of countries are well into their journey to transition to lower carbon energy economies. Krawchenko and Gordon (2022) conducted a study on the energy transitions in oil and gas industries in Denmark, New Zealand Scotland.

Denmark is considered to have the most stringent net zero carbon emissions commitments in the world and is committed to phasing out oil and gas by 2050.

New Zealand made a commitment to cease issuing any new oil and gas exploration permits as of April 2018.

Scotland has not made any firm commitments to the complete cessation of the oil and gas industry but has instead developed a 'just transitions framework' to manage the energy transition process. The transition has as some of its principles -1) the equipping of people with the necessary skills and education to benefit from the transition to a lower carbon economy and, 2) ensuring the benefits and opportunities arising out of climate action are fairly shared amongst communities.

This chapter will explore the existing literature regarding perspectives on the climate change crisis. Thereafter, the just transition theory framework will be used to establish the typical characteristics of an energy transition and its socio-economic impacts. Finally, the chapter will explore the literature on the just transition principles and what is considered best practices to attain a favourable outcome for all involved. This flow scheme is shown in Figure 2.1.1. below.

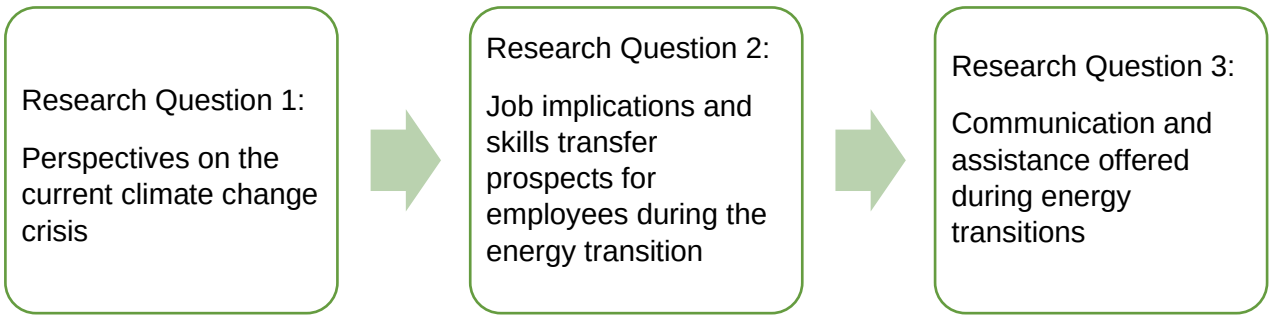


Figure 2.1.1 Framework for Literature Review

Atteridge and Strambo (2020) outline seven principles that must be applied to transition to a low-carbon economy. These principles are shown in Figure 2.1.2.

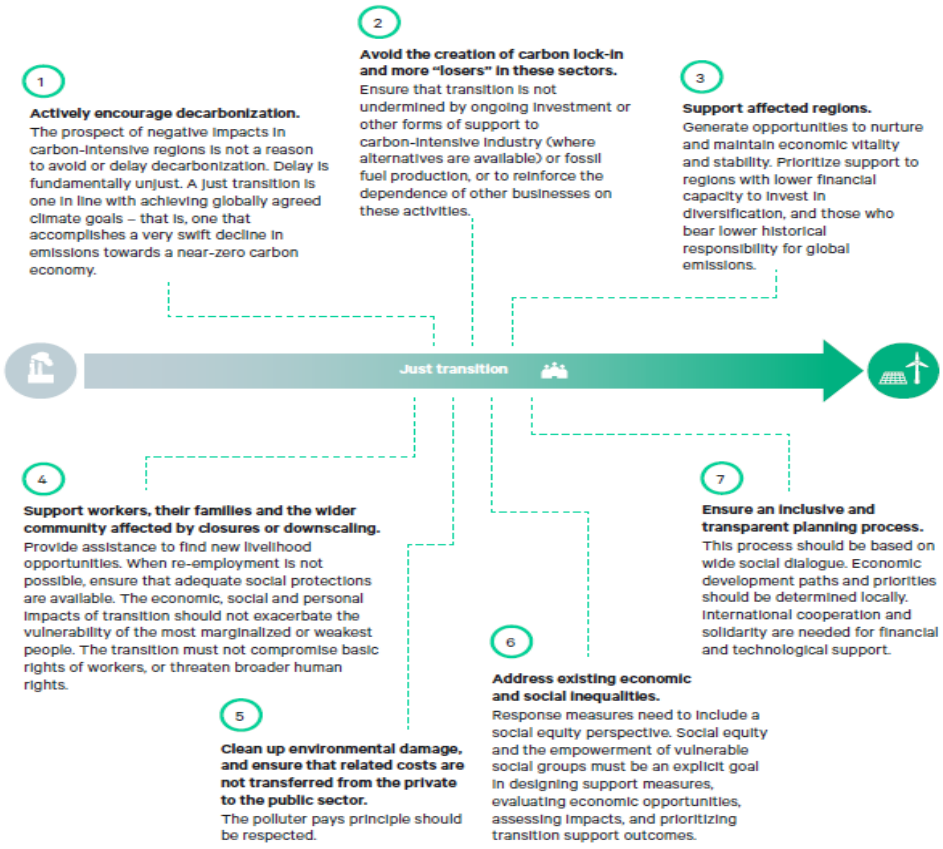


Figure 2.1.2 Seven Principles of a just transition (Atteridge and Strambo, 2020)

Bhushan, Banerjee and Agarwal (2020) in their work on Just Transitions away from coal in India developed a Just Transition framework for India that has at its core eight key pillars. These pillars include strong government support, diverse stakeholder engagement, public and private investment, and a robust communication strategy.

Piggot, Boyland, Down and Torre (2019) conducted a study of the energy transitions in Thailand and the United States. They came up with three key principles of a just transition they noted would be the key learnings from the two country cases. The first is that governments need to develop a strategy for the energy transition that seeks to meet the climate action goals while maintaining social equality. Secondly, the transition needs to include distributive and procedural justice to ensure consideration for all those affected by the transition. Lastly, the transition needs to seek to improve existing inequalities by ensuring the inclusion of marginalized or previously disadvantaged groups.

In December 2020, the South African president established the Presidential Climate Commission (PCC). The PCC is an organization comprised of multiple stakeholders to advise the president on South Africa's climate change response and on how to enable a "just transition to a low-carbon climate-resilient economy and society" (PCC, 2022). The PCC has three just transition principles. These are distributive justice, restorative justice, and procedural justice. Distributive justice entails the upskilling of communities to attain employment relevance in the low-carbon energy landscape. Restorative justice deals with restoring the environment to a state that does not harm the health of the community. Procedural justice deals with ensures robust communication and engagement channels amongst all key stakeholders during the transition (PCC, 2022).

To support this commission, the presidency has also launched the Just Energy Transition Investment Plan (JET IP). It is expected that this plan will attract new investment and result in the creation of new industries and new jobs (South African Presidency, 2022).

Using the principles in Figure 2.2 and the various studies on just transition outlined, the three research questions for this study were categorized as follows:

- *Research Question 1*: This is addressed by principles 1 and 2. These speak to intentionally shifting away from high-carbon industries and minimizing investment and development into high-carbon industries. These principles aim to send a consistent message about the urgency of climate change action. This way, perspectives on the need for a transition are not diluted.
- *Research Question 2*: This question is addressed by principles 3 and 4. These principles address the need to support affected individuals and communities to ensure equity throughout the transition.

- *Research Question 3*: This last question is addressed by principles 6 and 7. These principles indicate the need for open communication and alignment amongst all affected parties throughout the transition.

The sections that follow will dig deeper into these principles as they unfold in the existing literature.

2.2 Perspectives on the current climate change crisis

The concept of a just transition originated from labour unions and environmental rights groups in America in the 1970s. These groups aimed to put an end to industries that were causing harm to the environment and compromising the health of the communities in which they operated (Climate Justice Alliance, 2018; Bainton et al., 2021). This movement was rooted in ensuring that workers in those industries were intimately involved in crafting the transition towards cleaner and more environmentally friendly industries.

Winkler (2020) further emphasizes that the just transition concept combines the urgency of climate change action with the urgency of minimizing inequality and poverty. This culminates in the bold statement that 'just transition is a means to achieve zero poverty and carbon' (Winkler, 2020).

Figure 2.2.1 demonstrates the concept of a just transition. This transition deals with moving from an "extractive economy to a regenerative economy" that results in a scenario in which both businesses, communities and the environment are in harmony with one another and thriving (Climate Justice Alliance, 2018).

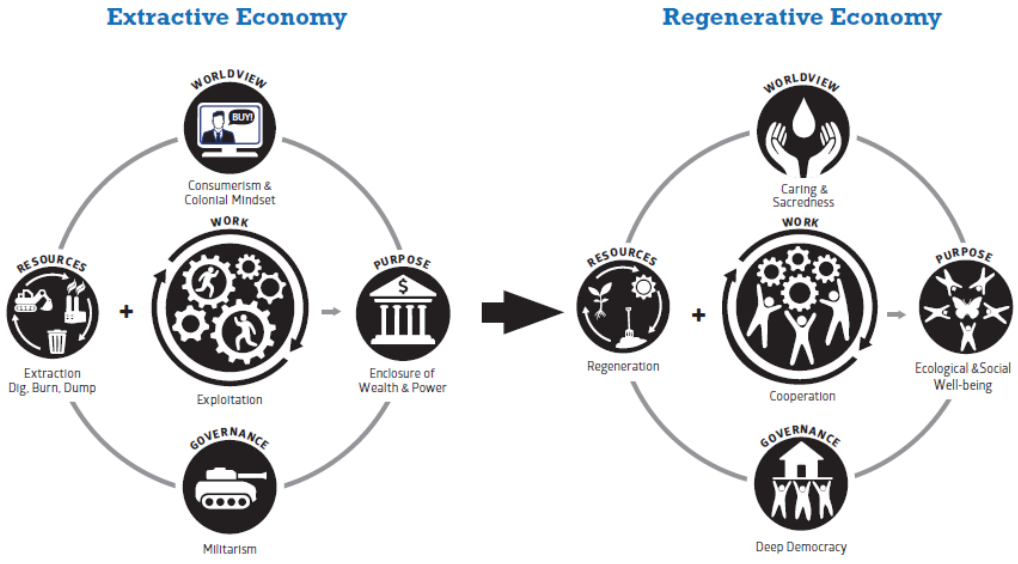


Figure 2.2.1 The objective of a just transition (Source: Climate Justice Alliance, 2018).

A closer look on the left and right diagrams on Figure 2.2.1 and comparing the equivalent location of circles reveals the following key concepts:

- *Resources:* The left diagram indicates the extraction of the natural earth resources and dumping into the atmosphere and the earth constantly. The equivalent circle on the left indicates an ecosystem where the earth is allowed to regenerate itself by creating a harmonious system of resource usage.
- *Exploitation*: the left circle indicates the current system of working in silos and the lack of sharing of wealth. The equivalent circle on the right indicates the common sharing of wealth and resources.
- *Purpose*: the exploitation circle leads to the purpose circle where wealth and power is reserve for a few. The equivalent circle on the right demonstrates the sharing of wealth and the attainment of good well-being for both the environment and the people that live in it.

All the objectives outlined above aim to paint the image of a just transition as one that protects the environment while maintaining shared wealth and the general well-being of everyone involved.

The first research question in this study seeks to establish how aware employees are of the urgency for a transition to cleaner, lower-carbon energy sources. Winkler (2020) suggests the concept of hegemony as a means to create awareness and a sense of urgency towards the energy transition. Hegemony can be defined as attaining power through persuasion, rather than by force or conflict. This infers that to further its economic success, the parties in power cannot do so by force; they must instead use intellect and motivation to form allies with the less powerful parties to move forward with them. In establishing the perspectives of employees on the climate change crisis, this study will seek to understand the level of hegemony currently being applied during the transition.

The concept of hegemony as of influencing a positive drive towards the energy transition is demonstrated in the study conducted by Cock (2019) on the resistance to the expansion of coal mines in South Africa. Cock (2019) shares how the notion of climate change is oftentimes viewed as a non-African concept. Cock (2019) further quotes an utterance from a NUM (National Union of Mineworkers) official that “climate change is a northern notion” that only applies to developed countries. Cock (2019) seeks to suggest a transformative way of shifting the current view of coal mining as a source of energy and employment, but rather as a driver of inequality and damage to the environment. This study on the coal industry then highlights the key role of stakeholders in the energy transition in influencing the perceptions of those

they represent of the transition. The stakeholders in this case are the labour unions that represent the interests of the workers at the mines.

There is plenty more literature on just transitions that demonstrates the negative view of employees and communities towards the energy transition. Healy and Barry (2017) discuss the political view of just transitions. They indicate that the perceptions of the negative socio-economic impacts associated with these transitions may impede support towards policies advocating for an energy transition.

Healy and Barry (2017) further assert that it is difficult to not view these transitions as having winners and losers, caused by the power imbalance between the industries transitioning and the communities that may be affected by the transition.

Cha (2020) conducted a study on the sudden closure of coal mines in the Powder River Basin in Wyoming in the USA. This study indicated how the closure of these mines was deeply opposed in this region, even with the justification of climate change as the driver. Cha (2020) also takes note that the major reason for this was due to the longstanding attachment to the economic role that coal had played in the region.

Olson-Hazboun (2018) conducted a study on individuals living in fossil-fuel-dependent communities in the US Colorado to establish their perceptions towards renewable energy and the low-carbon transition. The study found that individuals generally had negative views towards the development of renewable energy. The main driver for this view was the perception that renewable energy was a threat to the local economy and did not align with local identity.

Steiner (2020) conducted a study to establish whether individuals that work in carbon intensive industries and those that live in flooding-prone areas are more or less skeptical about the existence of climate change. The major findings were that the dominant view towards climate change was that of scepticism driven by the fear that climate action would increase unemployment. In essence, this is a recognition of carbon-based industries being crucial to economic success, hence influencing scepticism towards climate change.

Wong-Parodi and Feygina (2019) investigated the psychological processes that result in climate change denial. They found that among others, believing in climate change did not have much to do with the facts or the information or proof available on it; they found that it was related to issues like social identity and self-affirmation. For social identity, the assertion is that

individuals will tend to believe what others in their social class believe and will tend to want to fit within that group by aligning their views with the group. For the self-affirmation reason, Wong-Parodi and Feygina (2019) indicate that individuals will tend to be more in denial if accepting climate change causes them to question their way of life and their contribution to climate change. For example, mention is made of individuals using fossil fuel cars getting into denial as a form of self-defence against their being perceived as contributing to climate change.

In South Africa, there has been some work done indicating the active impact of climate change. Pinto et al. (2022) conducted an analysis of the floods that occurred in South Eastern South Africa in 2022. Amongst the findings was that climate change was a major contributor to the floods, resulting in the existing infrastructure being incapable of contending with this change. Pinto et al. (2022) further mention how, following prior flooding events in 2019, the City of Durban developed the “Durban Climate Action plan 2019” to put strategies and modifications in place to mitigate against future flooding events.

Chikosi Mugambiwa, Tirivangasi and Rankoana (2019) conducted a study on the perception of climate change in rural Limpopo where subsistence farming is prevalent. The study found that climate change was perceived as prevalent based on observed changes in temperature, reduced crop production and changes in water quality. In summary, this means that the perception of climate change, in this case, was not shaped by information from outside sources but by the personal experiences of the participants.

The studies by Pinto et al. (2022) and Chikosi et al. (2019) serve to indicate evidence of climate change in the South African context.

In summary, all these studies indicate the various factors that influence climate change acceptance or denial. There is a predominantly negative view of energy transition in many regions in which it has occurred. Huxham et al. (2019) and Montmasson-Clair (2021) highlight the benefits of the energy transition as being the creation of economic and employment opportunities and improvement in the physical health of communities from reduced environmental emissions.

