

**The role of women in the Mining Industry in Chaneng, Rustenburg,
North West Province**

By

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DECLARATION

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Abstract

Regardless of the region, mining has always been a male-dominated sector. There have been several initiatives that have worked to increase the involvement of women in the business, but females are still vastly underrepresented. The purpose of this study is to firstly provide a contextual point of view of the complexities that accompany the integration of women into the mining industry; secondly, to determine workplace relations struggles; and thirdly, to give a critical evaluation of the role that women are playing within the mining industry. This study intends to contribute to the sustainable deployment of women in the mining industry based on their contribution to the sector. Through qualitative data collection and analysis methods, the study interviewed 15 women with different racial, educational and marital backgrounds. The common factor among the study participants in the present study is that they are all mining industry workers. It should be noted that the study found women to play different roles within the sector and these roles cover areas such as leadership, inventors, researchers, training and awareness. Nonetheless, the roles that women in this study play are always impeded by the challenges and segregation associated with the mining industry which is considered an industry for men.

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Dedication

To my wife **Lesego** and my children, daughter **Remofilwe** and son **Boleng**, we have experienced tempest tossing waves and oceanfront views. We have been pits and nice places, endured tragedies and exclaimed over triumph. A life well lived is never a series of mountains. It is rather a mixture of valleys, plains and pinnacles. That being said, I dedicate this research paper to you.

List of Acronyms and Abbreviations

AMGC:	African Minerals Geosciences Centre
CEDAW:	Convention on the Elimination of Discrimination Against Women
CSR:	Corporate Social Responsibility
DAFT:	Department of Foreign Affairs and Trade
HTS:	Heat Tolerance System
IED:	Industrial Emissions Directive
IED:	Institute for Environment and Development
ILO:	International Labour Organization
IWiM:	International Women in Mining
MMC:	Multinational Mining Companies
NGO:	Non-Governmental Organization
SAMF:	South African Mining Forum
SEWA:	Self Employed Women's Association
STAMICO:	State Mining Corporation
TAWOMA:	Tanzania Women Miners Association
UNDP:	United Nations Development Programme
WGEA:	Workplace Gender Equality Agency
WiMSA:	Women in Mining South Africa
WMC:	Women Mining Coalition

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Clarification of terms

- i. Women in Mining- Refers to the women employed or participating in the Mining sector as employees.
- ii. Mining Sector- Refers to the mineral industry where individuals are employed to extract minerals either as skilled or technical workers.
- iii. Mine Workers- Individuals employed in the Mining industry extracting minerals.
- iv. Employment Equity- legislation that was implemented by the South African government to redress the inequalities of employing individuals equally not based on their genders.
- v. Effect-The word effect is defined as a change that somebody or something causes in someone or something else (Hornby, 2010:468).
- vi. Well-being-Is general health and happiness. It may be emotional, physical, or psychological well-being.
- vii. Law –“Law is a formal social role that is enforced by a political authority” (Zasdraw, 2010:284).
- viii. Employment-According to Venter and Levy (2009:117) employment is a means that describes the number of people in the economically active population, who contribute and are actively contributing towards the well-being of the country’s economy.
- ix. Women Empowerment-Women’s sense of self-worth, their rights to have and to determine choices, access to opportunities and resources. Ability to influence the direction of social change.
- x. Zoom-Online virtual platform used as the means of communication

Chapter 1 – Study Background and Overview

1.0 Introduction

As early as 1916, South African women had already started playing a significant part in the country's mining sector. Before 1916, they could work as subterranean workers; they had to work in a wide variety of above-ground professions. While working in the mining sector, women have had to confront many difficulties and barriers (Kaggwa 2020:400). The difficulties are no longer as profound as they formerly were, giving women a more significant opportunity to work underground. For many years, mining was the domain of males exclusively (McKay 2018:16). The paragraphs below provide information about the subject of the role of women in mining. Background of the study, problem statement, research objectives, and questions about the investigation, and as a study methodology summary, are included in this section.

1.1 Background of the study

The ILO's Convention No. 54 has been in existence since 1935, and prohibits women from doing underground mining labour. However, a significant number of signatories have renounced the treaty. In these nations, the results were established in 1988, with Canada leading, followed by Chile and South Africa, who recorded similar results (Mjoli & Ruzungunde 2020:8). Following the signing of Convention 176 (Safety and Health in Mines, 1995), confidence has risen to see more signatories to the ILO's Convention. ILO's opinion is that current safety regulations do not include the availability of preventative and protective measures for female miners regardless of whether they are working on the surface or below the ground (Lahiri-Dutt 2019:12).

Working beneath the earth is not as simple as most people would anticipate as this can be evidenced through an analysis of the mines present in South Africa. South Africa boasts of some of the deepest gold and platinum mines in the world. These mines are both historically and physically demanding because of the gruelling and physically difficult job. Many physical activities on the bottom rungs of the employment ladder are just too much work for most women to perform. Rock drill operators have been found to be among

the most physically taxing for women, especially if the work requires extreme physical strength (Ledwaba 2017:18; Lauwo 2018:703; Mutendi 2017:43).

Although women have been working in mining for generations, mining has nevertheless been a largely male-dominated sector because of the occupational and physical demands of the industry. Women's challenges in working underground serve as a barrier to having their role in the industry recognized (Ehrlich et al, 2018:8). There is a wide gap between men and women in the mining industry since women were legally prohibited from working in mines not just based on the demanding nature of the work but also because of custom. The social organization of the mining sector negatively impacts women, both inside the mining sector and outside of it (Mangaroo-Pillay & Botha 2020:480). The roles performed by women and men in the mining sector in South Africa have historically been conventional for both genders. While men were out in the public world working to provide for their families, women stayed at home to provide for their families.

There have been many problems female workers had to face when they joined the mining sector, including several vulgar jokes and harassment, and the workers had a difficult time being accepted by their male co-workers (Botha 2016:9). In South Africa, the need to comply with the 10% female representation goal under the Mining Charter was made more difficult because of the mentioned challenges. Before the charter, when women were working in the mines, it was believed that they were chosen on merit and thus were treated with respect (Benya 2017:517). Employees in mines governed by the Charter risked being called "quotas" and therefore were not taken seriously. The preceding facts point to the assumption that most researchers have not explored the role of women in mining thoroughly. Hence, the motivation of this study which is an evaluation of the role of women in the Mining Industry in Chaneng, Rustenburg, North West Province.

1.2 Statement of the problem

Regardless of the region, mining has always been a male-dominated sector. A number of good initiatives that have worked to increase the involvement of women in the business exist, however females are still greatly underrepresented (Mutendi 2017:27). Women who

work in the mining sector face a “double bind,” which involves juggling two different types of work simultaneously (Kaggwa 2020:401). The different types of work speak of the work required of the women at the mine itself and tending to the family’s needs when they get home. This suggests that they must combine their obligations at work, which frequently require hard physical labour, with their everyday home duties and raising their children (McKay 2018:17; Lauwo 2018:689). Female miners work longer hours than their male counterparts because of the additional domestic duties they take on. Because of these changes, female mine employees, among others, lose a crucial portion of their families’ lives (Botha 2016:11). This puts an enormous amount of strain on the female employees. The representation of women in the sector has remained, relatively speaking, small, and very few women have achieved noteworthy success in the field, but the numbers have gradually increased, resulting in the establishment of this research. Stated facts here reflect the myriad of challenges that women deal with and these challenges in turn make it difficult for the role of women in the industry to be recognized. This study is aimed at unearthing the role that women play in the industry and the opportunities available to them. The present study argues that women play a vital role in the mining sector. Through discussions with women in the sector, there exists a possibility of understanding exactly what role women play in mining. There is growing interest by women to work in the mining industry and play various impactful roles. Yet, there are socio-economic, cultural and legal complexities associated with the participation of women in the mining industry in South Africa, which are not well understood to guide appropriate policies and actions to enhance women role in mining. It is this knowledge gap that the study seeks to make a contribution by investigating the role of women in the Mining Industry in Chaneng, Rustenburg.

1.3 Purpose of the study

The present study hinges up on the purpose of providing a contextual view as it pertains to the integration of women into the mining industries and the complexities that are associated with that integration. The study further provides struggles faced by women in the various workplaces of the mining industry. A critical evaluation is offered of the role

that women are playing in the mining industry. Largely, a look at the preceding stated facts creates a platform for discussion on how women can sustainably be deployed in the mining industry considering the role they play and the contributions they make.

1.4 Research objectives

1.4.1 Main research objective

- To explore the role of women in the mining sector in South Africa.

1.4.2 Sub-objectives

- To analyse the impact of women's participation in transforming the mining industry.
- To assess the existing opportunities provided for women within the mining sector.
- To critically appraise the extent to which women participate in decision-making processes within the mining sector.

1.5 Research questions

1.5.1 Main research question

- What is the role of women in the South African mining sector?

1.5.2 Sub research questions

- What is impact the impact of women's participation in transforming the mining industry?
- What are the existing opportunities provided for women within the mining sector?
- To what extent are women participating in the decision-making processes in the mining sector?

1.6 Research methodology

1.6.1 Research approach

The process, stance, or a procedure adopted by one in their quest to collect data aimed at addressing specific questions of a phenomenon is considered research methodology. When a need exists to understand opinions and experiences exist, more often than not,

the most popular method is a qualitative method which when summed up is the collection of data that is non-numerical (Bleiker et al 2019:4-8). The ability of qualitative research in ensuring that a researcher has room to gather insights that are undoubtedly deep made it to be the best suitable method for the present study.

1.6.2 Empirical context

1.6.2.1 Setting of the research

Mines in Chaneng, Rustenburg, North West Province were used in the present study as the setting of the present research. Chaneng is a village where the BaPhiring people live. Despite platinum mining happening in the Bojanala District since the 1930s, there are very few railway safety booms or bridges to prevent ore carrying trains that belong to the mining companies, and taxis and busses from becoming entangled in fatal crashes. Chaneng is surrounded by mining operations, but unemployment amongst the youth and women is high. Through selling cattle around 1800s, a group of people came together and brought land and that is what Chaneng became. At present, the community identifies as the Royal Bafokeng Nation but that was a result of its integration to the Bafokeng tribe and this integration was necessitated by political transitions. Formerly, the Chaneng community resided in the area commonly referred to as the Kgetleng, to the north of the Eland River. Fig 1 is an illustration of the research setting.