Literature, therefore, suggests the existence of opposing views on the climate change crisis.

This study sought to establish the prevailing views on the necessity of the energy transition in the oil and gas industry in South Africa relative to the discussed opposing views in other areas transitioning to cleaner energy forms.

2.3 Job implications and skills transfer prospects for employees during the energy transition

Principles three and four of the seven just transition principles by Atteridge and Strambo (2020) highlight the need to support workers and communities affected by the transition from carbon-based industries that they depend on for employment.

Montmasson-Clair (2021) highlights the disruptive nature of an energy transition. It is expected that an energy transition in South Africa may have a little negative impact on large corporations and high-income communities. The greatest impact will be on lower-skilled workers and low-income communities.

On the other hand, Cock (2019) details the plans for Eskom to reduce the number of power stations in South Africa, and how this transition has not made any plans for the workers affected by these closures. As such, there have been numerous protest actions, with workers placing the blame on their labour unions for not fighting for them during the process.

Wang and Lo (2021) investigated the impacts of transitions from carbon-intensive industries in various regions. They highlighted how in some instances, employees in these industries struggled to find employment and were forced to relocate to different regions, in the process compromising their culture and social identity.

Burke, Best and Jotzo (2019) conducted a study on the closure of coal-fired power stations in Australia. Their key finding also highlighted the negative impacts of the transition where the unemployment rates increased by 0.7% in the affected regions. However, the study also noted that the negative impact typically did not last beyond 10 years as the economy eventually transitioned.

Pai (2021) indicates that the requirements for a just transition may vary from region to region. Future work opportunities need to be properly assessed as there is a likelihood that renewable energy jobs are not suitable replacements for fossil fuel-based jobs.

This leads to the study conducted by Winkler (2020) on the utilization of hegemony to enable an energy transition. Winkler (2020) identifies various change agents ‘actors’ required in the

hegemony relationship towards a just transition. Winkler (2020) defines change agents as social actors that initiate a change. These could be from politics, non-governmental organisations, businesses or government. Given that the term just transition originated from the action of labour unions, Winkler (2020) further emphasizes how key the role of labour unions would be in the energy transition process.

Hess, McKane and Belletto (2021) support the importance of change actors as key in facilitating a just transition process. In their study, they highlight that instead of just the government and labour unions leading the transition, non-governmental organizations can play a huge role in the energy transition. This is as evidenced in the Appalachia region referenced in the study where civil society organisations played a huge role in ensuring a just energy transition.

Krawchenko and Gordon (2022) conducted a study on just transitions in oil and gas regions in New Zealand, Scotland, and Denmark. In New Zealand, they found the main driver of the transition was trade unions, whose main intention was to ensure workers were re-trained and re-skilled during the transition. In Scotland, a coalition of labour unions and environmental non-governmental organizations (NGO's) formed a Just Transition Commission that developed a list of principles that needed to be upheld during the transition. These included equipping people with the required skills to gain value from the transition as well as empowering communities to remain economically stable during the transition.

In June 2022 in the UK, strike action took place outside Manchester Piccadilly station where environmental activists and railway staff campaigned against the state and railway bosses over the cost of living and efficiencies in the public transport system (Atkins, 2023). Atkins viewed this strike action as a symbol of solidarity between labour unions and environmental activists, which could be a positive direction in the climate change debate. Atkins (2023) further outlines that the role of workers has generally been overlooked in climate change discussions and that this example indicates how such coalitions will be critical in ensuring just energy transitions.

Gazmararian (2022) conducted a study on the best ways to provide assistance to workers during energy transitions. They found that in their study that there was a salary sensitivity towards new careers outside of the fossil fuel industry and the best way to bring credibility to the transition would be by generating well-paying employment opportunities.

This might not be an easy task as Saha (2020) asserts that it is an illusion to believe that clean energy jobs will be able to employ most workers displaced from fossil fuel jobs. Saha (2020) proposes that policy makers take cognizance of the skills discrepancies and geographical locations when making plans for job creation or replacements for fossil fuel workers.

On a positive note, however, Ju, Sugiyama, Kato, Oshiro and Wang (2022) found that for Japan, job creation from cleaner energy will increase from 2030 as job losses from fossil fuel industries become superseded by new jobs from the cleaner energy landscape.

2.4 Communication and assistance offered during energy transitions

Principles six and seven of the seven just transition principles by Atteridge and Strambo (2020) highlight the need for an inclusive and transparent process to enable a just transition. In a study conducted on the transition for the coal industry, Grubert (2020) indicates that for a just transition to be effective, the planning process must be participatory and government supported. It must emphasise willingness to transition to a cleaner, lower carbon energy economy. This willingness links to the first research question on the awareness of employees on the urgent need for the transition in the first place. This awareness can be brought about through communication and facilitated participation in the transition through government or/and the various change agents highlighted in section 2.3.

This awareness combined with the communication and assistance throughout the transition would enable a smoother execution of the second research question on adapting and reskilling towards a cleaner energy economy.

In South Africa, a just transition from fossil fuel to cleaner energy will require approximately USD250bn over the next 30 years (Presidential Climate Commission, 2022). The PCC further outlines that the Paris Agreement caters for funding to be attained by developing countries from developed countries. As a result, there is a USD8.5bn partnership being developed between South Africa, the United States, and several European countries to support a Just Transition.

In Italy, Rugiero (2019), outlines that a just transition was achieved by having a strong system of industrial relations in which labour unions played a pivotal role to negotiate solutions to ensure workers are well taken care of during the transition.

As much as some positive transitions have been reported, there are still different schools of thought. Swilling (2020), in their book on sustainability in a complex world, is of the opinion

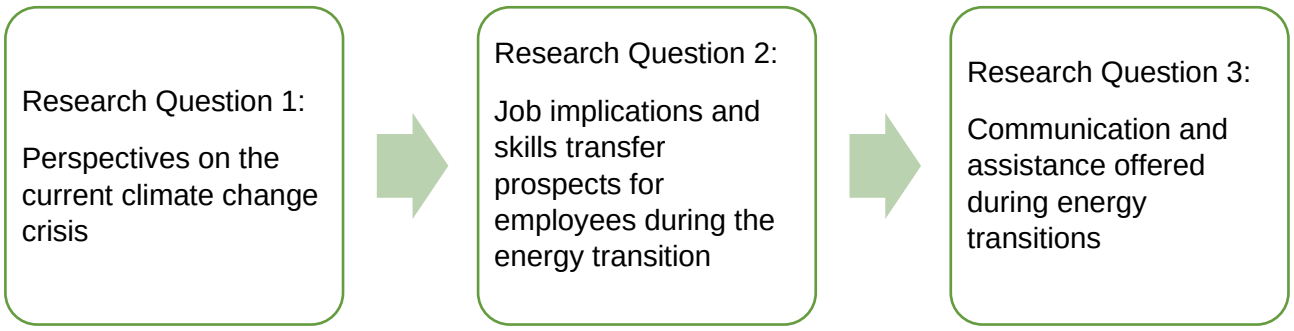
that achieving a just transition unlikely. This is because decisions are made in a way as to "serve the elites" while letting poverty continue. These sentiments are very similar to those made by Routledge et al. (2018) that such agreements as the Paris Agreement are perceived as designed to serve the most powerful states first at the expense of the developing countries.

In Germany, the energy transition has also not been smooth. Labour movements that play an important role in the transition have been in conflict with policymakers over their failure to guarantee assistance to affected employees and communities during the transition (Kalt, 2021).

In the City of Chicago in the United States, a fair transition in action can be perceived as being according to Saha (2020). In this city, robust milestones and a time frame for the realization of the low-carbon transition have been well laid out and communicated. To assist fossil fuel workers, the city has pledged to invest only in low-carbon companies that hire employees that have been displaced from fossil fuel energy jobs.

2.5 Conclusion

The literature review has attempted to analyse the existing literature on the three research questions about energy transition in fossil fuel-based industries.



The outcome indicates the criticality of various change agents facilitating the transition and supported by the government. The literature also outlines the predominantly negative perspectives around energy transitions; the resulting theme does not seem to suggest this reluctance is largely due to individuals and communities not buying into the climate change problem but rather due to the perceived potential negative impacts on their livelihoods.

Chapter 3 : Research Questions

3.1 Introduction

After reviewing the literature, three research questions were formulated. The main aim of these questions was to establish the implications of the energy transition for employees in the oil and gas industry. They seek to explore the different elements that encompass these implications. From literature, these emanated to be linked to perspectives about climate change in general, the employment impacts of such transitions and the communication and buy-in strategies employed during the transitions. The three research questions that needed to be answered are outlined in the following section.

3.2 Research Questions

Research Question 1: What are the perspectives of employees on the current climate change crisis? Do they understand the urgent need for the transition?

The aim of this research question was to establish how aware employees are of the urgency for a transition to cleaner, lower-carbon energy sources. This would give insight into how they respond to the strategies their organizations employ to transition, where applicable.

Research Question 2: What are the job implications and skills transfer prospects for the employee throughout this transition?

The aim of this research question was to establish how employees perceive they will be impacted by the transition. The questions were structured to gain insights into the skills they possess and how they view these to be relevant in the near future as the energy industry transition out of the current methods and technologies of producing energy from fossil fuel sources.

Research Question 3: How have employees been communicated with and offered assistance by their employees during the transition process?

The aim of this research question was to establish whether the participants' organizations have given any communication about the energy transition, how it will affect their employment, and what assistance is being offered to ensure job security during the process. The questions were structured to gain insights into the skills they possess and how they view these to be relevant in the near future as the energy industry transition out of the current methods and technologies of producing energy from fossil fuel sources.

Chapter 4 : Proposed Research Methodology and Design

4.1 Introduction

This chapter will outline the research methodology and design that was used to answer the three research questions. A qualitative approach was used to establish the implications of the transition to cleaner energy for employees in the South African Oil and Gas industry. Data was collected through semi-structured interviews. The data was then analysed and interpreted in line with the research themes established in the literature review. Cognisance was taken of the reliability of the data collected; this was mitigated accordingly during the data gathering planning process. The limitations of the study were also identified.

4.2 Proposed Research Methodology

4.2.1 Research Philosophy

The philosophy followed in this research was epistemology. Epistemology is an approach that focuses on what is known to be acceptable knowledge in a particular field of study (Saunders, Lewis and Thornhill, 2007). The type of epistemology that was adopted was interpretivism. Interpretivism can be defined as an approach that seeks to establish differences between human beings as pertaining to their roles in society (Saunders et al., 2007). Interpretivism was chosen as opposed to positivism as the purpose of this research study was not to establish relationships between phenomena or variables (Saunders et al., 2007), but to gather insights that can be used to make sense of the world. The further strand of interpretivism followed in this research study was phenomenology. Phenomenology is specifically concerned with how human beings interpret the world around them (Saunders et al., 2007). This was deemed suitable for this research study as the intent was to establish how employees are currently viewing the happenings around them. The aim was not to compare their views with any other pre-determined views but to gather insights into how they are experiencing the ongoing energy transition.

4.2.2 Research Strategy

The strategy followed in this study was that of a case study. Saunders et al. (2007) define a case study as an investigation of a phenomenon in its real-life context. The energy transition in South Africa is currently happening in real-time and potentially affecting the employees in the affected industries. This makes a case study an ideal strategy to utilize.

4.2.3 Research Design

The case study strategy is typically used in research that is either explanatory or exploratory (Saunders et al., 2007). The research design for this study was exploratory. Exploratory research can be explained as research that aims to attain new insights by asking questions that have not been asked before (Saunders and Lewis, 2018). This type of research reviews topics in a new light. The energy transition is occurring for the first time at such a radical scale in the history of the oil and gas industry in South Africa. Therefore, the questions in this research study are fairly new from a South African context and the perspective of employees in the industry.

4.2.4 Research Approach

This research study was undertaken using the inductive approach. This is the approach where data is collected to develop a theory and is most common with research that follows the interpretivism route (Saunders et al., 2007). It puts particular focus on the context within which events are occurring and as such offers flexibility in the interpretation of these events. This approach was chosen rather than the deductive approach to avoid rigidity in the research process and allow a more organic development of insights.

For this study, the aim was to establish the specific implications of the energy transition on employees in the specific South African context, therefore care was taken to not pre-empt what these employees' experiences are supposed to be.

4.2.5 Population

A population can be defined as a group of individuals who possess a common and binding characteristic (Explorable, 2009). Defining the target population is essential to ensuring that the sources identified for data collection will be suitable for the study.

The population in this study was defined as employees in the oil and gas industry in South Africa. The population in this study was not limited to a specific company or geographical location as the participants envisaged for the study were employees in the industry in general and were located in various geographical areas in the country. The individuals in the population were employees that have worked in the industry for at least five years or whose careers can be deemed as having grown in the industry.

4.2.6 Unit of analysis

The unit of analysis can be defined as the parameter being investigated (Discoverphds, 2020). The type of unit is derived from the data analysis that will be performed during the study. The unit of analysis to be used in this research study was the perspectives of employees as per the responses received for the three research questions.

4.2.7 Sampling method and size

This research study made use of non-probability purposive sampling as the data-gathering method. Purposive sampling can be defined as a way of sampling where the researcher uses their judgement in selecting the cases that constitute the sample (Saunders et al., 2007). The type of non-probability purposive sampling used further was heterogeneous sampling.

Heterogeneous sampling allows a researcher to collect data and establish the key themes that are observable from the data. For this study, heterogeneity was attained by selecting employees with different skill levels and different skill sets within the industry. The aim was to establish if there were any differences in the experiences of employees with different skills within the industry.

The data was gathered via semi-structured interviews. Semi-structured interviews provide the researcher with the opportunity to probe deeply for answers and allow the interviews to keep building on their responses (Saunders et al., 2007). The interviews were conducted via

Zoom, Microsoft Teams, or Google Meet. An interview guide was shared with the Interviewees before the interview. The interview guide contained a consent form, and a confidentiality agreement to be discussed and accepted by the interviewee before the meeting. The interviews were then recorded by the interviewer for review.

Saunders et al. (2007), indicate that the use of a case study may necessitate the utilization of multiple sources of data to enable triangulation of data. Triangulation is the use of multiple data sources to confirm the consistency of data (Saunders et al., 2007), e.g. semi-structured interviews combined with questionnaires. As much as this research was using the mono method for data collection, it still had ambitions of attaining triangulation. This was to be achieved by the selection of a diverse skillset of interviewees in the industry. Insights from the different skills groups would help establish how differently they are experiencing the transition. For example, if triangulation were not attained, this would give insights into the varying effect of the transition on different skill groups.

The study targeted to interview a minimum of 12 participants in the industry. An attempt was made to vary the skillset to 4 of each of 1) Qualified Engineers (mechanical, chemical, electrical, etc.) as per access, 2) Production technicians and 3) non-technical skill participants (e.g. finance and human resources). As best as possible, and as per available access, the study attempted to vary the management level of the participants.

4.2.8 Measurement Instrument

The measurement instrument was semi-structured interviews. Semi-structured interviews allow a more in-depth discussion and attainment of information. They are also likely to lead to other discussion areas not previously thought of but that provide valuable insight into the research study (Saunders et al., 2007).

An interview guide was utilized to guide the interview. The interview guide was developed to seek answers to all three research questions.

4.2.9 Analysis approach

The data collected in this study was qualitative data. Qualitative data is best analysed by first grouping it into categories that can be analysed in a more meaningful manner (Saunders et al., 2007). From the structured interviews, the data was converted to text first to enable the analysis process. The data was thereafter separated into categories. These categories were considered as codes that would be used to group the data (Saunders et al., 2007). Atlas.ti was thereafter used to conduct a more critical analysis of the data that had been converted to codes. The software was used to establish common themes in the codes and the frequencies in which they appear in the grouped data.