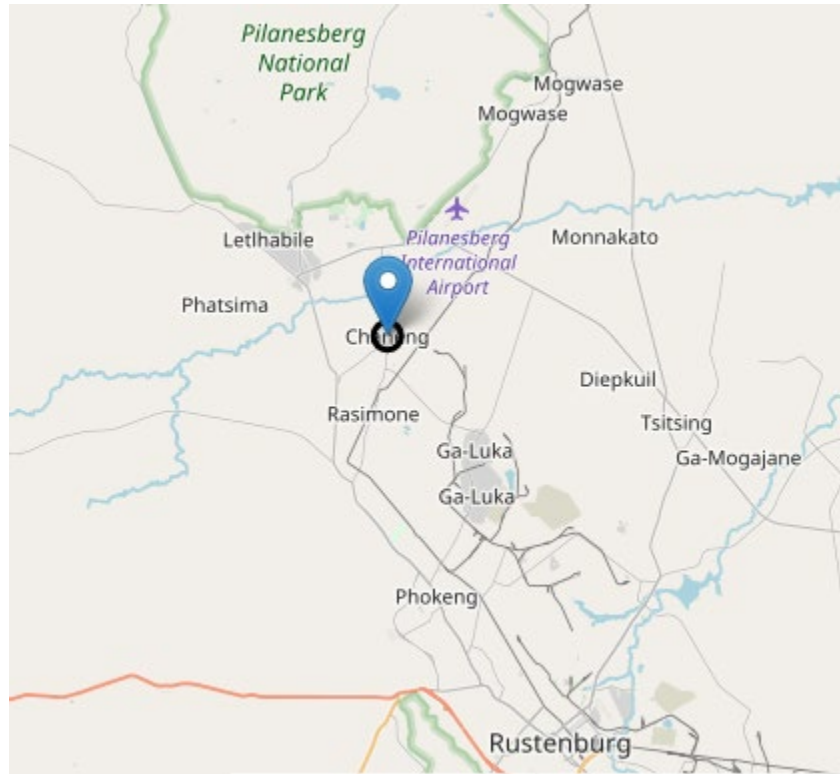


Figure 1: Map of Chaneng village

Source: Google maps (2021)

According to Figure 1, there is not much activity happening around the research setting. Notably is the existence of the Primary School and the Traffic Department. The unavailability of much detail on the map serves to explain how backward the environment is and why conducting a study that expounds the role women play in the mining industry is of essence.

1.6.2.2 Sampling

Sampling is the systematic selection of participants from a larger population to take part in a study. According to Dickerson *et al* (2020:32) the process through which members of a larger group are selected to participate in a study with the purpose of gathering their views on a particular subject is called sampling. Sampling often involves the selection of several entities whose views represent those of a larger group (Dickerson *et al* 2020:33). To satisfy the qualitative nature of the research, the study consisted of a sample of 15

women working in the mining industry. The participants were drawn from management, skilled, technical or general workers. Participants of the study were selected through purposive sampling. Purposive sampling is the process through which a researcher use their own prerogative in deciding who can and cannot participate in the study. Purposive sampling is less costly and ensures that the researcher gets a sample they consider best fit for the study. Purposive sampling was used in this study because of the limited number of women working in mines in Chaneng. Furthermore, study participants had a minimum of one (1) year to a maximum of ten (10) years working experience within the mining industry.

1.6.2.3 Data collection

Data collection is the process of gathering and measuring information on targeted variables in an established system, which then enables one to answer relevant questions and evaluate outcomes (Hochbein & Smeaton 2018:8). Data collection is a research component in all study fields, including physical and social sciences, humanities, and business (Chauke 2020:9). While methods vary by discipline, the emphasis on ensuring accurate and honest collection remains the same (Finesse 2018:12). The goal for all data collection is to capture quality evidence that allows analysis to lead to the formulation of convincing and credible answers to the questions that have been posed (Arusha 2021:12). The study used semi-structured interviews for data collection, because the researcher wanted to explore participants thoughts, feelings and delve deeply into personal and sensitive issues. Data collection with each study participant lasted between 45 minutes to 1 (one) hour and this allowed the researcher to exhaust all possible questions that would aid in the understanding of the subject being studied.

1.6.2.4 Measuring instruments

Measuring instruments speak of the tools designed by a researcher that aid in collecting information from research participants. In this study, the researcher adopted the semi-structured interview schedule as the method of data collection by using face-to-face

interviews with participants. A semi-structured interview schedule refers to a process of conducting an interview through the use of open-ended questions. This implies that the researcher is guided by a set of questions but more questions can arise depending on the answers provided by the interviewee (Hochbein & Smeaton 2018:11). This tool assisted the researcher to have control of the data collected and this also channelled the participants in the way that the research wanted to collect the data.

1.6.2.5 Data analysis

Data analysis in qualitative research is defined as the “process of systematically searching and arranging the interview transcripts, observation notes and other non-textual materials that the researcher accumulates to increase the understanding of phenomenon” (Marutlulle 2019: 200). Creswell's method was used to do data analysis, because it allows the researcher to do both data analysis and data collection simultaneously. Creswell's (2014:18) method in qualitative research follows a linear, hierarchical, format, it is interconnected and does not always progress in the order presented as in a chart was used to do data analysis. Data was collected, prepared and organized. This was a very important stage since it included transcribing the interviews from the 15 (fifteen) key participants. Before doing any more study, the researcher examined all the data gathered. To discover a broad feeling of the information and potentially its overall significance, the reading of the data was done in stages. To arrange the data into chunks of information, the coding of the data was performed. This was followed by assembling data into themes.

1.7 Significance of the study

Female employees often experience discrimination in the workplace. As a result, they often struggle to fully accept their male colleagues. There are no clear and transparent development opportunities for female employees, which frequently leads to them being exposed to some form of sexual harassment. In addition, women working in mines are sorely lacking in support mechanisms (Mangaroo-Pillay & Botha 2020:479). The present study puts decision makers on a quest of ensuring that the environment through which women are employed is conducive enough for them to participate without discrimination

based on gender. This research will contribute in setting up a training platform in diversity and training sessions to promote understanding of workplace problems that affect men and women, and build an atmosphere in which people's responsibilities, contributions, and differences are valued.

1.8 Ethical considerations

The researcher was responsible for the research process' integrity, and the data collection approach was not targeted at any participants because it simply consisted of a set of questions that do not require names or identification numbers. When participants were unable to answer or engage in some of the questions, the researcher acknowledged this. Participants were given a written agreement to engage in the study willingly. To effectively interpret the data presented by the participants, the researcher made every effort to prevent bias. As a result, the researcher kept track of his personal experiences, biases, prejudices, and orientations. There was no danger to the participants. In addition, the researcher performed the interviews according to Covid-19 guidelines. Because of the limits and lockout requirements, the researcher performed the research using zoom video calling for the safety of the participants.

The results of this study are not directly linked to the participants, and their names are not revealed. "It is the responsibility of researchers to ensure that sensitive information about their study and subjects of study are protected," Marutlulle (2019:164). The researcher was solely responsible for the study's ethical considerations, and when he was doubtful about anything, he sought advice from his supervisor.

1.9 Limitations

Participants in this study were only female mine employees, which proved to be a challenge in providing enough information on the subject, despite the fact that participants were being knowledgeable about the issue being studied. Furthermore, the researcher conducted the study in the participants' chosen language, rather than translating from vernacular to English medium, and this had the potential to skew the results which could

be prejudiced because they only respond based on their experiences as women. There was the issue of time, which provided a difficulty because participants were not always accessible or had limited time to spare due to the researcher's availability. Participants were mostly women who worked in the mining industry, which could be prejudiced because they only responded based on their own experiences.

Because of the lockdown and covid-19 restrictions, the researcher could not see the volunteers in their natural environments.

1.10 Delimitations

The present study is an evaluation of the role of women in Chaneng village. Through the use of a qualitative methodology, the study argues that women play a significant role in the mining industry. Still, but their role is often overshadowed by the challenges they face as they enter and navigate the industry in question. The study explores the role that women are playing in the industry, as a whole and this is inclusive of mainstream mining and artisanal mining. Even though there are many mining sites in the Province, this study is limited to only three sites found in Chaneng that is Styldrift, Rasimone and South Shafts. Even though there are many roles played by women in mining, this study will focus on four roles namely, leadership, technological advancement, research training and awareness creation. The literature consulted in the present study is from 2016 to 2021.

1.11 Structure of the thesis

The study comprised of five (5) Chapters and will be structured as follows:

Chapter 1: Introduction and Background of the study

The researcher introduces the study in this chapter. The chapter discusses the background of the study, aim and objectives, literature review, motivation for the study, relevance of the study and definition of concepts.

Chapter 2: Literature Review: The role of women in the mining industry.

This chapter reviews existing literature that is relevant to the research topic, synthesises, compares, and contrasts the findings of this study with other studies undertaken. The researcher's topic is "The role of women in the mining industry."

Chapter 3: Research Design and Methodology

This chapter discusses how the researcher conducted the study. It includes the data collection methods and instrument that the researcher used.

Chapter 4: Presentation of the study data, finding and analysis

This chapter presents the findings/discussion and analysis of the study. In this chapter the researcher uses thematic analysis not only to tell the story brought to light by data but also to present the data.

Chapter 5: Discussion of the findings, conclusions and recommendations

This chapter will discuss and interpret the findings of the study, recommendations made by the researcher and conclusions. This chapter marks the end of the research project.

1.12 Chapter summary

Existing arguments on the role of women in the mining industry have been provided in a bid to provide a contextual view of the study and the position taken by the research in addressing this study. The present research is guided by four research questions and four research objectives and these were explicitly stated in this Chapter. The chapter has established that the number of women participating in the industry when compared to their male counterparts is relatively low. This makes it all the more impossible for anyone to look and establish the role that women play. This therefore calls for the need to observe closely the experiences of women working in the industry to establish how they roles have evolved since the time of joining the sector. In the following chapter, the study explores in detail what other researchers have established in the relation to the subject under discussion. The analysis of literature in the following chapter is aimed at identifying a gap in literature which the present study will cover.

Chapter 2 – Literature Review

2.0 Introduction

In this chapter, the researcher examines the current literature on the topic of women's roles in the mining industry. The chapter evaluates available research in order to determine how women's roles in mining have changed over time. Although the study is focused on a region in South Africa, the literature in this chapter is global in scope, allowing for a contextual knowledge of the topic at hand. This chapter is organised as follows: contextualizing the mining industry in South Africa, the gradual participation of women in the mining industry, gender bias in the industry, women as transformational leaders in mining etc. The literature review provides an overview of the environment through which the role of women should be understood which the premise of this study is. All these sections found in this chapter are closely tied to the research objectives listed in the preceding chapter. At the end of the chapter, the researcher presents a discussion on the theoretical framework of the study.

2.1 Contextualizing the mining industry in South Africa

Since mining has been the country's basis for so long, South Africa's economic, social, and political environment has been heavily influenced by mining. Despite the popularity of gold, diamonds, platinum, and coal, South Africa also produces other minerals such as chrome, vanadium, and titanium (Benya 2017:511). Many of the mines in South Africa have conditions that are close to similar. This is however not the case when it comes to gold mines considering that the geothermal gradient is very low, about 9°C per kilometre of depth, and the ore bodies are narrow making underground mining in South Africa virtually difficult than elsewhere in the world (Benshaul-Tolonen 2019; Amponsah-Tawiah & Mensah 2016:228).

There is notable exception to the rules that apply in South African mining operations and this is because of the threat of silicosis, a deadly illness of the lungs which is present at all times. As a way of mitigating the threat of silicosis, loose rocks are often wetted down. In most mines, mechanical assistance is not available due to the narrowness of the sloping reefs and ore bodies. At 1000 tons of rock extracted each month, the amount of ventilation air circulating in South African gold mines was a staggering 6 cubic meters per second (210 cu ft/s) for each worker (Pretorius 2019:659; Ndlovu et al 2018:120).

Heat is one of the most often mentioned issues in South African mines. Refrigeration of the intake air is frequently required in deeper mines where the geothermal gradient is greater, and this is increasingly the case on several platinum mines, even if they are shallower (Stewart, 2020:36). The refrigeration system uses a lot of energy, which, according to Eskom, threatens to push the state power company into bankruptcy if Eskom's current power supply problems persist. Before the year 2012, Eskom could not provide most mines with the power supply they required for refrigeration but that was solved through the provision of a new power station (Aneke et al 2017:37).

Despite poor safety records and high fatality rates, circumstances are improving in the South African mining sector. The number of deaths has decreased to 199 in 2006, a substantial drop in total deaths from 533 in 1995. The mortality rate was 0.43 per 1,000 people per year, although the data was only from 2006. In the Sixties, the coal industry produced about 1.5 times the amount of coal it did in the present decade (based on information found in an annual published by the Chamber of Mines). An explanation on the differences is given; mines where gold is often found have a bigger depth and are hazardous and, as a result, it is much more difficult and hazardous to work there (Pretorius 2019:667).

The depths of most mines have immense pressure and when country rock is moved constantly, two-thirds of the ground falls were found on the gold mines (Moroe and Khoza-Shangase 2018:18). Fatalities include the absence of safety belts while working on grizzlies, working underneath loose rock in ore passages, and being crushed by the lethal combo of a locomotive or the door-frame of the ventilation (Pretorius 2019:657). There are also discussions about drilling into mine misfires, demonstrating poor and perhaps dangerous mining practices. Dramatic falls are difficult to eliminate even if their occurrence is increasing with depth. This often makes it difficult to provide continuous roof support because in gold mines there is often the face blast violence, and the same can be said about long walls in coal mines (Moroe and Khoza-Shangase 2018:23).

Following 3,200 miners being stuck at the Elandskraal mine underneath rock surface in 2007 when a burst compressed air line broke free and plummeted down the man-hoisting shaft, mine safety garnered extensive media attention (Pretorius 2019:667). The

employees were ultimately saved once the blasting smoke had dissipated, due to the rock hoisting shaft's large size. Following the accident, President Mbeki issued mandates for all operational mines to undergo complete safety assessments. Following to this audit, several facilities, including the country's biggest gold mine situated at Driefontein had to temporarily shut down (Pretorius 2019:667).

The contextual picture of the South African mining sector does not reveal how many men or women are employed within the industry. Rather it provides a picture of the state of the actual mines and the dangers associated with those mines. The dangerous state of these mines is indicative of why most women have been hesitant to get involved in the sector highlighting why it has been difficult to unearth the role women in mining. The present study goes beyond recognizing the dangers associated with the sector and to establish the role that women play in those dangerous situations thereby creating room for the inclusion of more women in the mining industry.

2.2 The gradual participation of women in mining

The gradual participation of multinational mining companies have begun to be more sensitive to gender problems and have therefore committed to gender equality by establishing social responsibility programs. Due to local legislation and custom, women have always been barred from working in some subterranean jobs in South Africa. Mining activities have always been considered inappropriate for women due to their frequently demanding nature and working conditions. It has become more difficult to recruit and retain female workers as a result of this. The Mining Charter established a goal for women to make up 10% of the workforce in the mining industry (Botha 2016:10).

Women have been legally allowed to work underground in South African mines since 1996 (Mining-Charter, 2010:12). When women were initially permitted to work in mining, they had to meet several requirements. A Grade 12 certificate, and physical and medical fitness, was among the criteria for women. Physical fitness was paired with the capacity to do physically demanding tasks in a hot, humid environment. The heat tolerance of each person was tested to see whether this was true (Laplonge 2016:847). It provided the mine

an idea of whether someone would be able to work underground. Women challenged these constraints, often informally, by using non-traditional means of authority, with varying degrees of success (Laplonge 2017:305).

The Grade 12 certificate, which most women did not achieve, was one of the first kinds of discrimination used against women working in mines. Women jointly fought this kind of prejudice by buying fraudulent Grade 12 diplomas as a means of combating it. Women, in particular, would be unable to work in the mining industry without this qualification (Botha 2016:10). As a result, counterfeit certifications appeared to circumvent the mines' requirement of Grade 12 certificates. Women did this because of desperation for work and a high poverty rate. Although only around one in ten applicants passed the grade 12 diploma requirements, the mine dropped the threshold to Grade 8 (Benya 2017:517). The forgery of credentials challenged the selection criteria used by management and provided an opportunity for women to demonstrate their strength (Botha 2016:7).

The additional requirements to work in the industry included staying within a 60km radius to the mine and working to and from the mine. For the most part, most women were able to satisfy this requirement. However, for a select few, who could not, they used addresses of nearby relatives and even relocated closer to obtain addresses that rendered them employable (Botha 2016:8; Mangaroo-Pillay & Botha 2020:477).

Women were also made to go through rigorous medical examinations. The medical examination included being subjected to an X-ray, a full body scan, and a check of their ears, eyes, and noses (Lauwo 2018:689). The medical examination is still very relevant to this present day for anyone whose wish or anticipation is working in the mining industry. The medical examination was an important task and passing it would warrant a person to go through Heat Tolerance Screening. HTS is a necessary medical exam that is required for everyone who joins the mining industry and those who have been away from work underground for more than fourteen days. It is a repeated workout that takes place in a controlled atmosphere for thirty minutes at a temperature of 28 °C with a wet bulb that is maintained at a constant temperature of 28 °C and a dry bulb maintained at 29.5 °C, and which has a margin of 0.3 °C. Most women failed the HTS because of many reasons.

Some of them did not make it to the exam, while others failed or were removed before or after the exam (Ehrlich et al, 2018:9).

Being underweight or overweight, going on menstrual cycle or even having a child to breastfeed were all reasons why women were kept out of several fields in the past. The temperature of the woman's body rose during menstruation, according to the HTS centre manager, and was typically over the permissible starting body temperature (Ledwaba 2017:32). Breastfeeding during pregnancy did not warn women against undergoing HTS, nor did it counsel them to work beneath the earth; some women nevertheless went through with HTS as long as the results were positive and they could support their families (Lahiri-Dutt 2019:17). Furthermore, women were prohibited from receiving HTS while they were pregnant because fat deposits increased during pregnancy, and perspiration decreased, which made their bodies try to insulate the baby. As a result, HTS body temperature increased significantly above and beyond the limits established (Mjoli & Ruzungunde 2020:9).

While women were unable to control their weight and therefore their ability to conceive, they could control many other things that impeded their ability to go through and get positive results from the HTS. Most women lied about nursing, and those who were on their monthly cycles used specific medications to postpone or stop menstruation until they had had hysterectomy (McKay 2018:17). Women directly challenged management authority over who could participate in the HTS, which was the most often utilized approach. Women turned to HTS pills in other circumstances as well. These tablets were used to lower body temperature (Mutendi 2017). For other women who had tried taking medicines that had failed to help them, but who still had biological factors that prevented the medicines from working, these women used a false HTS stamp, and so were allowed to work in the mines. This stamp was used to trick the mining personnel into thinking that the lady had completed the heat tolerance screening, while in reality she had cheated and changed the results. Because the stamp was illegal, miners and the HTS centre worked together to ensure that women did not take advantage of the scheme (Kaggwa 2020:398). In light of the current research, it should be highlighted that as women continue

to work their way into mining, they want to be acknowledged for their position within the industry.

2.3 Gender bias in the mining labour market

A large number of women are being introduced to underground employment in South African mines, and this has the potential to upset the mining labour market's established practices. For economists, the market is governed by gender-blind economic rules (Kotsadam & Tolonen 2016:327; Laplonge 2018:307; Mutendi 2017). There is a belief that the market functions only based on neutral terms. For example, Classical Marxists believe that capitalists have no consideration for or reference to gender when using labour force. They have an interest in the areas of women's lack of representation in the producing industry and the fact that they have a need to give birth (Kotsadam & Tolonen 2016:327). Neoclassical theory fails to handle gender completely, just as several modern theories. In Neo-classical theory, wage rates are understood to be governed only by forces of supply and demand. They take gender for granted, yet it has a major impact on earnings. They give a lot of credence to gender roles, especially division of work. When men are in a position of power, as in mines, they do not realize they are in charge. They believe that a lack of women leads to male homo-sociality.

For years, the issue of gender equity in the business has been disputed. The construction of the mining sector having a 'type of woman it requires' is a component of male standards, as mentioned by Laplonge (2018:307). When women enter the mining sector, they are often drawn to the old-fashioned, sexist behaviour seen in mining and alternative business models (Laplonge 2017:309). Because of the males in the business, women may have to change their positions. Both their social responsibilities and professional position will need them to move both physically and mentally for their well-being and that of their families in the male world (Laplonge 2017:308). As Ey (2018) and Spence (2014) contend, male power is woven into the fabric of all parts of the mining sector throughout the world.

Sustainable development for women offers possibilities, difficulties, and dangers in mining. Although a few mining firms have women's empowerment programs, it has often been unclear how much these policies have influenced gender equality. Policy designed to improve gender equality in mining firms' workplace practices seems to be at odds with those firms' actions. However, it is no longer accurate to state that the gender pay gap and pay equality are two completely separate issues. The mining industry offers discretionary compensation between 39% and basic wage for managers of different sexes, as stated by the Workplace Gender Equality Agency (WGEA) (2018). Pay disparities between men and women continue to shrink as the business goes on. Basic wages were lowered by 2.1 percentage points to address the total gender pay difference (WGEA, 2018).

Several multinational mining companies (MMCs) have begun to be more sensitive to gender problems and have therefore committed to gender equality by establishing Corporate Social Responsibility (CSR) programs in departments dedicated to it (Buss & Rutherford, 2020:179). The specific purpose of the CSR was to ensure gradual inclusion of females mine employees is realised and hold companies accountable for involving and promoting gender equality in the mining industry. Furthermore, it is through CSR programs that equal number of female employees are considered and that is necessary because it will be legally binding. Although the mining sector may be a significant catalyst for economic growth, ensuring that women face no additional disadvantages in the workplace regardless of their function compared to males is crucial to maximizing the benefits that come in the long run for working in the mining industry for both genders.

Women in the mining industry often find it difficult to have others recognise their fundamental labour rights and these are inclusive of the ability to have a set minimum salary and to have a representative on the job (Macfarlane, 2018:12). Economic resources fail to reach those who would put them to the best use. When it comes to access to and control over money and resources, women often do not have the same levels of authority and leverage as males, or equal rights of inheritance, ownership, independence, and decision-making, including reproductive rights. The study of the historical foundations of gender inequality often revolves on people's traditions, practices,

and social standards (Fakier & Cock, 2018:47). Rodrigues and Mendes (2018:81) discovered that, contrary to the predictions of those who thought that the workforce involved in metalliferous mining would increase between 2009 and 2014, the percentage of females did not change from 2009 to 2014, hovering at 15 per cent. The gender gap remained the same at 5.5 males to 1 woman in the workplace (WIM, 2013). Thus, knowledge of the significant role women play in mining is crucial.