4.2.10 Quality controls

An interview guide was used to ensure that data collected by this study remained within the scope of the research questions. This guided the research such that the interviewees remained on course during the semi-structured interview processes.

4.2.11 Limitations

This study only focused on oil and gas industry employees in South Africa. The employees selected were within the skills groups specified; the results are not generalized to employees in other skill groups in the industry. The reason for this is that some skills are more easily transferable to other industries than others. As a result, different employees within the same industry may have different views on the impact of the transition on their specific trade. As indicated in the literature review, there are other industries besides oil and gas currently undergoing an energy transition. Therefore, as much as the results of this study may indicate themes common to those industries, this study will not seek to proclaim that the results are completely representative of those industries as well.

4.2.12 Conclusion

The research method discussed was considered to be suitable for answering the three research questions developed in this research study. A qualitative approach was adopted; the various paths of this approach were identified and defined. The method of data collection and consequent analysis were also been described. At this point, the study was therefore deemed ready for the data collection phase.

Chapter 5 : Results

5.1 Introduction

Semi-structured interviews were used as the data-gathering tool for this research. Each interview was recorded and audio files were saved electronically on the researcher's computer and on Google Drive. The first step in the data analysis was therefore transcription of all the interviews. According to Saunders et al. (2019), transcribing can be defined as reproducing the interview as a written file using the actual words used during the interview.

After all the interviews were transcribed, the process followed to analyse the data was Thematic Analysis. Saunders et al. (2019) describe Thematic Analysis as a qualitative analysis method in which the researcher searches for themes that occur across a data set. The researcher does this by coding their data to identify themes that can be used for further analysis. This process involves the following steps: 1) Familiarization with data, 2) Coding of data, 3) Searching for themes and recognizing relationships and 4) Developing and testing theories. This chapter will focus on steps 1 to 3. These are described further below.

5.2 Data Analysis Approach

5.2.1 Familiarization with data

The first activity to enable familiarization with the data was the transcribing process described above. Following the transcription, the data was classified into categories. This is a process proposed by Saunders et al. (2007) as a useful approach to commence data analysis. The researcher first created three categories based on the three research questions as a starting point for the data analysis process. The three research questions were 1) understanding perspectives on climate change, 2) perspectives on job security and skills transfer and lastly, 3) communication and assistance offered during the transition. Following this, a review of each transcript was done to get better familiarization with the data arising out of the interviews. The next step was a manual categorization of all themes arising out of the interview into the three identified categories. This method was found to be useful in getting better acquainted with the information gathered. This step is similar to the unitizing of data discussed in the next section.

5.2.2 Coding of data

Saunders et al. (2019) describe coding as a means of labelling units of data within a document with a code that describes the meaning of that section. The purpose of coding is to enable easy access to data of interest for further analysis. For this project, Atlas.ti software was used for fragmenting the data and coding it for further analysis. The categories derived from the research questions were used as a baseline for the researcher to work from.

The codes were generated from the data gathered. However, the code generation was done by using the research questions as a guide. Saunders et al. (2019) discuss that for an inductive data approach, the researcher generates the codes from the data collected during the analysis process. For a deductive approach, the codes are pre-generated from literature. The approach used in this project can therefore be described as a combination of both an inductive and a deductive approach. The research questions for this project were generated following a literature review; these were used as the starting point to guide the code generation. Thereafter, the codes were generated per interview based on the information collected.

Saunders et al. (2019) outline that there are three main sources of codes. These are actual words or terms used by participants, labels developed from the data, and lastly, codes derived from theory or literature. This is demonstrated in Figure 5.2.1. The codes generated in this project were derived from a combination of these sources; they largely stemmed from the interviews and a few from the theoretical framework that the research questions are derived. The list of codes generated are shown in the code data book in Appendix 5. The main themes will be shared in following sections on the data presentation.

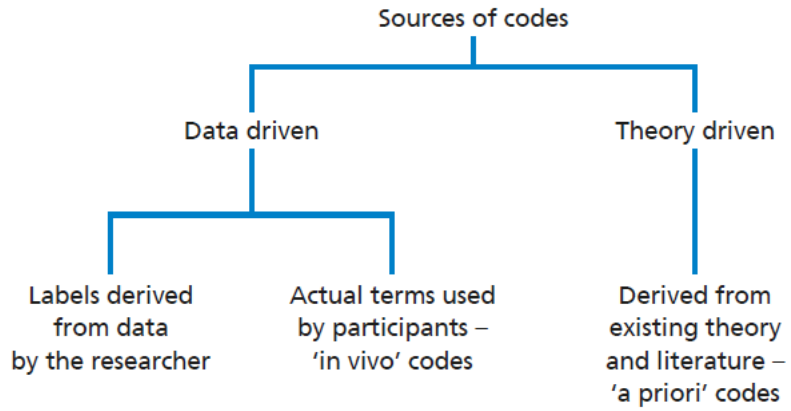


Figure 5.2.1 Sources of Codes (Saunders et al., 2019)

5.2.3 Searching for themes and recognizing relationships

Saunders et al. (2019) describe this stage as that following the coding process. Data analysis occurs throughout the stages outlined above; however, the official data analysis process begins once all the data has been fully coded. This stage entails searching for patterns and relationships amongst the codes that have been generated in order to develop a shorter list of themes from the codes.

For this project, approximately 65 codes were generated from which the various themes were deduced.

5.3 Description of the sample

The purpose of this research study was to establish the implications of the transition to cleaner energy for employees in the South African Oil and Gas industry. The targeted participants for the study were hence employees that work in this industry. In Atlas.ti, the interview transcripts were sorted into five groups indicating the background or organization level of the employees where possible. The aim of this segregation was to further distil any differences in the themes arising from individuals with different skillsets or management levels in the industry. This segregation is indicated on Table 5.3.1.

Table 5.3.1 Description of Sample

Sample Groups on Atlas.ti	Total
Engineers- Junior	1
Engineers- middle management	6
Higher management	2
Skilled workers- Maintenance	2
Skilled workers- technicians	2
Total	13

Table 5.3.1 indicates the diversity of the sample group.

All the participants interviewed work in the oil and gas industry. The following are some of the quotes from the participants to indicate meeting the sample criteria of being part of the energy transition in the oil and gas industry.

"*Our company has more of an integrated plan with regards to decarbonisation.. they have started this journey in 2017 where they derived a sort of roadmap to get to a certain greenhouse gas reduction target by 2050…the target that they looking at is at least 3% reduction that is looking at a whole lot of different project that concerns looking at the type of assets that we have and how it is we can change the existing infrastructure. The second part of this is looking at post-2030 which is looking at complete net zero by 2050 carbon target*." (AC)

"*My organisation was moving towards that from a regulatory drive… in South Africa it is called cleaner fuels, so that was enforcing a level of cleanliness to make sure fuels are much cleaner but not necessarily into greener energy*." (MM)

"*I am a communications specialist for which is a joint venture between Shell and BP South Africa.*" (PJ)

"…*from the time I arrived there's been a movement from high sulphur machines to low sulphur fuels where before we used to have 500 ppm diesel and now we have gone down to less than 250 ppm. Even before the whole shutdown of refineries happened, they had bought installations to try and reduce the carbon emissions*." (TK)

"*I am an associate consultant in Johannesburg, so I work with any topic that has to do with strategy and operational excellence in various industries like oil and gas as well*." (US)

"*I know we are planning to move to diesel 10ppm soon, or that is something that is still in the pipeline for the company, especially for the mine industries that we service, and it is via importing. We are also more focussed on energy saving rather than moving into renewable energy*" (WT)

From these quotations, it is evident that the interview participants work in the oil and gas industry, and most in organizations that have energy transition in progress. It can therefore be concluded that the participants were in the right position to share their insights and perspectives on the energy transition.

5.3.1 Evidence of data saturation

Saunders et al. (2019) and Creswell 5th Edition (2018) discuss the concept of theoretical saturation as conducting data sampling until such a point that no new data or new insights are revealed. Creswell 5th Edition (2018) asserts this is an indication that the sampled data is adequate. For this project, the researcher tracked the number of new codes and themes generated per interview. Data saturation was reached by the 13th interview.

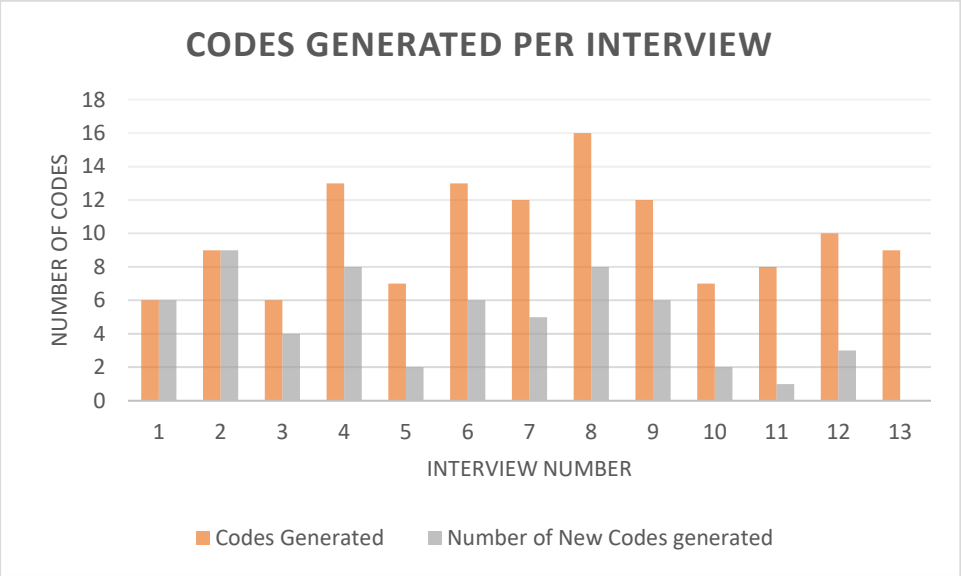


Figure 5.3.1 Evidence of data saturation

Figure 5.3.1 indicates that the number of new codes generated started declining by the 9th interview, with zero codes generated by the 13th interview.

5.4 Presentation of Findings

5.4.1 Baseline Question: How is the organization moving towards cleaner and greener energy in its operations?

The first part of the interview was dedicated to establishing the background of the participants and the organization they work for. The aim was to understand whether the organization was currently undertaking any activities to transition away from fossil fuel-based energy to more renewable energy strategies. This information was important to determine the direction of the interview. The reason for this was that some interview questions might not be applicable to participants that upfront shared that their company does not have any plans in place to undergo an energy transition. The results of this screening process are presented in Figure 5.4.1 below.

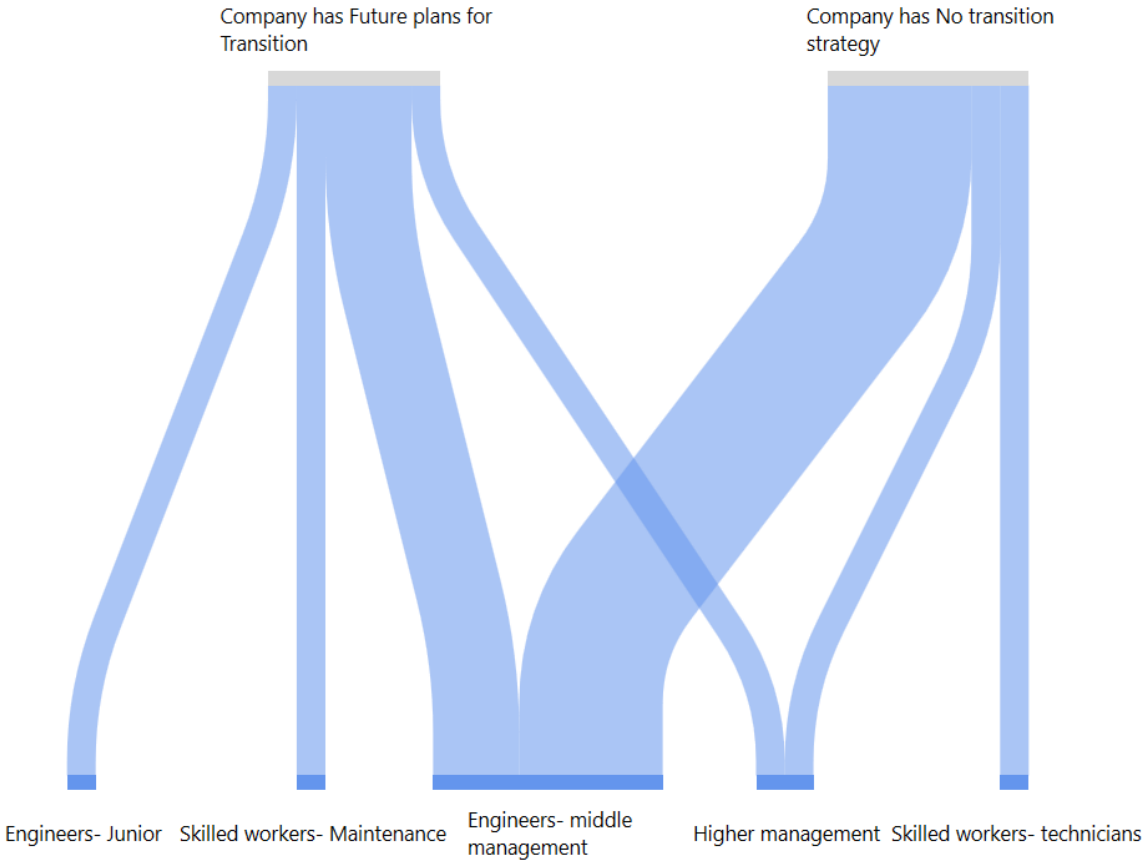


Figure 5.4.1 is what is called Sankey diagram. This type of diagram indicates flow whereby the width of arrows or lines is proportional to the rate of flow. The width of each line is proportional to the quantity flowing through it. Therefore, the wider the line, the greater the

quantity flowing through it (Li, 2022). From Figure 5.4.1, it can be seen that there is a tendency towards the view that the company does not have an energy transition strategy, although a significant amount of participants believe their company has an energy transition strategy. The majority of the sample was engineers at the middle management level. The majority of these and a few other participants perceived their organizations to be having no transition strategy at the time of the interviews. However, as it will be revealed in subsequent sections, the energy transition has a strong and direct impact on their organizations and their career paths, irrespective of the level of preparation of their organization has for the transition.

5.5 Results for Research Question 1

Research Question 1: What are the perspectives of employees on the current climate change crisis? Do they understand the urgent need for the transition?

The aim of this research question was to establish how aware employees are of the urgency for a transition to cleaner, lower-carbon energy sources. This would give insight into how they respond to the strategies their organizations employ to transition, where applicable.

5.5.1 Question 1a: Understanding of the need for the energy transition

This first sub-question sought to establish how the participants viewed the impact of the transition on their employment prospects would be in the next 5 to 10 years. The responses to this question were categorized into positive and negative prospects to better discern the general theme towards this impact. The results are shown on Table 5.5.1. The columns on the left indicate codes generated from the responses of the participants, while the rows above indicate the responses as per participant categories.

Table 5.5.1 Understanding of the Energy Transition

	Engineers-Junior	**Engineers-middle management**	**Higher management**	**Skilled workers-Maintenance**	**Skilled workers-technicians**	**Totals**
Changing weather patterns	1	3	1	0	1	6
Climate change impact	0	0	1	1	0	2
Destroying the ozone layer	1	1	0	0	0	2
Durban Floods	0	2	0	0	1	3
Environmental pollution	0	0	1	1	1	3
Fossil Fuels have a negative impact on environment	0	2	0	1	0	3
Global warming	1	1	0	0	1	3
Sustainable environment	0	1	0	1	1	3
Totals	**3**	**10**	**3**	**4**	**5**	**25**

Table 5.5.1 indicates that all the participants had an understanding of the reason behind the ongoing energy transition and the contribution of the oil and gas industry. The most dominant

concepts that arose were changing weather patterns being evidence of a climate change crisis. There was strong mention of the April 2022 Durban floods as a sobering testament to the urgent need for climate action.