2.4 Women as transformational leaders

Mining has recently seen a dramatic shift. The price of commodities varies, and as a result, businesses are using data analytics and networking to stay competitive. In this new era, organizations that can respond quickly to market changes and implement innovative ideas are at a distinct advantage. It calls for even more variety (Poswa & Davies, 2017:101). It has been shown that promoting inclusiveness and fostering cognitive diversity yields greater financial returns and often results in more creative, inventive, and productive company outcomes. One of the mining industry's most important qualities is the need of maintaining a positive attitude to change (Tuokuu et al, 2019:923). Transforming leadership enables teams to develop trust and unity while empowering those teams (Poswa & Davies, 2017:101). This further emphasizes the importance of leadership style and the extensive variety in mining accelerates the shift in how mining firms perceive and value women in the workplace.

Women are more likely to be characterized as supportive, adaptable, empathic, compassionate, and nurturing, all of which are distinct characteristics of a transformative (or community) leader. Research indicates that collective leadership is superior to a conventional hierarchical system when it comes to employee engagement. Having a more positive impact on work-life balance and job satisfaction, collective leadership may also enhance motivation and morale. Historically, the mining sector developed via backbreaking labour, tenacity, and persistence, with little regard for how such traits relate to male identity (Barankariza, 2016:13). Today's world is moving at an increasingly fast pace, and the identity mentioned above is gradually losing significance. According to Mangaroo-Pillay (2018:39) these types of businesses that have long used a "command-

and-control" or hierarchical, masculine-centric leadership style will need to change their leadership approach because they want to remain competitive.

A paradigm shift is beginning to emerge as the speed of change in the mining sector increases. Diversity may be increased via the use of new technologies. Concerns about gender diversity within the mining sector are now being addressed, with the introduction of leaders who can engage and inspire teams in more effective ways. With this new approach, industry gender diversity goals are finally being reached (Svobodova *et al.*, 2020:23). Conversely, organizational "blind spots" may drive gender policies off course. Attempting to achieve gender equality objectives over a short period or using rules that are either too difficult to comprehend or set too many requirements has proven to not work (Svobodova *et.al.* 2020:19). There is a danger of diminishing the perception of others as valuable, as significant, and as welcomed members of society. As a way of dealing with this, Svobodova *et al.* (2020) presents the various roles that women play to transform the mining industry as evidenced in Fig 2. According to Fig 2, the roles being played by women which are transforming the mining industry include ore exploration and sale, mineral processing, goods and service provision, ore processing and sale, heavy mining, mineral purchase and sale, exploration, processing and mineral sale, product purchase and sale, ore processing and mineral sale, and mineral processing and product sale.

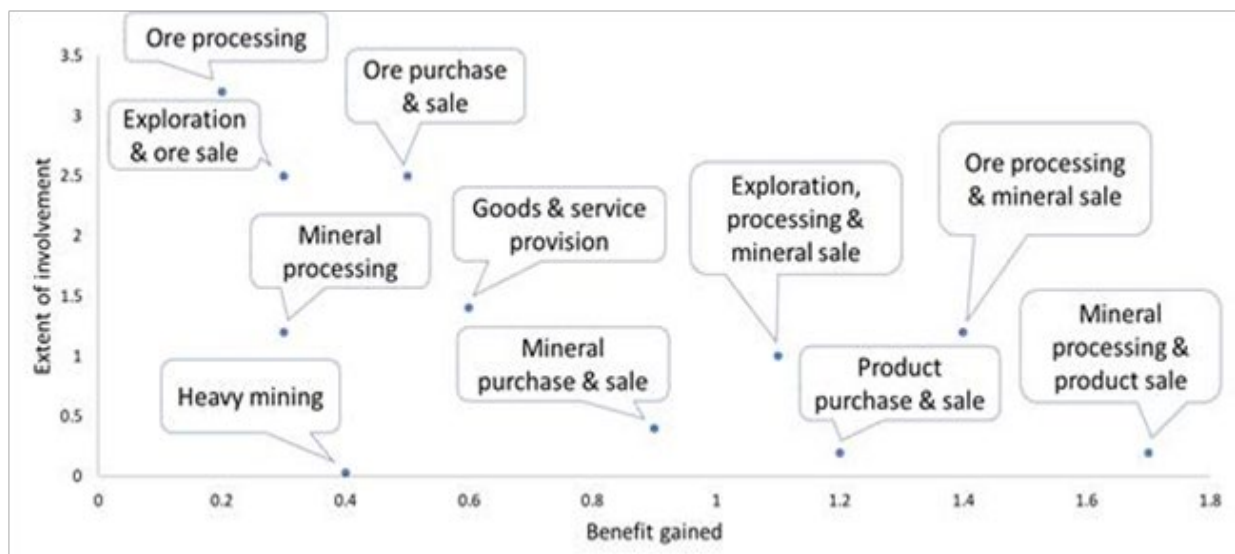


Figure 2: Women’s various roles in mining

Source: (Svobodova *et.al.* 2020)

2.5 Other challenges for women in mining

There are limitations to the control of land, access to land and use of land, permits, financing, and geological data and this has often resulted in disparate economic difficulties for women in mining. In South Africa, the traditional beliefs of the community sometimes hinder women from fully using their economic opportunities, thus depriving them any authority over their profits (Keyser et al, 2020:267). This results in women having less access to capital to invest in mining equipment and technology, which makes it more difficult for them to set up a profitable company. There are policies in place that privilege males and discriminate against women, which means women frequently have less of a say in important policy choices. Differences in legal and social title to land and property hold women back from taking advantage of many other factors in the mining industry, such as money (Koomson, 2019:105).

It is customary to have restricted ownership and inheritance rights regarding land and mineral rights, which limits the number of women who register their mines or desire to own mines (Mokotong, 2016:123). This further exacerbates woman's weakness when it comes to formalization, a worldwide movement for which demanding criteria many women are unable to meet. Women are less likely to participate to a productive and responsible mining industry when their ability to do so is impeded by the formalization process.

2.5.1 Lack of financial resources

Many society's traditional standards according to a 2013 United Nations report often prevent women from having, using, or controlling land and other resources. Women are believed to be unable to utilize resources effectively because of their physical and intellectual weakness. Many countries, including South Africa, have found that owning concessions does not always guarantee women access to the money generated from mining (Wegenast & Beck, 2020:203). As a result, women are not informed about the amount of real minerals extracted, which results in many unmet needs. When mining is

done by males, who control finances, women are excluded from the crucial phases of the process, allowing males to dominate the financial decisions. Women see no money coming in therefore they get nothing from their labour (Wegenast & Beck, 2020:205). Women who perform the real job in pit areas are not in charge of any money or business-related issues, regardless of whether the amount of effort they bring to the industry. In many underdeveloped nations, women are seen as inferior to males, with limited personal freedom.

In many cases, it is thought that women who have financial freedom and power are more successful. In very rare instances, women run a mining company and possess mineral rights. This assumption often leads to many women facing backlash from most men. The assumptions that men hold against women leads to men having concerted efforts to present women to the world as incapable and incompetent (Turton, 2016; Ledwaba, and Nhlengetwa, 2016; Baxter, 2019).

There is no doubt that both males and females struggle with the inability to get access to financial resources. Banks are happy to provide loans to agricultural enterprises, but they are unlikely to provide credit to mining companies, and they will seldom accept mines as collateral (Botha 2016:8). Societal obstacles, such as a lack of conventional collateral, and women's comparatively lower income levels, make it harder for women to get financing especially concerning the need to venture into mining. Women working in mining still have a significant disadvantage owing to the absence of this kind of collateral, which is known as 'lack of a surety' (Botha 2016:11). Women are restricted from getting financing due to their incapacity to get sufficient capital to invest in essential mining equipment and technologies. Women who turn to borrowed technology control and deny themselves independence, like in the case of microfinance institutions (Botha 2016:11).

Without money, mining companies cannot be established and will not be successful. It is reasonable to invest in expanding women's access to finance since the women's market is now underutilized, and their sales are lucrative and rising (Kaggwa 2020:404). Not all of the issues women confront are addressed by provision of financing from government and development partners. Unfortunately, education and awareness around these programs have not been disseminated among miners' associations and local

governments, with particular focus on female miners, who may not be able to attend meetings or be informed of information on notice boards because of their time-consuming domestic chores (Benshaul-Tolonen 2019:33). Calls for special treatment have been raised, such as the possibility of giving women preferred treatment to receiving grant and loan money, which may be done via exemptions, or by providing them simpler processes. Countries such as Zimbabwe and South Africa established public microfinance and village banking, which served as model facilities for sustainable financial assistance when they implemented their respective mining policies in the late 1990s (Spiegel, 2012). Women are often finding it difficult to have access to financing programs from policy makers without those policy makers having to consider the spouses of the women requiring financing and women's organizations through these facilities.

Suggestions by Amponsah-Tawiah and Mensah (2016:102) at the macro-level may assist women's access to finance. The International Finance Corporation is a mainstream method existing among development organisations and it can be helpful in advancing gender equity in the mining sector. While the provision of finance has the potential to help open up opportunities for women in mining and other sectors, more work has not been done as yet to overcome mining-specific obstacles. To improve the understanding of financial systems and requirements, a need exists for raising awareness and capacity-building on the side of financial service providers to the needs of women in the mining industry (Kaggwa 2020:401).

The informal financial services that are not designed to increase female participation in microfinance or direct lending (such as microfinances and small loans from individuals and groups) are instead failing to provide opportunities for female miners to benefit from specific advantages. Such advantages are inclusive of credit services access that is localised and repayment terms that are not burdensome. Thus, while addressing these services, many problems (including credit charges and payback terms that are biased in favour of lenders) are not considered (Pretorius 2019:669). The failure of governments to implement subsidy programs has kept hard-to-reach, egalitarian, and widely available informal financial services out of reach for most people. Furthermore, attempts to making it easy for women to have access to financing which is more formal have met with more

rhetoric than actual results, due to a reduction in initiatives aimed at increasing the participation of financiers (Aneke et al 2017:43). To realize the importance of women in mining, a well-rounded support system focused on government is required to help women deal with the banking sector's lending needs. Alliances between the public and commercial sectors must be established that start and enable risk awareness raising on mining business possibilities, and financial collateral guarantees for women in mining (Pretorius 2019:660).

Partnerships may be used to develop specialized financial solutions that are aimed at serving women in the industry while simultaneously offering risk mitigation for lenders. Success elements that may be included into these collaborations include a high degree of mutual trust and a common vision for the future, and confidence in one's abilities and the recognition of different levels of education and literacy among the women in mining.

2.5.2 Legal and institutional challenges

Often, women experience prejudice in policy-level choices that impact them, and these discriminatory policies hold them down. Due to inequality in access to and control over land and property rights, women are often prevented from benefiting from mining (Botha 2016:12). For example, in Kenya, the old social structure gives women access to the land, but does not enable them to exert authority over it, which limits their total output. The lack of wider gender equality principles in Madagascar seems to have strengthened male control of land via land tenure reform, in contrast to the land rights of women. With land control, mine ownership is out of reach for most female miners (Mangaroo-Pillay & Botha 2020:479; Lauwo, 2018:701). Women who do not have any control or access to land are thus held back from accessing other variables such as money, which are important in the mining industry. Exposure to these restrictions occurs at the level of legislation like those in Botswana and Lesotho, which need a husband or father's permission for a woman to get a loan (Ehrlich et.al. 2018:103).

In cases where a woman is the head of the household and owns the property, a male relative must give his permission before anything may be done (Ehrlich et.al. 2018:103).

Because women are more likely to join unwanted partnerships in such a tough circumstance, they are also more likely to do so with miners of opposite sex to survive and preserve money for future investment. In exchange for providing them with raw material to use in the gold mining process, miners agree to have sex with female miners in relationships that are almost always confined to the workplace. Madagascarians term these partnerships “gold marriages” or “vadin saffira” (sapphire weddings) when one person is in a relationship with several others (Ehrlich et.al. 2018:103). This kind of marriage has no legal standing in regard to land or property rights, and the women involved usually take advantage of the women who are less powerful (Ehrlich et.al. 2018:103).

After the death of their spouses, many widowed female miners may perceive a chance to obtain mineral rights. As long as both men and women hold property, women and men have equal rights to property ownership, but, when it comes to property ownership, widows' inheritance rights, in particular, are unequal to those of widowers (UN-CEDAW, 2013:11). More often than not, customary rules and cultural beliefs require that the assets and belongings of the dead be passed down to the son or male relatives. Due to this, women are not allowed to inherit their husbands' mining deeds under law (Laplonge 2017:307). In Tanzania, an exception is recognized in which a license transfer may occur from a deceased husband's spouse to the widow if she is able to produce a legitimate marriage certificate and pay associated costs. In most instances, only the first wife has a marriage certificate (Laplonge 2017:307). To get access to mining rights, widows must get permission from their parents-in-law. This almost always results in a conflict with the parents-in-law, since the widows believe they have exclusive authority over the mines, while the parents-in-law believe they own and control the mines.

Despite the good intentions, attempts to formalize and make things transparent in mining often work against women. Additionally, there are women gold traders in the Democratic Republic of Congo who are referred to as the “shashulere,” but who are not officially registered, which has recently resulted in the modification of the mining law to declare them to be illegal. In the public's eyes, they are held responsible for “illegal practices, including the trade of minerals outside the official circuit (Bashwira *et al.*, 2014:113).

Huggins *et al.*, (2017:102) point out how onerous formalization requirements are for "just a tiny percentage" of women in mining. If gender mainstreaming is not pursued, women's ability to participate to a productive and responsible mining is compromised.

The fair mined standards include a commitment to gender equality in its certification procedures. In these cases, it is assumed that mines may be formalized if they are unaccommodating to the diverse range of female miners who are less literate and thus unable to satisfy the legal criteria that take into account gender. The results of a study conducted by McQuilken (2016:93) show that four gold certification systems fail to overcome the institutional power structures that imprison a large number of mining entrepreneurs in poverty in sub-Saharan Africa. While gender is rarely directly addressed, it is probable that the gender power systems inside institutions are just as immovable.

Though laws may vary, general findings of existing studies conclude that gender plays a crucial role in determining whether or not women participate in mining. Gender equality was included into legislation granting equal access to mining titles in Ghana and Zimbabwe (Benya 2017:519). Nonetheless, in the real world, women are systematically denied access to property, licenses, and other public services. Because of these many factors, this may occur: First, because of the impact of customary laws on women's rights and provisions; second, because people do not know about rights and provisions of women; and third, because women lack the ability and resources to access these rights and provisions. In other nations, women have made attempts to clarify and make the requirements for women to get equal access to property and licenses as user-friendly as possible (Benshaul-Tolonen 2019:39). Certainly, there is a significant discrepancy among government entities tasked to ensure that there is policy formulation and implementation. Women, having experienced constraints both from inside the institutions they are a part of and also due to external factors, have little motivation to make it easier for themselves to have access to land and permits, female quotas for licensing and property rights (Amponsah -Tawiah & Mensah, 2016:17).

Not only are governments failing to provide female miners with protection which is legal against concerns such as exploitation and discrimination, but these problems are made worse by governments not providing women with legal protection. Experts interviewed in

South Africa during the IIED's mining discussion noted a situation in which women lack legal knowledge and skills and therefore engage into subordinate contracts and partnerships with male miners (Benshaul-Tolonen 2019:23). This may put some women in a difficult position if the agreement is broken. Women, in addition to pursuing their rights provided in the constitution to obtain property and permits for mining when their spouses pass on, women also seek to safeguard themselves from male relatives who oppose their claims in the courts (Benshaul-Tolonen 2019:23). Unfair enforcement of gender-related requirements is leaving regulatory organizations unable to appropriately and effectively implement such regulations. In addition, regulatory agencies avoid exerting influence on customary rules. Lack of competence and commitment across government and civil society continues to impede the government's effectiveness in enforcing gender-related laws (Benshaul-Tolonen 2019:24).

2.5.3 Lack of participation in decision-making

Women in mining suffer frequent marginalization in organizations, governments, and other venues when important topics are addressed. At almost every level within the mining industry, women often find themselves excluded throughout the process of negotiating rights to land and mineral extraction. Huggins *et al.*, (2017) believe this is due to customary gender-related discrimination in land access and participation in low-paying occupations. This inequality is supported by traditional attitudes and practices, such as gender-based discrimination, which have made it difficult for women to reach higher levels in virtually all areas of social and economic life (Botha 2016:1-12). Several cultural norms have had a role in the ways in which legislative gender policies are implemented and this has often resulted in subtle and blatant legal discrimination against women. As a result, women have been confined to becoming bystanders, with poor self-esteem and confidence to voice their thoughts and opinions in front of males. Because of their inferior position, women have no real authority or influence in the decision-making processes that govern society. As a consequence, women's ideas, skills, and interests are ignored (Mangaroo-Pillay & Botha 2020:479).

In many mineral-rich developing nations, women establish local and national women's organizations to advocate for women working in the mining industry. The majority of women's groups often have a positive beginning, only to encounter setbacks owing to organizational inefficiency, interpersonal rivalry, inadequate leadership, and corruption (Lauwo, 2018:701). Such organizations sometimes begin inside the government and lack credibility, resulting in many female miners disregarding them. It is very uncommon for organizations to fail to reflect "the lowest of the poor," instead choosing to target women who are already licensed, which obscures the majority of female miners and their needs. Additionally, mining companies often locate their offices far away from mining locations, so the knowledge disseminated during meetings does not make it to female mine workers (McKay, 2018:16-17).

A consequence of women's organizations' lack of cohesiveness and success is their lack of political power and influence. It is not always possible for women's organizations to overcome their difficulties and successfully advocate for their causes. Women's organizations also have the additional difficulty of a culture where males are expected to be dominant and women are expected to be submissive. Even when they do, lack of follow-up holds development back.

2.6 Mining Opportunities for greater participation by women

Despite the many obstacles female miners face, they have shown great potential in profiting significantly and managing thriving companies, proving their indispensable presence in the mining industry according to the Institute for Environment and Development (IIED) (2017a). A 2017, Buss *et al.*, study which was qualitative found that in Uganda's Western Region, women-only teams conduct all elements of the mining process, including the use of males when required. The researchers detail these female entrepreneurs, and women miners' abilities to fight back against sexual harassment and discrimination.

In general, women are regarded as being financially conservative, trying to conserve money and invest in the family and community. A World Bank (2018) research showed

that women are more willing to spend locally and are better at saving than males. Women, prefer to use their extra money to benefit their local communities and families by purchasing food and education for their children (Mutendi 2017:17). Women may initially participate in mining because they face significant challenges, but in the long term, they will have enough opportunity to balance their home and work lives. For example, women who arrived in a mining region with the intention of generating income by providing goods and services to the mining community have amassed enough capital to acquire and operate mines themselves, by investing in pits and holding claims (Kaggwa 2020:399). Women who have found success in mining businesses have been able to increase their efforts in economic diversification, and that is a key part of sustainable development.

As a result, women in the mining industry must be given the attention and support they deserve since their participation is critical in supporting and growing the output of traditionally mined minerals that are becoming more essential as key components of emerging technologies. In the sub-section that follow, a discussion is offered on some of the notable achievements that have helped in raising awareness about the role of women in the mining community and their roles as key members of the community and successful mining entrepreneurs who help support the community's long-term viability.

2.6.3 Mainstreaming and technological advancement

Mining equipment and technology has shown to have a major impact on increasing the quantity of mined minerals while simultaneously enhancing the well-being and safety of mine operators. Equity and gender sensitivity are critical for access to equipment and equipment loans. Developing nations are collaborating with the World Bank and the private sector (including large-scale mining firms) to supply equipment for infrastructure projects. Studies conducted to date (Kotsadam and Tolonen, 2016; Buss and Rutherford, 2020; Macfarlane, 2018) indicate that women in South Africa who work in the coal industry may have missed out on essential information due to a lack of knowledge or gender discrimination. Because of this, efforts are being made to ensure that networks be built around female miners, and new methods of distributing information be sought for so that they may be used to expand women's access to those rare financial schemes. This is an

opportunity being used to take advantage of existing networks, including women's professional groups and other women's organizations.

A comprehensive program that addresses issues not just for the mining industry but also the environmental, health, and safety concerns of society and biodiversity is being built. To go forward in this business, cooperation between government, development partners, and the corporate sector and civil society groups are coming together. This kind of collaboration is taking place via establishing funds that provide loans and grants with more favourable treatment for women (Fakier, & Cock, 2018:55). Similar attempts have been made, for example, by the UNDP, which provides the Sudanese gold miners with an innovative hire-purchase system (Spiegel, 2012). This system was initially created to reduce the use of mercury until it was determined that further improvements could only be achieved via significant upgrades to the mining process that could only be completed with basic equipment. Equipment was made available to groups of female miners that allowed them to purchase a gradually broader variety of items.

2.6.4 Education and skills training as empowerment opportunities for women

Most of the obstacles to women's active and equitable involvement in mining are the consequence of either cultural norms or affected by those practices. Addressing such obstacles involves behavioural change, which in turn takes time, effort and cooperation amongst different stakeholders. Most significantly, increasing awareness and developing knowledge via education has been seen to make a difference in social behaviour and cognitive ability (Rodrigues & Mendes, 2018:33). Women's education and skills training programmes are often regarded as one of the most important facilitators of women's economic empowerment (Hunt & Samman 2016:47). Women's worldviews are broadened by a thorough knowledge, which increases their confidence and capacity to make their own claims, share ideas, and fight for their own rights. There are two ways for women to acquire the knowledge base they need to succeed in mining: formal education and education via short or longer-term courses or skills trails (Rodrigues & Mendes 2018:34).

Education via schooling is a broader component that encourages formal and regular learning from elementary school through higher education (Rodrigues & Mendes 2018:34). While most developing countries have a poor overall school attendance rate, school-aged girls suffer the most as a result of cultural barriers and domestic responsibilities. As a result, many countries have chosen to establish national programmes to promote universal education, using suitable ways to help school-aged girls in poor regions become beneficiaries (Rodrigues & Mendes 2018:34). This will have a longer-term effect on altering society's attitude towards gender equality and boosting women's participation in sectors such as mining, and allowing women to exercise their rights to develop and execute their creative abilities to play a significant constructive role in mining.