The prevailing theme arising out of this research sub-question is summarized on Table 5.5.2.

Table 5.5.2 Thematic analysis for awareness of Energy Transition

Categories	Theme(s)
○ Fossil Fuel industry impact ○ Environmental pollution	Transition necessary to reduce climate change caused by oil and gas industry
○ Changing weather patterns ○ Global warming	

The theme shown on Table 5.5.2 was deduced after analysing the responses to the first research question that pointed to was an acceptance of the occurrence of climate change and the contribution of the oil and gas industry.

5.5.2 Question 1b: Closure of crude oil refineries

Following the recent closures of some crude oil refineries in South Africa, this question sought to understand how the participants interpreted this phenomenon and how it pertains to the potential loss of employment opportunities in the country. The results are shown on Table 5.5.3.

Table 5.5.3 Perspectives on fossil fuel refinery closure

	Capitalism	Carbon Tax	Poor Profitability of oil refineries	Refining margins	Totals
Engineers- Junior	0	1	0	0	**1**
Engineers- middle management	1	0	1	2	**4**
Higher management	1	1	1	0	**3**
Skilled workers- Maintenance	1	0	0	1	**2**
Skilled workers- technicians	2	0	0	0	**2**
Totals	**5**	**2**	**2**	**3**	**12**

Table 5.5.3 indicates that the majority of respondents cited the closure of crude oil refineries as stemming from poor profits, and hence capitalism, instead of climate action or as a means to reduce carbon emissions. A few quotations to demonstrate this are as follows:

"*They are capitalists, so I think the main reason is because of the companies not making profit and not because they want to transition to cleaner and greener energy forms*." (BD)

"*I think it does have to do with the government pushing to move to cleaner and greener energy unit, but at the same time I think it's an opportunity for shareholders to get their profits from imports.*" (TK)

The prevailing theme arising out of this research sub-question are summarized on Table 5.5.4.

Table 5.5.4 Thematic analysis for Oil Refinery Closure

Categories	Theme(s)
Capitalism Profitability of oil refineries	Transition is profitability driven
Carbon Tax	

5.5.3 Question 1c: South Africa's Climate Change Action

Having established the participants' understanding of the climate change crisis, the aim of this question was to establish the views of the participants toward South Africa's climate action. This question was key in establishing the awareness levels of the energy transition not just within the participants' organizations but in South Africa as a whole. The reason for this links to the interconnectivity between private organizations and the government. The results are shown Figure 5.5.1.

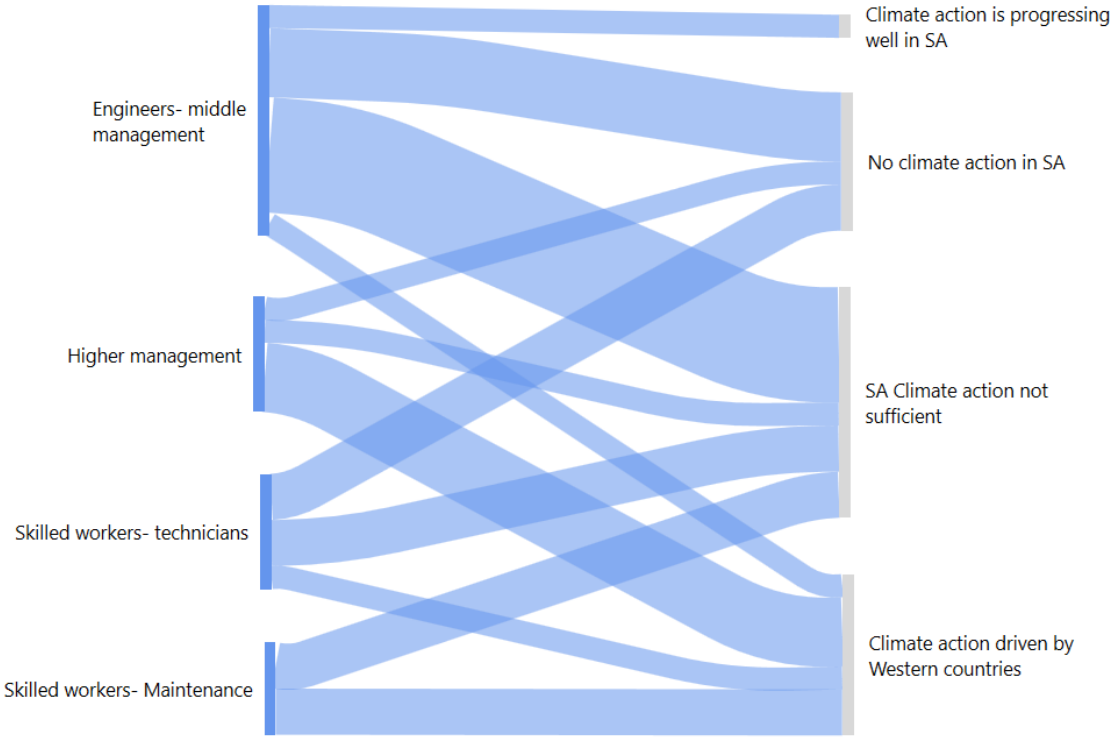


Figure 5.5.1 Perspectives on South Africa's Climate Change Action

Figure 5.5.1 indicates that a substantial number of participants believe that South Africa's climate change efforts are not sufficient. A great number of participants also viewed climate change action as a concept pre-mature for a devaluing country like South Africa and that it is

being imposed on the country by Western countries. A few quotations to demonstrate this are as follows:

"*For me, I do not think South Africa is doing enough, it's been very clear from a political perspective there has been a clear plan guideline for us to reach, what it is that needs to change with regards to pollution or emission levels, but we have not seen any direct investment from our government or any drastic change that requires investment and consistency*." (AC)

"*My view is that South Africa is not ready for it, and they are not doing anything*" (BD)

The prevailing theme arising out of this research is summarized on Table 5.5.5.

Table 5.5.5 Thematic analysis for awareness on South Africa's climate action

Categories	Theme(s)
○ Developed countries subsidised ○ Funding for fossil fuels declining ○ International Agenda	South Africa's climate change action is insufficient and premature
○ South Africa not ready for transition as a developing country ○ Lack of industrial policy	

A number of participants are of the view that climate action is Western concept that South Africa is not well prepared for. This is demonstrated via the following quotations:

"So the reason why Europe and The U.SA are ahead is because they are highly subsidised by the government and in South Africa that policy is not there yet, so that is why you will see work for the government because the government is generating a lot of tax from fuel." (JS)

"*I also think that they are driven by the international agenda on whatever they are doing for example the collapsing of power station which is using coal and the very same coal is needed in Europe." (BD)*

There were also a few participants whose view was that South Africa is making some strides towards climate change, either via supporting private organizations or through industrial policy and legislation enabling the advancement of renewable energy production. This is demonstrated in the quotation below.

"*There is vibrations in the private sector and again it does link to the providers of capital and the relative is of securing capital from a government point of view for greener technology effort brought the government into play as well you can energy generation through Eskom, the solar systems, so there is momentum building*. " (MM)

5.5.4 Conclusion to Research Question 1

All the codes and themes generated for the first research question can be summarized in the network diagram shown on Figure 5.5.2.

The diagram give a visual depiction of all the codes that were eventually distilled to establish the themes discussed.

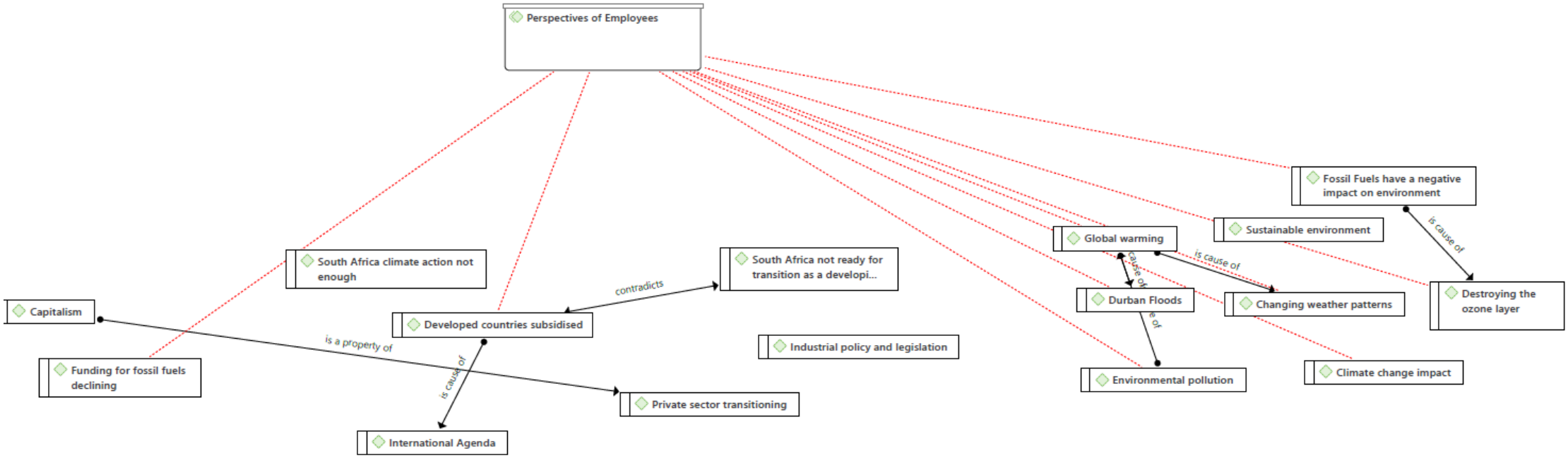


Figure 5.5.2 Network Diagram for Research Question 1

5.6 Results for Research Question 2

Research Question 2: What are the job implications and skills transfer prospects for the employee throughout this transition?

The aim of this research question was to establish how employees perceive they will be impacted by the transition. The questions were structured to gain insights into the skills they possess and how they view these to be relevant in the near future as the energy industry transition out of the current methods and technologies of producing energy from fossil fuel sources.

5.6.1 Question 2a: Impact of the energy transition on employment prospects

This first sub-question sought to establish how the participants viewed the impact of the transition o their employment prospect would be in the next 5 to 10 years. The responses to this question were categorized into positive and negative prospects to better discern the general theme towards this impact. The results are shown on Figure 5.6.1.

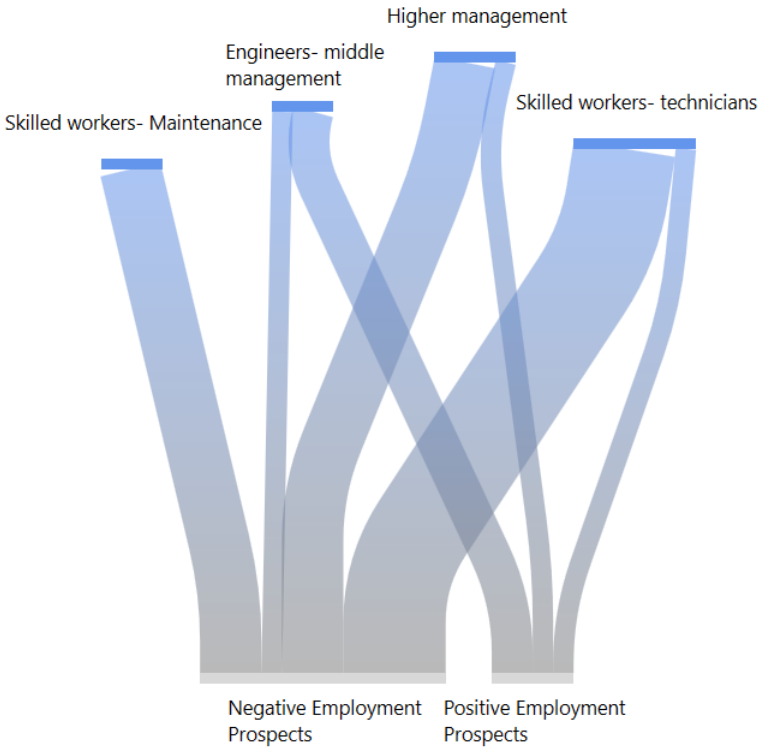


Figure 5.6.1 Future Employment prospects

Figure 5.6.1 indicates that the majority of the participants believe that there will be reduced job security in the future throughout this transition. There were two dominant themes arising from this pessimistic view; these were linked to the ongoing closure of fossil fuel refineries across the country and the high unemployment rate in South Africa leading to the view that even if the fossil fuel jobs can be replaced with renewable energy jobs, there is a scarcity of jobs to start with and if the employees are not already skilled in those jobs, job opportunities are not guaranteed. The first theme is evidenced by the two quotations below.

"*Due to the lack of direction on this transition, the only thing I have observed is that it's collapsing employment, I do not see myself working in the next five years*." (BD)

"*I think there are little opportunities for me because more and more people are in this industry and with the refineries closing more people will be going to storage facilities. So, a person looking for a job due to the shutdown of refineries, is not going to be easy because the industry is saturated with people looking for jobs due to company shutdowns*. "(TK)

The second theme centered on the high unemployment rate in the country and the fears that the transition will increase unemployment. This is demonstrated in the following three quotations.

"*Yes, the skill I have is good, it covers a wider scope; the only challenge is the rate of unemployment in the country*." (BD)

"*From what I have seen, I think in the next five years we will not have future employment,"* (MMS)

"*For me, the priority is to fix the country because we have unemployment issues and it is one of the highest in the world*," (JS)

The prevailing theme arising out of this research are summarized on Table 5.6.1.

Table 5.6.1 Thematic analysis for employment prospects resulting from Energy Transition

○ **Categories**	**Theme(s)**
○ Employment prospects negative for female technicians ○ High unemployment rate in South Africa ○ Opportunities only exist outside of South Africa	Poor future employment prospects
○ Opportunities exist in New green technology ○ Skills transfer easy for engineers	Positive future employment prospects

5.6.2 Question 2b: How transferable are the current skills in transferable are your current skills into the cleaner/renewable energy space? What employment opportunities exist outside of your province or country?

The purpose of this sub-question was to establish how the participants viewed their skills would remain relevant during the transition and what opportunities they believe exist for them in other geographical locations.

The responses were grouped into three categories: the first category was responses indicating that skills would be easily transferrable into the clean energy space; the second category was for responses indicating that skills were not transferable; the third category was for responses indicating that skills would be only transferable with upskilling.

Table 5.6.2 Skills transfer prospects during the energy transfer

	Skills not easily transferable for line workers Gr=2	**Skills transfer easy for engineers** Gr=7	**Upskilling required** Gr=4	**Totals**
Engineers- Junior	0	0	0	0
Engineers- middle management	1	6	4	11
Higher management	0	0	0	0
Skilled workers- Maintenance	0	0	0	0
Skilled workers- technicians	1	0	0	1
Totals	**2**	**6**	**4**	**12**

Table 5.6.2 indicates that the majority of the respondents viewed their skills to be easily transferable into the cleaner and greener energy space. Additionally, these respondents added that upskilling may be required to adapt to new technologies. This is evidenced by some of the responses quoted as follows:

"*I think my skills are transferrable far worse for me because am in the maintenance space where equipment is an equipment. There is also some learning but is limited. I do not think it is a challenge, but one might have to upskill a bit*. "(MM)

"For the *skills transfer I think as process engineers we will need to learn new skills, but it will not be that hard, but I think for some areas they will need to be extreme training*." (MMS)

"*I think for my role specifically, it will be transferable, and, in our industry, there are certain people that may not be able to transfer especially for people that are at line level. For example, if we stop dealing with petrol that means we are not going to need drivers*." (WT)

"*Moving from one type of energy to a different type of energy does not change the fact that you a chemical engineer or an electrical engineer because it is still the same, but I think there is massive consequences when we do not plan, and we do not foresee those big changes happening and it is directly going to affect a group of skills*." (AC)

The second part of this sub question was to establish the participants' perspectives on the availability of opportunities in other parts of the country, or possibly abroad. The aim was to establish the willingness to relocate and the general feeling around this kind of disruption to their lives. The results are shown on Table 5.6.3.

Table 5.6.3 Perspectives on relocation opportunities during the energy transition

	Relocation abroad possible Gr=1	**Relocation difficult because of tribalism for artisans** Gr=1	**Willing to relocate** Gr=2	**Totals**
Engineers- Junior	0	0	0	0
Engineers- middle management	1	0	2	3
Higher management	0	0	0	0
Skilled workers- Maintenance	0	1	0	1
Skilled workers- technicians	0	0	0	0
Totals	**1**	**1**	**2**	**4**

Table 5.6.3 indicates that while some respondents are willing to relocate, they acknowledge there might be challenges arising from the cultural diversity of South Africa and, at times, the gender preferences of overseas recruiters. This is deduced from the following quotations:

"*Remember South Africa is driven by a lot of politics, ethnic groups and a lot of tribalism as well, Richards Bay is another growing area but the people from there have said that, if you are not from this area then you will not have employment so now it becomes difficult*" (MMS)

" *I do think about that, now am not sure about South Africa but maybe outside South Africa, and I am a female and a lot of refineries are hiring are males*. " (TK)

The prevailing themes arising out of this research are summarized on Table 5.6.4.

Table 5.6.4 Thematic analysis for skills transferability during the Energy Transition

Categories	Theme(s)
○ Upskilling required	○ Skills not easily transferable for line workers
○ Relocation abroad possible ○ Relocation difficult because of tribalism for artisans ○ Opportunities exist in New green technology	○ Skills transfer easy for engineers

5.6.3 Question 2c: Government or other assistance during the transition

For organizations actively going through a transition, this sub-question sought to establish what external assistance was available to the employees to minimize the impact on job security and to ensure the livelihoods of the employees.

The results are shown on Table 5.6.5.

Table 5.6.5 Perspectives on relocation opportunities during the energy transition

	Company offers upskilling	**No government intervention for retrenchments**	**Retrenchments imminent**	**Totals**
	Row-relative	Row-relative	Row-relative	**Row-relative**
Engineers- Junior	0.0%	0.0%	0.0%	**100.0%**
Engineers-middle management	0.0%	0.0%	100.0%	**100.0%**
Higher management	33.3%	33.3%	33.3%	**100.0%**
Skilled workers-Maintenance	0.0%	33.3%	66.7%	**100.0%**
Skilled workers-technicians	0.0%	0.0%	100.0%	**100.0%**
Totals	12.5%	25.0%	62.5%	**100.0%**

Table 5.6.5 indicates that there is little assistance available for organizations undergoing the transition as some are currently retrenching personnel. There is one respondent that indicated that the company was offering upskilling opportunities employees. The following quotations indicate these themes.

"There is nothing that says the government will intervene and employ people." (PJ)

"*So globally for… they give you your package and retrench you and during the last phase of your employment they will help with courses her and there and become more marketable but that's it*" (JS)

" *We are engaging with section 189, one is addressing minimizing the number of people who are being retrenched*." (BD)

The prevailing themes arising out of this research are summarized on Table 5.6.6.

Table 5.6.6 Thematic analysis for assistance during Energy Transition

Categories	**Theme(s)**
○ Retrenchments imminent ○ No government intervention	No assistance provided during the transition
○ Upskilling offered by organization	Organization offers some assistance during the transition

5.6.4 Conclusion to Research Question 2

All the codes and themes generated for the second research question can be summarized in the network diagram shown on Figure 5.6.1.

The prevailing themes were lack of assistance during the transition and mixed views on skills transferability.

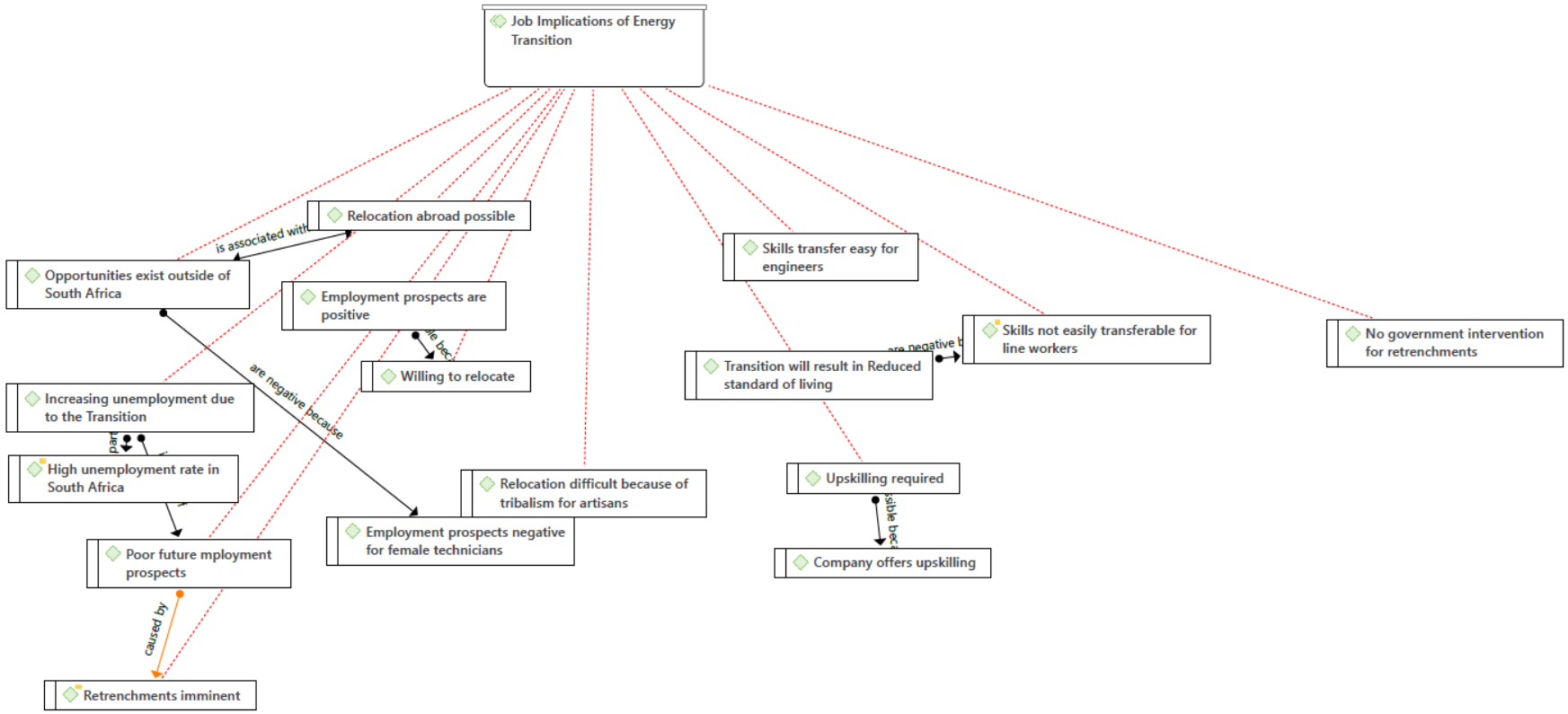


Figure 5.6.1 Network Diagram for Research Question 2

5.7 Results for Research Question 3

Research Question 3: How have employees been communicated with and offered assistance by their employees during the transition process?

The aim of this research question was to establish whether the participants' organizations have given any communication about the energy transition, how it will affect their employment, and what assistance is being offered to ensure job security during the process. The questions were structured to gain insights into the skills they possess and how they view these to be relevant in the near future as the energy industry transition out of the current methods and technologies of producing energy from fossil fuel sources.

5.7.1 Question 3a: What communication has been made regarding the company's transition strategy and the roles of the employees in the transition?

A number of participants shared that their organization had not given any communication whatsoever regarding their transition strategy. On the other hand, a handful of participants shared that their company had strong communication channels about their strategy and what their roles would be during the process.

A few participants shared that their organisations were in the process of retrenchments, leading to that being the only communication shared regarding their transition. The results are summarized on Table 5.7.1.

Table 5.7.1 Company communication on transition strategy

	Good Communication on company strategy Gr=4	**Poor Communication from company about transition** Gr=3	**Retrenchments imminent** Gr=4	**Totals**
Engineers- Junior	1	0	0	**1**
Engineers- middle management	2	0	1	**3**
Higher management	1	1	1	**3**
Skilled workers- Maintenance	0	2	2	4
Skilled workers- technicians	0	1	1	**2**
Totals	**4**	**4**	**5**	**13**

A number of participants indicated poor communication from their organizations about the transition. This is demonstrated by the following quotations:

"*Yes, they communicate well, they are just gathering enough resources to implement the strategy."* (FL)

" *Yes, because I know it is one of our key things we focus on when it comes to our sustainability profile…and our annual report that comes out, I know that there will be a few things about our carbon emissions*" (WT)

In contrast, a number of participants felt that the communication from their organisation was not sufficient. The following quotations demonstrate this.

"*The way that it is communicated and the way that it is done, I feel detached from all of it, I do not know where it is now and where it is going*" (PJ)

"*There is nothing that has been communicated to the workers yet and am not sure whether they are ready for it or keeping the information to themselves.*" (BD)

The prevailing themes arising out of this research are summarized on Table 5.7.2.

Table 5.7.2 Thematic analysis for company communication and assistance on transition strategy

Categories	Theme(s)
○ Poor Planning for transition	Poor communication on transition strategy
○ Company communicated its decarbonization strategy ○ Company has a clear energy transition roadmap ○ Retrenchments imminent	Good communication on transition strategy

5.7.2 Question 3b: What opportunities has the organization created in preparation for the energy transition?

This question is a follow-up from the prior question to establish whether any assistance was being offered by organizations during the transition; this would be to assure job security or minimize the impact of the transition on the livelihoods of the employees. The results are shown on Figure 5.7.1.

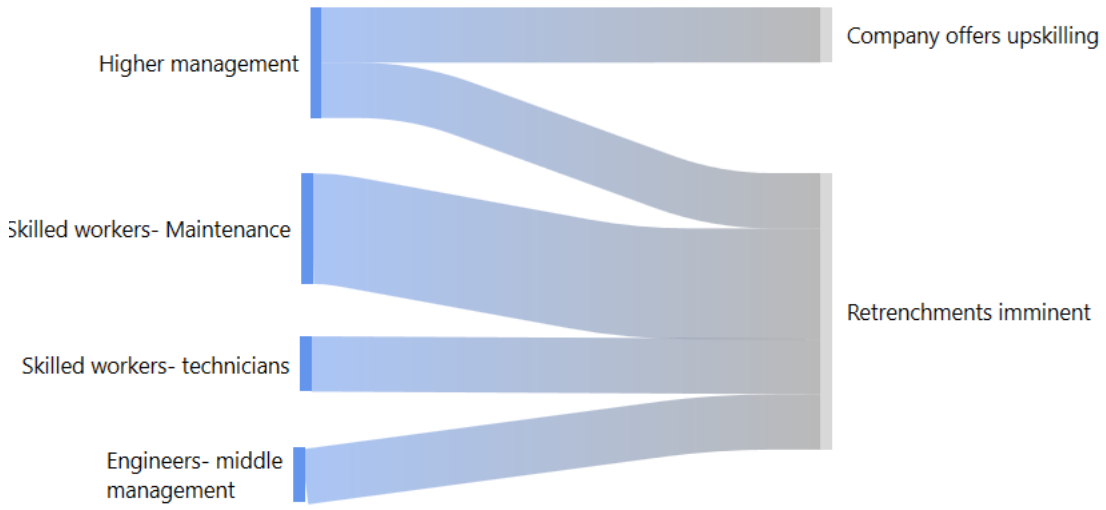


Figure 5.7.1 Company assistance during the transition

Figure 5.7.1 indicates that the majority of the participants shared that their organizations are in the process of retrenching staff in organizations whether crude oil refineries were shutting down. A few respondents shared that their organizations offer upskilling as part of the negotiation process. This is demonstrated by the following quotations:

" *No, but we are engaging with section 189, one is addressing minimizing the number of people who are being retrenched*." (BD)

A few respondents shared that their organization was in the process of integrating team members as part of the transition strategy, indicative of a positive outcome in this regard. An example of this testament is demonstrated below.

"*There was a wider communication for the country where they laid out their plans and even made public statement about their plans, some of these plans do integrate on the unit of the members."* (SM)

5.7.3 Conclusions to Research Question 3

All the codes and themes generated for the first research question can be summarized in the network diagram shown on Figure 5.7.1

The prevailing themes arising out of this section for employees that are affected by the transition was imminent retrenchments and upskilling being offered by the company.

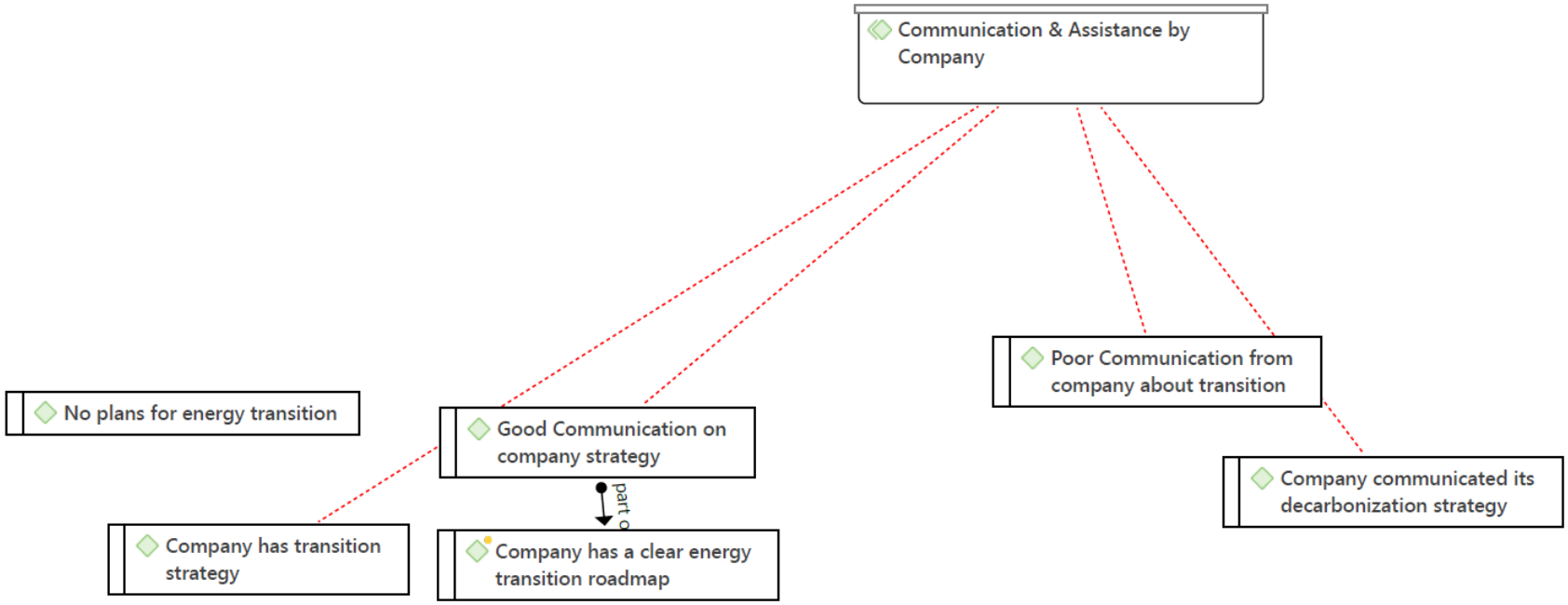


Figure 5.7.1 Network Diagram for Research Question 3

Chapter 6 :Discussion

6.1 Introduction

The analysis of results will be presented per research question and sub-question. Within each sub-question, the findings will be presented according to the themes presented in Chapter 5 for each respective question.