Government and non-governmental organisations are failing to collaborate on literacy initiatives for women in mining, which is a more urgent and targeted kind of education. Literacy programmes for women in mining towns may play a significant role in addressing the many gendered problems mentioned above if they are supported by legislation that change legal provisions to promote women's rights to active and equal participation (Poswa & Davies 2017:101). Technical, administrative, and management training; basic literacy courses; and other inductions on government legislation, communications and networking, finding and obtaining information, and processes such as licence application are all common components of literacy programmes (Barankariza 2016:18). Women in mining, like their male counterparts, need technical, managerial, and administrative skills to build and run successful mining businesses. Recent research has found that the most promising approaches to equipping women to be successful small business owners in developing countries focus on personal psychology rather than traditional business skills training: "Personal initiative training led to a boost in profits for micro entrepreneurs and was particularly effective for female entrepreneurs," according to the study (World Bank, 2018).

A training needs analysis should be conducted and training programmes should be initiated to maximise women's involvement in the full spectrum of activities listed above. In Sri Lanka, Brazil, and at the Institute of Gemmology in Madagascar, for example,

training women in value addition such as gemstone cutting and polishing may offer possibilities for women (Eftimie *et al.*, 2012; Lawson, 2016). The training, education, and arts programs that Somos Tesoro has implemented in Colombia allow female miners to reach positions of authority and to feel proud when they work in an environmentally-friendly manner. The empowerment being offered to women has led to greater bargaining power when female miners are confronted with male purchasers of minerals, thanks to novel teaching techniques for women which educate them about gemology, the worth of their stones, and the ways in which their jewellery should be worn (Lawson, 2018).

Training programs should be developed and implemented by governments but also supported by other groups such as civil society organizations, NGOs, development partners, and the business sector. Due to women's place in mining communities, their particular capabilities and the difficulties they encounter, a variety of new strategies may be used to ensure women have effective skill development in mining. Providing unrestricted opportunities for women to express themselves and to share their views is important in fostering a positive female culture. Create an opportunity for learning by inspiration and personal experience-based testimony by having successful women mining operators train women in workgroups and instruct them on the benefit of working alongside professionals who share their gender (Barankariza, 2016). It is essential that training programs be customized in a flexible manner to women's limited time and possibilities, many of which are dictated by their varied daily activities.

2.6.5 Gender mainstreaming of networks, information and mining data

Unrestricted access to information and networks, whether imposed or not, negatively impacts women's roles and influence in mining communities. Information and helpful networks are important in helping women to secure their independence and allow them to successfully carry out all the various positions that are typically considered "male" roles (Poswa & Davies, 2017:101). Opportunities that arise time and again include such issues as the advantages and disadvantages of different activities, regulations and laws, practices and standards, available jobs, funds, equipment, and technology, market conditions, and so on. Having a major effect on all the aforementioned transformations is

elevating women's knowledge and bringing them together to grow their capabilities across the board (Fakier & Cock, 2018:47). An approach that targets both women's in-depth structural issues, and political and social support, is needed.

Both men and women feel the pressure of not having access to geological data, but women are more disadvantaged as a result of their lack of education and technical abilities, and the sexism they face when it comes to supplying such data (Fakier, and Cock, 2018:47). Women should be included in the proposed initiatives that would allow more access to geological data through mechanisms such as mining data centres in mining sites and online systems (Mokotong, 2016). Helping to ease access via subsidized travel, data access inductions, and distribution of information materials is the best method for development partners to set up new centres in areas where women are particularly vulnerable (Wegenast & Beck, 2020). It is important that associations for female miners have strong and active roles in providing geological data and any kind of assistance that is made available to assist women to get simple access. A wide range of extension services, including ones targeting women, will also help women better understand and access geological data (Wegenast & Beck, 2020). This type of training is more practical in nature, making it relevant for women working in mining ministries.

Knowledge has to be produced and disseminated by using creative and effective platforms that empower communication to increase awareness, which influences public policy and practice (Wegenast & Beck, 2020). An example of IIED's successful tales of transformation that have been circulated to national and international events and digital platforms (see IIED 2017a). These tales motivate and serve as role models for other female miners, helping them to bring out great accomplishments and projects. A major role in spreading knowledge and information is played by players in both the public and private sectors, such as national and local governments, community-based organizations, media, and civil society groups (Wegenast & Beck, 2020). Government entities in charge of mining-related departments should help support female miners' organizations, regional miners' organizations, and coal mining workers' organizations. Women's involvement in broader networks has to be addressed so that they get appropriate information and knowledge.

2.6.6 Access to markets and training on marketability

As an important end result of mining activity, access to the right market is a crucial determinant of business survival and success (Wegenast & Beck, 2020). It is frequently difficult for women to travel large distances, since they lack the time, money, and knowledge required (Wegenast & Beck, 2020). Lack of information on markets and pricing is a serious obstacle for mining companies, and it leaves women missing out on a substantial portion of the mineral values. Dialogue between mining company executives and the South African government and development partners highlighted the need of developing retail facilities on mine sites where women have equal access (South African Mining Forum, 2018). These market centres have access to reliable pricing and inventory information, making them good sources for market research. The mining centres may assist link female miners with outside businesses and the rest of the worldwide market as well.

Marketability, company stability, continuity, product quality and standard approval, are all vital. Mining's gender diversity efforts are an excellent way to increase the productivity, design, and quality of their mineral products, and the development of strategies to manage and mitigate business and market risks (Wegenast & Beck, 2020). Training is offered inside the market centres, and all market-related services may be offered in one location. Marketing, branding, and networking with women suppliers, and a program of certification granting third party validation of companies with "a woman at the helm" are supported by TPOs (Australian DFAT, 2017). It is essential to begin an integrated campaign that focuses on developing and marketing companies owned by women in mining that are well-organized and managed.

2.6.7 Building women's institutional capacity

Numerous support services and procedures are required to help solve the intractable problems that women confront. As women, not only are they discriminated against at mining sites, but they also confront difficulties in the home sphere, where they must fulfil

numerous responsibilities and cannot fully use their potential (GROW, 2017). Unburdening women from their home obligations and increasing female involvement at all levels of the mining sector is critical for public and private organizations alike. Another option is providing childcare facilities, so women in the mining industry will not be overloaded. While mining in Peru, a women's miners' organization has organized a nursery and safety equipment for women to help them deal with childcare demands (Maldar, 2011). Comfortable, women-friendly facilities must be created, together with proper equipment and technology for mercury and cyanide. A structured, well-planned, and goal-oriented support mechanism, channelled through existing or new female miners' groups is required. When women are organized and represented in organizations, their voices and power grow.

Women's organizations for women mine workers typically start with little budgets, but big ideas for empowering women in the workplace (Buss *et al*, 2017). These organizations have a hard time just surviving and they struggle to achieve their goals. All these organizations will have a lot of the assistance they need in terms of institutional, administrative, and technical capabilities (Buss *et al*, 2017). Lacking proper facilities, financial and in-kind (material and knowledge) backing, and management, administration, and leadership abilities, most associations fail to meet their stated objectives. A small amount of this assistance is given in locations like South Africa, where the state-owned company known as the State Mining Corporation (STAMICO) and the African Minerals Geosciences Centre (AMGC) supported TAWOMA in the areas of training and knowledge sharing (Buss *et al.*, 2017). However, these efforts are on their own, and it is difficult to assign a role to the organization as a whole. This kind of organization should establish an integrated program of assistance, with defined vision and goals, to assist ensure the organization can deliver on its mission.

When successful and working women's miners' association has been formed, it is a viable conduit for development organizations and other connected institutions to offer assistance and services to help women achieve their potential. Women, however, are prohibited from participating in the primary moneymaking commercial activities in mining, and their many income sources outside of mining may be seen as a path to financial stability (Buss *et al.*,

2017). Women in Sierra Leone, for example, utilize the money they earn from MINE to start companies in the community, including enterprises in agriculture, finance, and trade (such as food) (Maconachie & Hilson, 2011:18). After investing their earnings from selling food and panning for gold, some Ugandan women were able to purchase raw ore for processing, rent out equipment, and own holes (Buss *et al.*, 2017). Through the involvement of female mine workers' organizations, the government and NGOs may assist women put their earnings from MINE to use by helping them to start and manage profitable farming and other small enterprises.

According to Maconachie & Hilson (2011:18) public and private agencies are often seen providing various other support and services. The examples include educational institutions to train and build members' knowledge and capacity; business entities and support centers to provide resources, services, and capacity; government agencies that manage licenses, environmental quality, and land and other relevant agencies to promote policy change or advocate for legal support for women. Both strategic and integrated assistance mechanisms, and an all-in-one resource on women in mining are available to associations already (Buss *et al.*, 2017). It increases their trust with individual female miners by offering these services.

2.6.8 Promoting women's voices through dialogue

It is important to carefully examine gender-specific effects and the role of women in resource preservation and exploitation, with regard to mineral resources such as coastal regions (Westerman & Benbow, 2013:77) and forests (Lahiri-Dutt, 2008:302). Assisting women in planning and decision-making helps all parties, and the environment. In Agarwal (2009), the researchers observed that participation of older women, in particular, improved forest and canopy regeneration by enhancing collaboration and therefore helping to preserve the forest, while also increasing the older women's knowledge of plant species. In her assessment of indigenous women's involvement in mining negotiation, O'Faircheallaigh (2013:93) concluded that although some women were excluded, or

excluding themselves, others had key positions and results were very positive. Women were very important as trustees and leaders in trusts, managing millions of dollars, ensuring the funds were equally distributed between men and women, and then using the money for the agreed-upon purpose.

Research indicates that there is need to find methods to involve women in the discussion while working on complicated projects. A new and important viewpoint is brought to meetings when women are involved (Botha 2016:8). Research indicates that women tend to act in a gender-specific manner when it comes to financial management, saving, and investing in their families. In the presence of a chance to engage, individuals provide novel concepts and methods that are very valuable in leading to sensible resource management and use (Botha 2016:8). Therefore, to divert resources back into the community, it is necessary to develop women's ability to actively engage and have a voice in critical decision-making processes (Botha 2016:9). Comfortable conversation venues must be provided simultaneously as encouraging women in active engagement and boldly hearing their views. There may be a significant role for conversation processes that focus on bottom-up, inclusive participation, backed by field research and ongoing involvement, in identifying and addressing issues related to women's participation (IIED, 2017b).

Various procedures need to be put in place to help promote women's voices. Stakeholders, such as rural women, should be supported to expand their understanding on gender mainstreaming in policies (Botha 2016:9). Gaining support and buy-in is critical since gender-neutral resource management methods used by national governments and NGOs may instead increase the gender gap and exacerbate development outcomes (Eftimie *et al.*, 2012). Promoting informed involvement at all levels is one way to promote involvement from the local women leaders, and doing so helps foster connections across groups.