6.2 Discussion of Results for Research Question 1

6.2.1 Question 1a: Understanding of the need for the energy transition

6.2.1.1 Awareness of Climate Change

The first question was to establish the awareness of the participants about the climate change phenomenon and how it links to terms such as decarbonization and green energy. Most participants cited confidence in their understanding of the concept of climate change, the contribution of the oil and gas industry in particular and eventually, the need to transition. A few participants expressed initial denial but converted later. This is discussed in more detail after this section.

Cock (2019), in their study on the resistance to the expansion of coal mines in South Africa, shares how the notion of climate change is oftentimes viewed as a non-African concept. In their study, they quote an utterance from a labour union official that climate change only applies to developed countries, and not a developing nation like South Africa. In this particular study then, the participants did not believe there was climate change occurring in South Africa.

Interestingly, this view seems to be somewhat justified by the findings of Routledge et al. (2018) in their work on Just Transition and climate justice. This study asserted that the agreements signed by the UNFCC for climate action only favoured the states that were more powerful economically and politically such as China and the Unites States.

Steiner (2020) conducted a study to establish whether individuals that work in carbon intensive industries and those that live in flooding-prone areas are more or less sceptical about the existence of climate change. For individuals that work in carbon-intensive industries, the findings were that climate change acceptance or belief was highly dependent on the education levels and the income of the individuals involved. Steiner (2020) further discusses the “fear

of unemployment and destitution" as a potential strong driver of climate change denial. Individuals who had higher education levels and higher income were less fearful about policies to reduce emissions and the increased energy costs associated with such policies. Steiner (2020) makes mention of climate change denial to protect the "current industrial capitalist order" and for the perpetuation of political agenda that favour the economic well-being of that particular society. In essence, this is a recognition of carbon-based industries being crucial to economic success, hence influencing scepticism towards climate change.

Wong-Parodi and Feygina (2020) found that in some communities, people tend to deny the existence of climate change as a means to oppose climate change solutions. Climate change solutions in this case are viewed as having negative economic consequences for these communities, resulting in resistance to climate action.

In summary, this climate change denial is fuelled by the need to prevent the alteration of existing socio-economic institutions that provide job security and stability in these communities.

These findings are similar to those made by Olson-Hazboun (2018) on individuals living in fossil-fuel dependent communities in the US Colorado. The study sought to establish perceptions towards renewable energy and the low carbon transition. The outcome was that the individuals had negative views towards renewable energy developments as they viewed these to be a threat to the local economy and the identity of the region. Findings indicate that representatives overall had negative views of renewable energy development, driven mainly by the perceived threat to the existing local economy.

6.2.1.2 Conclusive findings

All the participants interviewed displayed awareness of the need for climate action and how it influences the environment.

At the same time, it is interesting to note that some of the same participants that expressed understanding and acceptance of climate change viewed climate action in South Africa as being driven mostly by industrial capitalism, i.e., the need for big companies to make profits. As an example, many participants viewed the closure of carbon intensive plants in South Africa as not related to climate change but rather caused by declining profitability. As a result, the oil majors choose to shut down to save costs for themselves rather than shutting down to decarbonize.

The participants in this study were grouped according to different levels in the organization. The participants in the middle to higher management category were considered to be more educated and more experienced in the industry. The participants in the skilled workers

category were considered to be trained artisans. While all the participants expressed acceptance of climate change, the driver of the change in their organization and in South Africa in general was not consistently accepted as reasonable or necessary. This is discussed further in 6.2.1.2 below.

The findings were therefore partly in contrast to existing literature with regards to the acceptance and understanding of climate change, wherein the literature reviewed displayed mostly denial of climate change. The similarities to the literature, however, lie in the negative views on the transitioning away from fossil fuel to renewable energy, especially in communities whose economic stability is currently anchored by fossil fuel-based industries.

6.2.1.3 Acceptance of Climate Change- April 2022 Durban Floods

Besides general climate change acknowledgement, at least 80% of the participants interviewed mentioned the April 2022 Durban floods as a sure indication of the existence of climate change.

A few of the participants even mentioned how they used to be in denial about its existence, but the prevalence of changing weather conditions and the Durban floods caused them to change their view.

It is apparent that having experienced the impacts of climate change first hand had the effect of increasing the belief of participants in the concept of climate change.

Pinto et al. (2022) conducted an analysis of the floods that occurred in South Eastern South Africa in 2022. Amongst the findings was that climate change was a major contributor to the floods, resulting in the existing infrastructure being incapable of contending with this change. Pinto et al. (2022) further mention how, following prior flooding events in 2019, the City of Durban developed the “Durban Climate Action plan 2019” to put strategies and modification in place to mitigate against future flooding events.

Similar flooding events were recorded in Germany and parts of Europe in 2021. According to Dagsupta (2021), these events were regarded as strong warnings of the occurrence of climate change and urgent need for climate action.

Wong-Parodi and Feygina (2020) investigated the psychological processes that result in climate change denial. They found that among others, believing in climate change did not have much to do with the facts or the information or proof available on it; they found that it was related to issues like social identity and self-affirmation. For social identity, the assertion is that individuals will tend to believe what others in their social class believe and will tend to want to

fit within that group by aligning their views with the group. For the self-affirmation reason, Wong-Parodi and Feygina (2020) indicate that individuals will tend to be more in denial if accepting climate change causes them to question their way of life and their contribution to climate change. For example, mention is made of individuals using fossil fuel cars getting into denial as a form of self-defence against their being perceived as contributing to climate change.

Steiner (2020) studied whether individuals in flood affected areas tended to have stronger beliefs in the existence of climate change than those who did not. Surprisingly, the findings were again that acceptance or denial was not related to the probability of being affected by the changing weather but was based on how response to climate change will impact their livelihoods.

Chikosi et al. (2019) conducted a study on the perception of climate change in rural Limpopo where subsistence farming is prevalent. The study found that climate change was perceived as prevalent based on observed changes in temperature, reduced crop production and changes in water quality. In summary, this means that the perception on climate change in this case was shaped by information from outside sources but from the personal experiences of the participants.

6.2.1.4 Conclusive findings

All the participants interviewed have a strong awareness and belief in the existence of climate change. As a result, there was recurring mention of the April 2022 Durban floods as strong evidence of climate change. This is in line with the findings of Pinto et al. (2022) that climate change played a role in contributing to this change in weather, further supported by the call by the city of Durban to implement a climate change action plan in 2019.

Some of the participants outlined earlier denial about the existence of climate change but, on witnessing the Durban floods and other extreme weather events recently, this changed their view towards accepting that it exists.

It can be argued that this is in slight contrast to the findings made by Steiner (2020) that being in a climate change affected zone does not influence acceptance or denial of the existence of climate change. However, the participants in this study were speaking from having recently experienced the extreme weather and from being personally affected by it.

This is in line with the findings by Chikosi et al. (2019) that established that the acceptance of climate change can be linked to individuals personally experiencing its impact.

Steiner (2020) outlines that the social and economic impacts of climate action are the dominant factors in influencing belief in climate change. This study will demonstrate in section 6.2.3.3 that it is possible for individuals to accept the existence of climate change and still oppose climate action. This opposition links to the ideals outlined by Steiner (2020), Wong-Parodi and Feygina (2020) and Olson-Hazboun (2018) of the fear of the negative impact of climate action on the economic and social well-being of individuals

6.2.2 Question 1b: Closure of crude oil refineries

6.2.2.1 Poor Refining Margins

In response to the question on the perceptions around the recent closures of crude oil refineries in the country, the majority of participants cited the reason being poor refining margins. Only one participant mentioned that it was part of the international parent company's strategy to decarbonize.

A majority of participants were mildly emotive in their expression of the oil majors being only interested in profits and, with refineries becoming less profitable, they decided to shut them down.

A number of participants further shared that their view was that shareholders ``were capitalists", who are only interested in profits.

It is also notable that the participants in higher levels of management did not only have the view of profitability as the only driver but were of the view that it was part of the bigger company strategy to reduce greenhouse gas emissions.

Green et al. (2022) conducted a study on the economic implications of the energy transition in the oil and gas industry. They established that organizations in the oil and gas industry are under pressure to comply with stricter environmental standards, while at the same time facing pressure in the market towards the adoption of electric vehicles and other technologies that will significantly reduce the demand for oil and gas. This work by Green et al. (2022) served to highlight the unique pressures that oil and gas firms face that may influence their decisions on whether or not to stay in the oil and gas business.

6.2.2.2 Conclusive findings

Most participants expressed their views on the recent refinery closures as a result of poor profitability rather than as a form of climate action. This is somewhat corroborated by Green et al. (2022), who attempt to paint the picture from the point of view of the oil majors. These

are subjected to increasing pressures to comply with various legislation, while at the same time facing the pressure of imminent irrelevance of their core products of oil and gas. These two points of view serve to paint a balanced picture of the predicament faced by both the oil majors and the employees in this industry.

6.2.3 Question 1c: South Africa's Climate Change Action

6.2.3.1 South Africa's Climate Action inadequate

The views on South Africa's efforts to combat climate change were largely mixed. Others believe they have not seen enough investment into transitioning, while other views are that there seems to be foreign funding but with no clarity as to how these funds are being spent. Others mentioned they have noted changes in industrial policy and legislation favouring transitions.

At the same time, legislation like carbon tax have been cited by several participants as a deterrent towards a just transition. They cite that as a result of carbon tax, some companies have decided to shut down refineries due to declining margins, with carbon tax and other penalties towards transition a huge contributor to this.

A number of participants also cited that climate change action in South Africa is driven by Western or developed countries rather than by ourselves, leaving South Africa at the mercy of whatever the richer countries decide.

In reviewing the just transition principles outlined by Atteridge and Strambo (2020), the second principle speaks to enabling ongoing investment to enable this transition in a manner that avoids having losers.

In South Africa, a just transition from fossil fuel to cleaner energy will require approximately USD250bn over the next 30 years (Presidential Climate Commission, 2022). The PCC further outlines that the Paris Agreement caters for funding to be attained by developing countries from developed countries. As a result, there is a USD8.5bn partnership being developed between South Africa, the United States and a number of European countries to support a Just Transition.

Routledge et al. (2018) studied the strategy followed by Germany in its energy transition. This strategy entailed reversal of the privatization of energy supply. The study, however, outlined how this process has not been smooth and has led to a lot of dissatisfaction amongst the general population on the inefficiency of the new de-privatized energy supply.

Bhushan et al. (2020) wrote of the just transition strategies employed in the coal industry in India. They outlined the diversification to different forms of energy such as solar and wind energy as part of the major principles to the Indian transition.

6.2.3.2 Conclusive findings

Ongoing investment is necessary to avoid having losers during the transition. The South African presidency, via assertion by the PCC, has advised that funding is being secured via the provision of the Paris Agreement to enable a just transition. Studies on transitions in Germany and India allude to the facilitation of the transition via the introduction of new renewable energy sources and the enabling legislative allowances thereof.

In South Africa, this research has revealed that the participants are aware of changes in legislation to favour the introduction of renewable via independent producers in the private sector. This seems to be in line with how these transitions are being carried out in other parts of the world.

6.2.3.3 South Africa Not Ready for Transition

A number of the participants outline that as a developing country faced with high levels of unemployment and ongoing challenges with the existing power supply, South Africa is not ready for the transition

In their work on Just Transition and Climate Justice, Routledge et al. (2018) asserted that the agreements signed by the UNFCC only favoured the states that were more powerful economically and politically such as China and the United States. At the same time, they also assert that during the climate negotiations like the Conference of Parties (COP), the history of colonialism and neoliberalism creates a nature of distrust between the developed states and the less developed or developing states.

6.2.3.4 Conclusive findings

Other participants view climate action as a process South Africa is not ready for. This notion is supported by the observations of Routledge et al. (2018) in that the developed and more powerful countries tend to make the rules, with the less developed countries like South Africa, being left to follow whatever they are told.

At the same time, the existence of the climate change financing via the Paris Agreement offers some reprieve and some hope that there is genuine willingness for all countries to work together to combat climate change.

6.2.3.5 COVID-19 Impact

One of the themes that came out of this research question was the impact of COVID19 on the industry. A few participants were of the view that since the pandemic, they have noted a greater sense of urgency to transition in the industry, with several oil majors announcing divestment in the refining industry after the pandemic.

Griffiths et al. (2022), in their study on the decarbonising of the oil refining industry noted how the pandemic cast a spotlight on vulnerabilities in energy supply and the injustices arising out of transition away from oil refining. Additionally, Griffiths et al. further outline how the nature of the refining industry is characterized by low profit margins that are highly sensitive to unpredictable oil prices.

6.2.3.6 Conclusive findings

The findings are consistent with literature in that the COVID19 pandemic played a large role in altering energy supply and security, and hence expedited the reduction in oil and gas demand.

6.3 Discussion of Results for Research Question 2

6.3.1 Question 2a: Impact of the energy transition on employment prospects

On the impact on employment prospects as a result of the transition, the predominant theme was that these will be negative to the greater population as a result of the high unemployment rate in South Africa. The themes are shown on Figure 5.6.1.

All the participants in the middle management category, with the majority of an engineering background, were of the view that their employment prospects were positive as there were new opportunities in the emerging renewable technologies.

Wang and Lo (2021) investigated the impacts of transitions from carbon-intensive industries in various regions. They found that employees struggled to find employment within the regions they lived in and were forced to seek employment in other regions. Therefore, employment prospects for these employees were negative in these regions.

Burke et al. (2019) conducted a study on the closure of coal-fired power stations in Australia. Their key finding also highlighted the negative impacts of the transition where the

unemployment rates increased by 0.7% in the affected regions. However, the study also noted that the negative impact typically did not last beyond 10 years as the economy eventually transitioned.

Ju et al. (2022) conducted a study on the energy transition in Japan and the projected impacts to job creation. They found that in Japan, there would be an increase in job creation from 2030. These jobs would arise from the manufacturing and construction of renewable energy infrastructure and are predicted to exceed those lost from the cessation of carbon intensive jobs. The study, however, also notes that this job creation will cease again from 2050 after net carbon zero has been achieved. This study therefore insinuates that up until 2030, there is a strong possibility of job losses while the development of renewable technologies is gathering more momentum.

6.3.1.1 Conclusive findings

In economies where an energy transition has occurred, it has been indicated that unemployment initially increased but recovered within 10 years.

Given the extremely high unemployment rate in South Africa, a few participants even advised that they did not envision themselves with employment in the next 5 to 10 years. This view is consistent with the findings of Burke et al. (2019) that there will not be any significant job creation leading up to 2030. Therefore, there is a general view that unemployment is likely to increase leading up to 2030.

6.3.2 Question 2b: How transferable are the current skills in transferable are your current skills into the cleaner/renewable energy space? What employment opportunities exist outside of your province or country?

6.3.2.1 Transferability of Skills

The results on the question on whether participants viewed their skills as transferable into the renewable or cleaner energy era revealed two opposing themes. The first theme was a view of the skills being easily transferable. This view was mainly from the participants that are of an engineering background. However, the majority of the participants also mentioned that they may need some upskilling to understand the new technologies, but they did not view this as a significant task that would be a barrier to obtaining employment in those fields prior training.

Some participants whose training is in operations or maintenance expressed that their skills are transferable to some extent but would require significant re-skilling to find employment in South Africa. There was a strong view that the requirement for the skills they have has shrunk significantly, and, as much as they can transfer these skills to other technologies and combine with re-skilling, the chances of finding employment were very slim.

Another theme that accompanied this pessimistic view was that moving to other industries within South Africa, i.e., outside of oil and gas, would come with a penalty on remuneration as the oil and gas industry generally has better remuneration that other industries.

Bhushan et al. (2020) conducted a study on the transition away from coal in India. One of the principles they outlined to be in play was the creation of a transition fund to assist workers that were displaced after the closure of coal industries. On top of relocation support, support would be required to facilitate early retirement and re-skilling for younger workers (Banerjee and Agarwal, 2020)

On the other hand, Gazmararian (2022) in their study on transition assistance in energy communities found that there was a salary sensitivity towards new careers outside of the fossil fuel industry. This is because fossil fuel industries pay comparatively higher than the average of the other industries in those communities. This study concludes by suggesting that governments need to be able to generate well-paying employment for workers displaced out of fossil fuel industry jobs to facilitate an equitable transition.

6.3.2.2 Relocation

The last general theme was that there would be a need to relocate to other cities abroad to attain well-paying employment.

However, there was a view that relocating abroad would be a challenge for females as other fossil fuel industries, especially in the middle east, only employ males.

Wang and Lo (2021) in their study on the just transition concept, highlighted how in some instances, employees in fossil fuel industries often struggle to find employment within the geographical locations they live in, when their plants shut down. They tend to be forced to relocate to different regions, in the process compromising their culture and social identity.

6.3.2.3 Conclusive findings

The results indicate that the energy transition is envisioned to result in loss of employment opportunities within the geographical location of the fossil fuel industries. Most participants

were of the view that plenty employment opportunities exist outside of the province they were based. The result of the transition with regards to job changes will therefore be twofold. Firstly, there will be the need to relocate to other locations to find new employment. This is consistent with the findings of Wang and Lo (2021) and Bhushan et al. (2020).

Secondly, employment in non-fossil fuel industries will negatively affect the salaries of employees as the fossil fuel industries tend to remunerate better than other industries. This also then agrees with the findings by Gazmararian (2022) on the implications of transitioning out of fossil fuel industries.

The results in this study on relocation opportunities are therefore consistent with literature.

With regards to females having to relocate abroad for fossil fuel employment, there was no literature on the challenges associated with this issue. This is therefore a gap in the literature.

6.3.3 Question 2c: Government or other assistance during the transition

This question was to establish if any assistance was being offered by either the government or labour unions during the transition.

The dominant themes on the question on whether any assistance was being offered by either the government or labour unions revealed two opposing themes. The first theme was that retrenchments were imminent with hardly any assistance from either the organization, the government nor labour unions on how to stay in employment. These participants outlined that there was that any assistance offered was only as required by legislation during the retrenchment process.

The second theme was that the organization itself was aiding employees with upskilling during the transition. This upskilling, however, was to assist them find employment elsewhere after they are retrenched.

On the just transition principles outlined by Atteridge and Strambo (2020), the fourth principle outlines that an equitable transition needs to support workers and their affected communities. The transition ought to not worsen existing economic and social inequalities.

Krawchenko and Gordon (2022) conducted a study on just transitions in oil and gas regions in New Zealand, Scotland, and Denmark.

In New Zealand, they found that trade unions were an active driver of equitable transition by ensuring the workers remained empowered through re- training and reskilling.

In Scotland, a coalition of labour unions and environmental non-governmental organizations (NGO's) formed a Just Transition Commission that developed a list of principles to the government that needed to be upheld during the transition. These included equipping people with the required skills to gain value from the transition as well as empowering communities to remain economically stable during the transition.

In Denmark, the main oil and gas region of Esbjerg transitioned into wind energy and other forms of renewable energy. The transition was therefore managed to maintain jobs in this region by skills transfer to the new technologies.

These studies correlate to the findings by Gazmararian (2022) that in order for transitions to occur equitably, there needs to be policies put in place to support workers, like for example income compensation or healthcare assistance.

Winkler (2020) suggests the concept of hegemony as a means to create co-operation between the organizations in power, labour unions, the government and employees during a just transition process.

In June 2022, strike action took place outside Manchester Piccadilly station where environmental activists and railway staff campaigned against the state and railway bosses over cost of living and efficiencies in the public transport system (Atkins, 2023). Atkins viewed this strike action as a symbol of solidarity between labour unions and environmental activists, which could be a positive direction in the climate change debate. Atkins further outlines that the role of workers has generally been overlooked in climate change discussions and that this example indicates how such coalitions will be critical in ensuring just energy transitions.

6.3.3.1 Conclusive findings

For participants in companies planning retrenchments for the transition, the stakeholders cited by the participants were the government and the organization themselves. The government was cited in terms of the legal requirements for companies to undergo mass retrenchments in South Africa. The view was that any assistance that was being offered to them during the transition other than that legislated by the government for undertaking mass retrenchments.

These findings therefore support the work by Atkins (2023) on the lack of visibility from the workers themselves on the transition process. Additionally, the concept of hegemony

suggested by Winkler (2020) also did not appear to be visibly felt during the transitions in the organizations the participants work for.

There was no mention of any visible or meaningful role of labour unions nor the workers themselves as partners in the transition.

Other participants, however, advised that their organizations were offering upskilling opportunities during the retrenchment process. These opportunities, however, did not seem purposive and geared toward any particular new employment opportunities but rather left to the individual to figure out what new skills they potentially required and the offered funds to go study or attend their preferred courses.

In conclusion, the results attained are mostly inconsistent with what is deemed best practice in literature on how to ensure equitable energy transitions. As much as some participants shared that their companies offer upskilling during the transition, they did not express any confidence in the effectiveness of this strategy as it was left to them to establish what skills they required to remain marketable.

6.4 Results for Research Question 3

6.4.1 Question 3a: What communication has been made regarding the company's transition strategy and the roles of the employees in the transition?

The results on the question on the communication strategy of the company about the transition revealed three main opposing or mixed themes. The first theme was that there were good communication channels throughout the transition from the company. The second theme was that the communication was either very poor or non-existent. The third theme, which was expressed in a mildly emotive and dissatisfactory tone from all participants, was that the only communication received from their companies was that a retrenchment process was going to be initiated.

From the majority of the responses, it is noteworthy that the majority of participants had a negative view of the communication received from their organizations. From reviewing the manner in which this was mentioned, it was evident that these participants were dissatisfied with this process and felt that it was only being followed because it is mandated by the government as a bare minimum.

The participants who viewed the communication as positive mentioned how the communication is clear to the extent of them being aware of their imminent role in the transition and how it affects their team.

On the just transition principles outlined by Atteridge and Strambo (2020), the seventh principle outlines that an equitable transition needs to ensure that the planning process is inclusive and transparent. There needs to be open and clear dialogues amongst all involved.

This is supported by the work done by Bhushan et al. (2020), in their study on the Just Transition framework being applied for the coal industry in India. Thai study established the development of a communication strategy as a means to reach out to all stakeholders involved for updates on the transition as key in ensuring a just transition. They outlined this as a key pillar noted in the Indian Just Transition framework.

6.4.1.1 Conclusive findings

One of the participants who is at senior management level in their organization outlined how their organization's decarbonisation strategy is developed internationally by the parent company and cascaded down to the national level. The participants mentioned how in the company globally, they offer upskilling to employees for which they cannot sustain employment, in order to enable them to attain other employment.

A few other participants mentioned that there was no communication whatsoever with no clarity as to whether they will remain employed or not during the transitions.

Therefore, while there are a significant number of views that their organization's transition is conducted in a just manner comparable to adherence to some of the principles outlined by Atteridge and Strambo (2020), the results indicate that some elements of the transition are not being carried out according to best practice.

Question 3b: What opportunities has the organization created in preparation for the energy transition?

There were two themes arising out of this question on the opportunities and assistance offered to employees during the energy transition. The first theme was that there was no assistance offered by the company, instead only communication about imminent retrenchments of the majority of the staff. The second theme from only a minority of the participants was that the company was offering upskilling during the transition. These themes are as represented on Figure 5.7.1.

Kalt (2021), in their study on the climate change and labour movements in Germany, found that there existed some conflict between climate action and the maintenance of jobs. This conflict arose from the failure to guarantee assistance to affected employees and communities during the transition.

Krawchenko and Gordon (2022), in their study on the just transitions in New Zealand, Scotland and Denmark established assistance to potentially displaced or affected employees as a key pillar employed in transitions in these countries.

A Just Transition in action can be described as that outlined by Saha (2020) on the city of Chicago in the United States. Saha (2020) asserts that a fair transition is being developed in Chicago with robust milestones and a time frame for the realization of the low carbon transition. Additionally, the city has pledged to invest only in low carbon companies that hire employees that have been displaced from fossil fuel energy jobs.

6.4.1.2 Conclusive findings

Given that the majority of participants cited that the organization offered no assistance or new opportunities during the transition, these findings are consistent with some of the literature citing the existence of conflict in regions like Germany where a just transition was not perceived as being applied.

On the other hand, there were participants that were of the view that their organization was putting effort into including them in the transition. This is consistent with the findings from the city of Chicago where the transition is being carefully managed and crafted to re-employ employees that have been displaced from fossil fuel energy employment.

Chapter 7: Conclusion

7.1 Introduction

The aim of this research study was to establish the implications of the energy transition for employees that work in this industry and whose livelihoods are currently sustained by their jobs as oil and gas workers. There were three research questions that were developed to encompass the most potential dominant impacts in the South African context.

Various sources have indicated that increasing global temperatures are detrimental for the sustenance of life on earth, requiring urgent action. As such, South Africa signed the Paris Agreement in 2016 as a commitment to taking action to reduce greenhouse gas emissions (DFFE, 2016).

The energy industry, encompassing oil and gas, accounted for over 73% of the total greenhouse gas emissions in the world in 2016 (Ritchie and Roser, n.d).

Considering this, the first research question was aimed at establishing the perspectives of the participants about the impact the industry they work in has on the environment. The approach to establishing this first focused on what the understanding was on the concept of climate change. This was key as a lot of work has been done on climate acceptance and denial and what influences it. This is demonstrated by the work done by Steiner (2020), Wong-Parodi and Feygina (2020, Olson-Hazboun (2018) in various countries outside of South Africa. Within South Africa, some work has been done by Cock (2019) and Chikosi et al. (2019) that highlights views on the energy transition and climate change respectively.

Transitioning from fossil fuel to cleaner, greener, renewable energy sources is expected to come with socio-economic challenges (Ju et al.,2022). Work done by Cha (2020), Wang and Lo (2021) and Burke et al. (2019), Gazmararian (2022) in various regions around the world where such transitions took place, indicates that these transitions can have a huge impact on employment and livelihoods of employees and the entire communities that rely of the fossil fuel-based industries.

The second research question therefore sought to establish how employees in the South African oil and gas industry are currently being impacted, or predicting they will be impacted by this transition with regards to employment prospects. This is pertinent for a country like South Africa that is already characterized by high unemployment rates and inequality (Francis and Webster, 2019; PCC, 2022)

The South African Presidential Climate Commission has as one of its aims the facilitation of dialogue amongst all the stakeholders and to collectively pave a way forward towards a just

transition. This leads to the third research question that seeks to establish what communication and assistance has been offered to employees during the transition in their organization.

Communication and engagement are cited as one the key principles to achieving a just transition. This is highlighted strongly in work done by Atteridge and Strambo (2020), Bhushan et al. (2020), Saha (2020), Krawchenko and Gordon (2022) and Burke et al. (2019).

7.2 Principal findings

7.2.1 Research Question 1

The first research question was to establish the awareness of the participants about the climate change phenomenon and how it links to terms such as decarbonization and green energy. The question further sought to establish the perception towards climate action in South Africa, both by the organizations the participants work in and in South African in general.

This study indicated that there is knowledge and acceptance of the climate change phenomenon and the contribution of the oil and gas industry. The April 2022 Durban floods and other extreme weather events of the past few years have been a strong contributor to the acceptance of climate change. This is to the extent that even past sceptics' views changed after personally experiencing climate change.

While most literature available on climate change and fossil fuel-based communities indicates acceptance or denial being linked to how climate action will affect the livelihoods of those communities (Steiner,2020; Cock, 2019), this study indicated that climate change is accepted as happening and requiring action, regardless of the impact of climate action to livelihoods.

It must be noted, however, this acceptance is not that straightforward.

The study has indicated a prevailing view that South Africa is not doing enough to combat climate change. There is a strong awareness that the country is set to receive funding to enable a just transition as outlined by the Presidential Climate Commission (PCC, 2022; UNFCCC, 2015). However, the feeling is there is no clarity as to how these funds plan to be utilized. Even with this being the case, this study showed that there is also a strong view that South Africa is not ready for this energy transition, as a developing country with high levels of unemployment and a strong reliance on fossil fuel-based energy. While this view may seem like a defensive effort to minimize impact to the livelihoods of communities during the transition, the provisions of the Paris Agreement seem to make provision for this reality as outlined by the PCC (2022) and the UNFCCC (2015). However, this defence towards South

Africa being a developing country unfairly required to comply with the Paris Agreement is somewhat justified via the study done by Routledge et al. (2018). This study indicated how the countries with the greatest economic and political power, like China and the United States, tended to be favoured in the final decisions on such agreements.

Several crude oil refineries have shut down in South Africa in the past five years. While some sources reveal one cause of this as a means to decarbonize by the organizations involved (Hydrocarbon Processing, 2021), this study has found that the general view from employees in the industry is that this was caused by poor profitability of the refining fleet and the shutdown was a last resort for these oil majors to cut their losses. While the prevailing attitude towards this is that of disappointment and disdain, a lot of studies have found this to indeed be a challenge that a lot of the oil majors face. This is highlighted in the work done by Griffiths et al. (2022) that crude oil refineries typically operate with such low profit margins that efforts to upgrade technology for decarbonization would be limited without external help via industrial or other policy favouring such a transition.

The findings from this research question paint a positive picture for the potential success of the energy transition of South Africa. There is already a good understanding of the need for this transition. This will make it easier to attain buy-in into transition strategies laid out by the government or private entities. Granted, more effort would need to put into ensuring the livelihoods of those involved are not negatively impacted by the transition, as this would negate the acceptable of climate change strategies. The provisions of the Presidential Climate Change Commission and the Just Energy Transition Plan paint a positive picture of how the energy transition is expected to improve livelihoods and generate new opportunities for South Africans.

7.2.2 Research Question 2

The second research question sought to establish what the job implications are for employees potentially affected by this energy transition. The aim was to attain insights as to whether employees felt that their skills were transferable to the potentially new technologies that will be used in the cleaner and renewable energy environment. Furthermore, insights were sought on potential re-employment solutions for employees that might be negatively impacted by the transition.

The findings from this study are that there is a partial view that the cleaner and renewable energy space is going to bring new job opportunities that require newer or different skills to those people that work in oil and gas currently possess. The greatest challenge foreseen to

taking advantage of these new opportunities is that South Africa currently has a very high rate of unemployment sitting as high as 34.5% as of June 2022 (Statistics South Africa, 2022). This places an imbalance in the supply and demand for job opportunities going forward. For skilled trade workers whose expertise is solely oil and gas based, the perception is that the supply of job opportunities going forward is going to fall short of meeting the increased number of skilled workers that will flood the market when some fossil fuel plants shut down.

There is a strong view that employment opportunities may be available in different provinces to where the original plants are located. However, relocation poses fear and uneasiness with regards to quality of life and cultural familiarity. The study by Wang and Lo (2021) conducted on workers displaced to other regions after fossil fuel plant closures have revealed that relocation can be challenging for some employees; this is because the relocation process normally results in them compromising their culture and social identity.

These findings are corroborated by those made by Burke et al. (2019) on the closure of coal-fired power stations in Australia. The study highlighted that there was an initial negative impact at the onset of the transition with increasing unemployment rates. However, the study also mentioned that this impact did not last beyond 10 years as the transition gradually advanced.