A very simple change such as ensuring that a women-friendly meeting setting is available, has been seen to help encourage women to become more active participants in issues that concern them. An effort could include having a manageable and well-balanced number of participants, using seating arrangements to provide a welcoming environment,

and using skilled facilitators (who are usually male) to nudge and inspire participation by women. Although Eftimie *et al.*, (2012) note that women won't participate in workshops if they're not in the local language and are conducted in large mixed groups, they add that women won't participate in workshops that aren't done in the local language and conducted in large mixed groups. Even if they do, their involvement is passive rather than active.

This strategy is particularly effective before large community events or meetings, since it allows women to feel confident and build their courage, while also identifying the issues and approaches to communication that may be needed, for example, on who to introduce and how to handle situations where they feel intimidated (Botha 2016:8). Also, this kind of gathering may assist in the emergence of new leaders and allow them to be mentored. must be mindful, however, that women-led meetings may be detrimental, since in addition to privileged and affluent women who may be uninterested in the collective gender, those who want to perpetuate inequality may continue to dominate (Botha 2016:8). At times leaders of female miners' organizations are seen as serving individual interests rather than the interests of the majority.

2.7 Theoretical framework

Theoretical framework presents a broad picture of connections in the phenomena under investigation, offering the researcher a good foundation for explaining how the phenomena develop naturally (Marutlulle, 2019:37). This research draws on feminist, behavioral, and socio-cultural theories, but avoids heavy reliance on critical theory. The theoretical framework defines and presents the theory that explains why the research issue occurs. A framework (theoretical/conceptual) clarifies researchers' assumptions and expectations about their study subjects, and it differentiates the many assumptions and biases the researchers have about the various study subjects (Green, 2014).

A concept: a collection of linked concepts (variables, definitions, and propositions that provide a systematic picture of the world by defining how variables relate to one another

with the goal of understanding natural occurrences (Kerlinger in Creswell, 2009:51). Thus, the “theory serves as a direction for collecting data since it defines the kinds of data to be carefully observed,” according to Blessed and Higson-Smith (Marutlulle, 2019:38). This applies to typical masculine behaviour, which includes point-scoring, backstabbing, aggression, political game playing, and overconfidence, in Davey's (2008) research. As women employ many strategies to manage in male-dominated settings, they use mentor and participative leadership styles such as being compassionate, fair, and encouraging. Critical theory is employed in this study.

2.7.1 Critical theory

Critical theory is an approach that studies society in a dialectical way by analysing political economy, domination, exploitation, and ideologies. It is a normative approach that is based on the judgment that domination is a problem, which a domination-free society is needed (Fraser & Jaeggi 2018:24). It wants to inform political struggles that want to establish such a society. The question of what it means to be critical is of high importance for political communication. All contemporary political communication is in a specific way critical because it consists of speech acts that normally question political opinions and practices of certain actors (How 2017:15). Modern politics is a highly competitive system, in which elections and warfare are ways of distributing and redistributing power. This understanding of critique stands in the tradition of Kantian enlightenment that considered the Enlightenment as an age of criticism (Dejours *et al.*, 2018:15). In contrast to Kant's general understanding of critique, Karl Marx and the Marxian tradition understands the categorical imperative as the need to overcome all forms of slavery and degradation and to unmask alienation (McKie & Doan 2018:13). This school of thought points out a more specific understanding of being critical, namely the questioning of power, domination, and exploitation, the political demand and struggle for a just society. Critical theory is understood as a critique of society (How 2017:15). Scholars in the Marxian inspired tradition employ the term “critical” to stress that not all science is critical, but that a lot of it has a more administrative character that takes power structures for granted, does not question them, or helps to legitimate them (Fraser & Jaeggi, 2018:24).

Some define critical theory as the Frankfurt School's works, a tradition of critical thinking that originated with the works of scholars like Herbert Marcuse, Max Horkheimer, and Teodor W. Adorno (How, 2017: 13-18). Herbert Marcuse was a philosopher, born in Germany in 1898, who fled Nazi Germany to the United States in 1934, where he spent the rest of his life. Max Horkheimer was director of the University of Frankfurt's Institute for Social Research in the years 1930–1959 (Dejours *et al.*, 2018: 12-15). This institute was the home of what came to be known as the Frankfurt School. Teodor W. Adorno was one of the Institute's directors from 1953 until his death in 1969. Horkheimer and Adorno also emigrated, together with the Institute, to the United States, but unlike Marcuse they returned to Germany after the end of World War II. Critical Theory's starting point is the work of Karl Marx (Fraser & Jaeggi, 2018: 23-27).

Critical theory was used as a camouflage term when the Frankfurt theorists (McKie & Doan, 2018:11) were in exile from the Nazis in the United States, where they were concerned about being exposed as communist and Marxian thinkers and therefore took care in the categories they employed (Dejours *et al.*, 2018:15). Some definitions of critical theory couple the usage of this term exclusively to the Frankfurt School or the Habermasian Frankfurt School. A different approach is to identify dimensions of critical theory at the content level (Fraser & Jaeggi, 2018:27). There are six dimensions of a critical theory. The first concerns its epistemology, the next three its ontology, and the latter two its praxeology. Epistemology is a theory of knowledge, it deals with how the very concepts that constitute a theory are constituted and organized (How, 2017:14). Ontology is a theory of being; it deals with the question how reality is organized and develops and this dimension is of importance to this particular study.

Critique of the political economy forms an ontological dimension of critical theory: Marx treated Kant's fundamental philosophical questions about human beings and their knowledge, activities, and hopes in the form of a critical philosophy/theory and critical political economy (Dejours *et al.*, 2018:12). Marx's reformulation of Kant's question was his categorical imperative—the critique of domination and exploitation. Critique of the political economy of communication means to study how power relations shape and are

shaped by the production, diffusion, and consequences of mediated and unmediated communication (Fraser & Jaeggi, 2018:27).

The critique of domination and exploitation is critical theory's second ontological dimension: Critical theory holds that man can be more than a class individual. The goal of critical theory is the transformation of society as a whole so that a just society with peace, wealth, freedom, and self-fulfilment for all can be achieved (Fraser & Jaeggi, 2018:27). A precondition for such a society is the abolition of classes, exploitation, and all forms of domination. Communication is embedded in manifold ways into domination and exploitation. Examples are: that media are forms of communicating and challenging ideology, that communication labour is in contemporary society an important form of surplus-generating labour, that communication is part of the organization of production, distribution, and consumption, that communications have increasingly been turned from common goods into commodities, that class and power relations are sustained and organized with the help of communication, that social struggles make use of media for communicating protest, and so on (How, 2017:16).

Ideology critique is critical theory's third ontological dimension: In dominative societies, domination tends to be masked by ideologies that present reality not as it is, but in mythologized, inverted, and distorted ways (McKie & Doan, 2018:14). Given that in antagonistic societies, political contradictions are expressed in speech acts, it is possible to study ideologies that manifest themselves in such speech and the linguistic and visual strategies political actors use for presenting themselves and those whom they consider as enemies or opponents (Fraser & Jaeggi, 2018:27).

2.8 Chapter summary

In this chapter, the researcher has presented a critical discussion on the subject of women in mining. The chapter was subdivided into sections which shed light on the contextual picture of the mining industry in South Africa, the gradual participation of women in mining and the challenges that women face in the industry. The chapter has noted that while women can make meaningful contribution and play a pivotal role in the industry, it is very

difficult to see the role they play and their contributions because of the existing challenges. One of the most common and dominant challenge standing in the way of the role of women in the industry being recognized include the stereotype that mining is meant for men.

Chapter 3 – Research Methodology

3.1 Introduction

The chapter is a presentation of the method and procedures that were employed by the researcher in the process of data collection. Every procedure is explicitly stated and justified with scholarly evidence. This chapter is inclusive of the data collection approach, pilot study and data analysis approach. The chapter includes sections that explain the methodology, population and sampling, research instrument, data analysis and ethical considerations.

3.2 Research philosophy

Whenever a research is conducted, there exists a question on knowledge originated, its nature and its evolution and this covers the aspect of research philosophy (Coy, 2019:75). The definitions assigned to research philosophy vary in the explanations but are in similar in context in the sense that when studying a phenomenon, there should be stipulations that warrants data collection, data analysis and data utilization (Barnes, 2018:380). There are various research philosophies but the present study adopted interpretivism. Interpretivism, which is sometimes known as an interpretivist, includes researchers who interpret the components of the study. Interpretive scholars thus believe that access to reality is solely via social constructs such as language, awareness, common meanings and tools (Coy, 2019:75). The present study argues that an understanding of the role of women in the mining industry is only possible through an understanding of listening to the experiences of women who have worked in the mining industry.

3.2.1 Ontology

Ontology is the study of existence at its simplest. But it is a lot more, too. Ontology also studies how humans decide whether or not objects exist and how existence is classified (Hochbein & Smeaton, 2018:13). It tries to take abstract concepts and to show that they are really real (Queirós *et al.*, 2017). The first branch is ontology, or 'the study of being,' which focuses on what really exists in the world that people may learn about. Ontology helps scholars understand how sure they can be about the nature and existence of the things they are looking for (Tran, 2016:6). The present study adopted relativist ontology on the basis that the research philosophy is interpretivism. This perspective views reality as inter-subjectively founded on social and experience meanings and understandings (Tran, 2016:6). Relativist ontology is an approach or argument stipulating that outside human thinking, nothing exists and hence limited subjective experienced can be summed as reality. Relativist thinkers points out that there cannot be a separation of what one perceives and what one considers reality (Tran, 2016:6). Reality is human experience, and human experience is reality, according to this viewpoint. This is not about two

individuals having distinct experiences with the outside world; rather, their universes are different. In this anti-foundational philosophy, universal "truths" give place to negotiated truths. People do experience the same phenomenon differently resulting in varied interpretations of that particular phenomenon. The same way there are many individuals is the same way there are many realities (Tran, 2016:7).

In the present study, the role of women in the mining industry cannot be separated from the experiences that women encounter. The present study further argues because of the varied experiences of study participants, the understanding and meaning they give as it pertains to their roles in the mining industry is also varied.

3.2.2 Epistemology

The study of knowledge, or epistemology, is a method of comprehending and explaining how I know what I know. Epistemological inquiry examines the connection between the knower and the knowledge (Epstein & Salinas 2018:73). Epistemology is the study of how one makes sense of the world around them. Ontological views logically constrain epistemological beliefs, although epistemological latitude exists within ontological delimitations (Edmonds & Kennedy 2016:33). For example, believing in the existence of a world apart from consciousness does not imply that meaning exists in the same manner. The present study adopted the subjectivist epistemology.

The idea that knowledge is always mediated via the lenses of language, gender, social class, race, and ethnicity is known as subjectivism (Edmonds & Kennedy 2016:33). While not denying the existence of an external world, subjective epistemology acknowledges knowledge as having worth. Beyond individual reflections and interpretations, there is no way to have unaffected and universal knowledge of an external reality (Bergin, 2018:12). The observer influences observations and the observed influences the observer. There is no such thing as a good or bad picture; it all depends on the person seeing it. Subjective study aims to improve knowledge, raise awareness of ethical and moral problems, and promote personal and political liberation (Edmonds & Kennedy, 2016:33).

Based on subjective epistemology, the role of women in the mining industry can be understood through an understanding of women perceptions. The way women perceive their role in the industry also influences how they act and interact in the industry.