Studies on energy transitions all indicate the importance of the involvement of change actors to ensure that the transitions do not yield winners and losers. This is as shown in studies by Atteridge and Strambo (2020), Bhushan et al. (2020), Saha (2020), Krawchenko and Gordon (2022), Burke et al. (2019), Winkler (2020) and Atkins (2023). These change actors are typically environmental groups, trade unions and non-governmental organizations. In the scope of this study, there were no change actors notable in the on-going transition. Instead, the organizations themselves were affecting the changes. However, there was a general view that these changes were only being implemented as part of the legal responsibilities of the companies, as opposed to it being an ethical responsibility.

Another finding from this study was that some organizations were offering upskilling opportunities for employees during the transition. However, the new skills were not deemed to be necessarily relevant to any new opportunities but rather at the discretion of the employees as to what skills they believe they lack. Studies by Saha (2020) in Chicago indicated focused reskilling and re-employment of displaced employees by the city.

The Presidential Climate Commission for South Africa has as one of its principles distributive justice. One of the elements of this is the upskilling of communities to attain employment relevance in the low carbon energy landscape (PCC, 2022). While it is worth noting that the Just Transition framework developed by the presidency is fairly at its infancy in terms of years in operation, there is a perceived gap between the current application in the oil and gas

industry and the commitments made by the commission. In other words, employees being affected by the transition do not feel that there is any provision being made to support them during the transition.

Considering all the above, there is opportunity to close the gap between the views of employees in the industry and the stakeholders responsible for executing the transition. There is a lot of effort and work by both the government and private companies to make the transition as equitable as possible. More effort needs to be put into connecting employees with these opportunities, or better communicating the possibilities that exist in the cleaner and greener energy landscape.

7.2.3 Research Question 3

The aim of the third research question was to establish how employees have been communicated with and offered assistance by their employees during the transition process. This was communication with regards to 1) the organization's transition strategy and 2) the roles and opportunities created for employees during the transition.

This study has found that employees in some organizations perceive their organizations to have a fairly robust transition strategy. This strategy is considered well communicated with a clear roadmap outlining the initiatives to be undertaken. Moreover, there is clarity on the roles of all employees during this transition process. This is in line with the Just Transition principles outlined by Atteridge and Strambo 2020; Bhushan et al. (2020) that cite open communication as important in enabling transparency and alignment during the transition.

Conversely, some employees receive little to no communication whatsoever on the organization’s transition strategy. In some of these cases, the information shared was unclear and inconsistent, resulting in frustration and pessimism about the transition process altogether. This can be enlikened to the transition process followed in Germany in which there was conflict amongst various social actors and the organizations involved arising from the perceived lack of transparency during the transition process (Kalt, 2021).

As demonstrated, both the oil majors and the government have published information about the transition strategy of the country and the importance on making it as equitable as possible. Many employees do not feel included in the transition due to poor communication. This is something that needs to be improved. It is clear that there is intention to transform the South African energy sector to an environmentally friendly and economically resilient sector while creating jobs and protecting livelihoods. More needs to be done to make this visible.

7.3 Overall conclusion on key findings

This study has demonstrated that there is a general acceptance of the existence of a climate change crisis that requires immediate action. The contribution of the oil and gas industry to climate change is also well understood. However, there is reluctance on the readiness of South Africa to undertake the action required to combat climate change. As a developing country with a high unemployment rate, it is perceived that climate action will result in loss of jobs and worsening of the economic situation of many communities dependent on fossil fuel related jobs. Various just transition studies conducted in various parts of the world as discussed in this study indicate that it is possible for this transition to be conducted with minimal negative impacts to the employees and communities involved.

These studies indicate the importance of open social dialogue amongst these key stakeholders- the government, trade unions and environmentalists. The findings from this study have in some instances indicated lack of communication and transparency between the organization and employees,

Lastly, upskilling of employees to maintain relevance in the cleaner and renewable energy landscape has been found to be considered necessary as corroborate by the literature review. The framework developed to encompass a successful Just Transition in the oil and gas industry in South Africa is indicated in Figure 7.3.1 below.

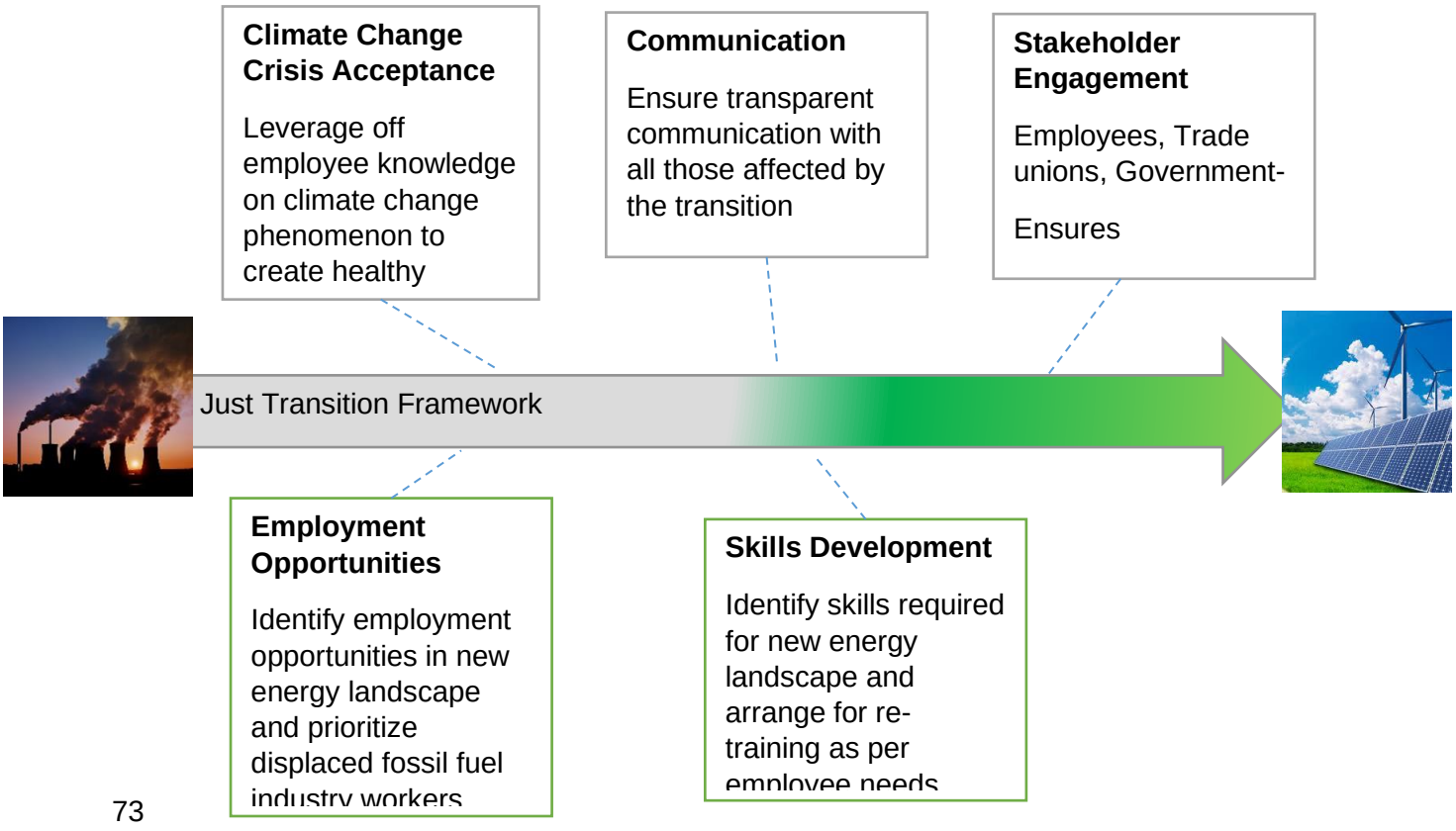


Figure 7.3.1 Framework for a South African Just Transition

Combining literature, this study and the commitments from the South African government and various oil majors on the energy transition, it can be concluded that there is a strong possibility for the attainment of bricolage in the needs of the various stakeholders. The employees and communities want to be included and accommodated in the energy transition; the government and oil majors are formulating transition strategies to ensure that all stakeholders are included. Although it is worth noting that some organizations are considered to be transparent and collaborative in their transitions, the gap this study has found is in the meeting and collaboration of these two sides to collectively craft a path forward.

7.4 Implications for management and other relevant stakeholders

7.4.1 Implications for Management

This study was conducted specifically on employees in the oil and gas industry. As outlined in Chapter 1, a number of oil majors are in the middle of navigating such a transition. The results from this study will be useful for management to gain knowledge on the impact to employees within South Africa (via the research results) and in various countries around the world (via the literature review). Combining the study results and the literature review reveals very common principles that are applicable to ensuring a successful just transition that does not result in winners and losers, but rather a constructive path for all stakeholders involved. It is critical to reiterate that the South African President formed the Presidential Climate Commision that has Just Transition principles as its backbone. These principles are common to those applied in various parts of the world and that have been deemed successful.

7.4.2 Implications for Academics

This study adds to the body of knowledge in Just Transitions from carbon intensive industries to a low carbon economy. The study has reviewed literature covering approximately nine countries including South Africa. The studies in South Africa only cover the coal mining industry. The oil and gas industry contributes approximately 21% to the energy mix of South Africa as opposed to coal that contributes 65% (South African Government, 2021). Therefore this is a valuable contribution to the body of work for the energy industry in general.

7.5 Limitations of the research

As much as the literature review covered in this study was for general transition from carbon intensive industries to lower carbon or cleaner energy industries, it is important to note the scope of this study was the oil and gas industry. Application or inference of the results of this study to other industries, even if related, would need to be done in a manner that recognizes any possible differences in the different industries.

Additionally, this study was conducted on a limited sample. Therefore, the results may not be a complete representation of the implications for all employees in the industry.

7.6 Suggestions for future research

The literature review revealed a lot of work done in South Africa on the development of Just Transition strategies. However, studies on where these principles have been applied, whether successfully or not was limited if available at all. Therefore, it is suggested that future research

seeks to close the gap between the strategies developed and promised by policy makers and the real-life application of these strategies.

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Appendices

Appendix 1: Ethical Clearance

Gordon Institute of Business Science
University of Pretoria

Ethical Clearance Approved

Dear Phakama Ntshwanti,

Please be advised that your application for Ethical Clearance has been approved.
You are therefore allowed to continue collecting your data.
We wish you everything of the best for the rest of the project.

Ethical Clearance Form

Kind Regards

Appendix 2: Consistency Matrix

Research questions	Literature Review	Data Collection Tool	Analysis
Research question 1 What are the perspectives of employees on the current climate change crisis? Do they understand the urgent need for the transition?	Climate Justice Alliance, 2018 Bainton et al., 2021 Winkler, 2020 Cock, 2019 Healy and Barry, 2017 Cha, 2020 Olson-Hazboun, 2018 Steiner, 2020 Wong-Parodi and Feygina, 2019 Pinto et al., 2022 Chikosi et al., 2019 Huxham et al., 2019 Montmasson-Clair, 2021	Semi-structured interview	Thematic analysis Coding and categorization
Research question 2 What are the job implications and skills transfer prospects for the employee throughout this transition?	Atteridge and Strambo, 2020 Montmasson-Clair, 2021 Cock, 2019 Wang and Lo, 2021 Pai, 2021 Winkler, 2020 Hess et al., 2021 Krawchenko and Gordon, 2022 Atkins, 2023 Gazmararian, 2022 Saha, 2020 Ju et al., 2022	Semi-structured interview	Thematic analysis Coding and categorization
Research question 3 How have employees been sensitized and offered assistance by their employees during the transition process?	Atteridge and Strambo (2020) Grubert (2020 Presidential Climate Commission, 2022 Rugiero (2019), Swilling (2020 Routledge et al. (2018) Kalt, 202 Saha (2020	Semi-structured interview	Thematic analysis Coding and categorization

Appendix 3: Interview Questions

	Research Questions		**Interview Questions**
	Baseline Questions	1	What is your role in the organization?
		2	How is your organization moving towards cleaner and greener energy in its operations?
RQ1	What are the perspectives of employees on the current climate change crisis? Do they understand the urgent need for the transition?	1	What do you understand about the concepts and linkages between climate change, decarbonization and greener energy?
		2	What in your view is the reason why oil refineries in South Africa are shutting down?
		3	What steps do you believe South Africa is taking to combat climate change?
RQ2	What are the job implications and skills transfer prospects for the employee throughout this transition?	1	How does the transition from oil to renewables affect your employment prospects in the next 5-10years?
		2	In your view, how transferable are your current skills into the cleaner/renewable energy space?
		3	What employment opportunities exist outside of your province or country? What are your fears about relocating, if any?
		4	What assistance are you getting from the government or labour unions on possible re-employment opportunities?
RQ3	How have employees been sensitized and offered assistance by their employees during the transition process?	1	What steps has your company taken to transition to cleaner energy? Are these communicated with employees?
		2	What communication have you received about your immediate role in the energy transition?
		3	What opportunities has your organisation created in preparation for the energy transition?
	Closing Question		To what extent do you feel included in the energy transition?

Appendix 4: Consent Letter

Gordon Institute of Business Science
University of Pretoria

Consent Letter

Dear Participant

I am a student at the University of Pretoria's Gordon Institute of Business Science and conducting my research in partial fulfilment of an MBA degree. I am conducting research to establish "***The implications of the energy transition for employees in the South African Oil and Gas Industry"***. The purpose of this interview is to attain insights from your personal experience on this topic.

The interview expected to last 45minutes to an hour to enable me to attain deeper insights into this topic.

Your participation is voluntary and you can withdraw at any time without penalty. All data will be reported without identifiers. If you have any concerns, please contact me or my supervisor. Our details are provided below.

Researcher name: Phakama Ntshwanti
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Phone: +27738665322

Supervisor: Liesel Kassier
Email: liesel.kassier@twimsafrica.com

Appendix 5: Code Book from Atlas.ti

- Climate action driven by capitalism
- Capitalism
- Carbon Tax
- Poor Profitability of oil refineries
- Refining margins
- Climate action driven by Western countries
- 4IR
- Developed countries subsidised
- Funding for fossil fuels declining
- International Agenda
- Russion War impact
- Climate action is progressing well in SA
- Private sector transitioning
- Company has Future plans for Transition
- Company communicated its decarbonization strategy
- Company has a clear energy transition roadmap
- Company has transition strategy
- Company has No transition strategy
- Company transition is foccused towards cleaner fuels
- No plans for energy transition
- No Roadmap for reduction of greenhouse gas emissions exists
- Negative Employment Prospects
- Employment prospects negative for female technicians
- High unemployment rate in South Africa
- Increasing unemployment due to the Transition
- Opportunities exist outside of South Africa
- Poor future mployment prospects
- No climate action in SA

- Industrial policy and legislation
- Positive Employment Prospects
- Employment prospects are positive
- Opportunities exist in New green technology
- SA Climate action not sufficient
- South Africa climate action not enough
- South Africa not ready for transition as a developing country
- Changing weather patterns
- Climate change impact
- Company offers upskilling
- Covid 19 has impacted the transition
- Destroying the ozone layer
- Direct Investment from the government
- Durban Floods
- Environmental pollution
- Fossil Fuels have a negative impact on environment
- Global warming
- Good Communication on company strategy
- Initial Denial about climate change
- No government intervention for retrenchments
- Poor Communication from company about transition
- Poor Planning for transition
- Relocation abroad possible
- Relocation difficult because of tribalism for artisans
- Retrenchments imminent
- Skills not easily transferable for line workers
- Skills transfer easy for engineers
- Suitability
- Sustainable environment
- There is foreign Investment for the transition
- Transition will result in Reduced standard of living

○ Upskilling required

○ Willing to relocate