3.3 Research approach

A research approach is a holistic way of doing research which is inclusive of different steps such as data generation, data analysis and data interpretation. There are three types of research methods: deduction, abduction, and induction (Taguchi, 2018:22). Whenever a research seeks to test a hypothesis, the process follows deductive reason in that the initial stages of research are driven by general assumptions while the progression of the research leads to a conclusive argument. Unlike deductive research, there is also inductive research (Jason & Glenwick, 2016:17). Inductive research in its nature associates itself with “intuitive thinking.” Inductive reason was adopted as the suitable method for the present study.

In inductive research, observations are noted and are considered of paramount importance at first. The considerations given to the observations give birth to the development of new theories when the research is concluded (Jason & Glenwick, 2016:17). When a researcher has taken note of their observations, inductive research requires them to draw patterns and give explanations for the patterns drawn. The explanation of drawn patterns is done through a hypothesis. When using the inductive method, the research is not bound to have any theories at hand and is also at liberty to change the course of the research regardless of the stage where they are at (Jason & Glenwick, 2016:17). While it is not a prerequisite to use or have theories at the beginning of the research when using the inductive method, there is no rule that prohibits researchers to adopt a theory or theories in their development of research questions and research objectives (Jason & Glenwick, 2016:17). Data collected during the research process should give the researcher meaning of their research questions and this is the heart of inductive reasoning. The generation of meaning leads to an overall theory of a research (Jason & Glenwick, 2016:17). The foundation of inductive thinking is that learning occurs through experience (Jason & Glenwick, 2016:17).

3.4 Methodological choice

There are three primary techniques for gathering data in research. These techniques are often known as qualitative, quantitative, and mixed (Wang 2015:17). Quantitative techniques utilize numbers, they are quantitative techniques. Complementary techniques utilize both (Strang 2015:45). In this study, the researcher used a qualitative method with a conclusive stance.

Any form of data which is not scientific and does not include numbers is considered to be qualitative data (Morse 2016:125). A plethora of methods exist through which this data can be collected and these methods range from the use of diaries, newspapers and in depth interviews. Two ways exist through which this data can be analyzed and thematic approach and grounded theory are inclusive of those ways (Avella 2016:8). In the present study, the researcher collected, analysed and interpreted non-numerical data collected from in-depth unstructured interviews. Through the in-depth unstructured interviews, the researcher gave the study participants a chance to explain how they subjectively perceive and gave meaning to their social reality in the context of their roles in the mining industry as women.

3.5 Research strategy

When a research is confronted with a choice of which method to use to collect data, their reliance is on the research strategy. This strategy ensures that the methods chosen to collect data aids the research in answering the questions of the research and meets the goals of the research. In this study, the researcher relied on the personal experiences of women in Chaneng as they work in the mining industry. The experiences of the participants in this study are crucial to their understanding of the roles they play and they have been playing in the sector. The personal experiences of these women also indicates their struggles under the leadership of men in mining and how those struggles have been standing in the way of women showcasing their roles and capabilities.

3.6 Time horizon

The timeframe through which a research is conducted is considered a time horizon. There are different time horizons and these include long term studies and short term studies. Short term studies are also known as cross sectional studies and they do not exceed 5 years. Long term studies are also known as longitudinal studies and in long terms studies, data collection spans over years. Participants in this short-term research were questioned about their thoughts on their role in the mining industry.

3.7 Population

A population is a group of people who are the focus of a study, whereas a sample is a particular group of people who are part of the study (Alvi 2016:17). A population may also be considered as a large group of persons or documents that is the focus of a logical investigation (Taherdoost 2016:27). The primary purpose of doing research is to benefit the general public. Nonetheless, due of the enormous population numbers, academics cannot do extensive surveys on each individual in the populace since the expense and time required is prohibitive. An array of individuals or items recognized to share similar characteristics can be considered as study population (Dhivyadeepa, 2015:33). This is mostly true for all individuals and things found in a given population.

Typically, the people and their restrictions are both shown in the same way (Alvi, 2016:17). Land area, age, pay, and many other traits may be used to describe the population. Researchers have to decide on the whole grown-up population of a country, which means making a series of deductions (Dhivyadeepa, 2015:33). Representative samples may be difficult to locate if the population is large, demographically mixed, and topographically dispersed (Taherdoost, 2016:27).

3.7.1 Types of population

3.7.1.1 Target population

When researchers look a group of people with the intention of using their findings from the group of people on a bigger population, the smaller group of people is identified as a target population. The target population can also be identified as a theoretical population but the elements within the target population consists of varying characteristics (Taherdoost, 2016:27). The present study targeted women who work in the mining industry particularly in Chaneng. This target population was informed by the fact that the study's objective is to assess the role of women in the mining industry. Choosing another gender as part of the target population would have defeated the aim and purpose of this present study.

3.7.1.2 Accessible population

The population who can apply the findings of the study is known as the accessible population. This group is part of the population that will be studied, and they are known as the studied population. The study is done by researchers who gather their samples from the general community (Taherdoost, 2016:27).

There are a limited number of women who work in the mining industry and this has already been established through factual evidence in Chapter 2 of this study. As a result of this limitation, the present study could not get access to as many women to involve in the study especially in Chaneng because of how remote the area is. Henceforth, the accessible population to the researcher was 20 (twenty) women.

The researcher obtained permission to interview participants from management at the mine in Chaneng. One of the female assistants at the mine invited women for initial briefing about the study. The researcher addressed the selected women and explained the purpose of the study. Subsequently, the researcher identified women who agreed to take part in the study and provided them with informed consent forms. This was followed by the researcher obtaining participants' contact details in preparation for conducting interviews.

3.8 Research design

The blue print through which a logical manner is followed with the aim of addressing the overall research question is considered as the research design. This blueprint consists of many elements of the research put together. Dhivyadeepa (2015:33) defines the research design as nothing but the gathering, analysis and interpretation of data in a logical manner which ensures that research objectives are met. In laying out the research design of the present study, the following sub-sections are a highlight of how study participants were selected, the methods used for data collection, the research instrument and how data was analysed.

3.8.1 Sampling

Sampling occurs when researchers examine a smaller group of people or a tiny sample of a larger group of possible constituents and use the results to convey information that applies to the larger group or population (Dhivyadeepa, 2015:33). The validity of the investigation structure is directly related to how far the examination findings can be summed up or utilized to the larger gathering or population. The best method to select a sample is essential to sound research (Alvi, 2016:17).

There exists a set of guidelines when choosing a sample for a study:

- Through the increase of a study sample size, magnitude of sampling error diminishes
- Between experimental and survey based studies, requirements for sample size differ
- Cost factors and availability of study participants are the two most important factors to considered when deciding on study sample size

To increase the external validity of your study, you must be knowledgeable with research setup standards (Taherdoost, 2016:27). Essentially, an effective sound sampling method frees the research from bias (every member of the population has an equal chance of being selected) and allows it to be trusted. Researcher selection of the sample must be properly chosen if meaningful conclusions are to be drawn from findings of any study

(Alvi, 2016:17). Sampling techniques may be divided into two types: probability and non-probability sampling:

- A random sample allows you to draw conclusions about the whole group. Probability sampling means that every person in the population has a known likelihood of being included in the research. Simple, stratified systematic, multistage, and cluster sampling techniques comprise the following types of probability sampling techniques (Dhivyadeepa, 2015).

Non-probability sampling is selecting individuals or objects using factors such as convenience or criteria other than randomness, so you can quickly start collecting data. Using non-random criteria, a non-probability sample selects people. Not every person has a chance of being chosen (Alvi, 2016). Sampling of this kind is more readily and less expensive to do, but researchers cannot utilize it to get accurate conclusions about the whole population. For exploratory and qualitative research, non-probability sampling methods are frequently suitable. An early knowledge of a small or under-researched group is the goal in this kind of study (Taherdoost 2016:27).

On certain research projects, it is impossible to generate an irregular probability sample due of time and expense constraints (Dhivyadeepa 2015:33). Individual judgment of the researcher must be used in the selection of sample groups. Abstract judgment, rather than the application of pure mathematics, plays a significant role in the design of most non-probability sampling methods. It is easier to do non-probability sampling for stages of a project like pilot research, such as an exploratory investigation (Taherdoost, 2016). Non-probability sampling requires varying sample sizes depending on the research-explicit variables present in each scenario.

Purposive sampling was used in this research, which is a non-probability sampling technique. The researcher decided to use purposeful sampling by intentionally choosing participants based on their capacity to explain a particular idea, topic, or occurrence. The research purposely included individuals who are women and who are working in the

mining industry in Chaneng to illustrate its findings. Other parameters which were used in selecting the 15 participants who participated in the study out of the 20 that were available included the number of years in the industry, the level of education and the position held by the study participants

The researcher chose to utilize this sampling technique due to the availability of sufficient data to paint a vivid picture of the overall population impact of their results, and because the technique is both fast and economical when compared to other sampling techniques.

3.8.2 Data collection methods

Data collection is the process of gathering and measuring information on targeted variables in an established system, which then enables one to answer relevant questions and evaluate outcomes (Hochbein & Smeaton 2018:8). Data collection is a research component in all study fields, including physical and social sciences, humanities, and business (Chauke 2020:9). While methods vary by discipline, the emphasis on ensuring accurate and honest collection remains the same (Finesse 2018:12). The goal for all data collection is to capture quality evidence that allows analysis to lead to the formulation of convincing and credible answers to the questions that have been posed (Arusha 2021:12). The study used semi-structured interviews for data collection why?. Data collection with each study participant lasted between 45 minutes to 1 (one) hour and this allowed the researcher to exhaust all possible questions that would aid in the understanding of the subject being studied.

The way through which the opinions and experiences of a target population can be drawn to assess them against given research questions is through data collection hence data collection methods refer to the apparatus chosen to download information from a particular sample. Data collection methods are different in context in the sense that some methods are secondary? while others are primary (Corner, 2015:24).

3.8.2.1 Primary data collection methods

Primary data collection methods can be divided into two groups: quantitative and qualitative. Due to the fact that this study is qualitative, the primary data collection tool was interviews. An interview is essentially a structured conversation where one participant asks questions, and the other provides answers. In common parlance, the word "interview" refers to a one-on-one conversation between an interviewer and an interviewee. There are several types of interviews and these are inclusive of face to face, phone and online interviews. Due to COVID-19 restrictions at the time of the study, the researcher opted for online interviews that were conducted via zoom. Interviews proved to be the most effective data collection instrument for this study because:

- They help the researcher explain, better understand, and explore research subjects' opinions, behaviour, experiences, phenomenon, etc.
- Interview questions are usually open-ended questions so that in-depth information will be collected.

In this present study, the researcher utilized both secondary data collection methods and primary data collection methods. The primary data collection methods utilized in the study as already indicated were online interviews.

The process of data collection lasted for a period of two consecutive weeks. Each study participant was interviewed for at least 1 hour and 15 minutes. The amount of time allocated for each interview allowed for the researcher to saturate all questions and follow up questions that stemmed from the responses given by participants. Each interview included 12 guiding questions (see Appendix C). However, because the interviews were semi-structured, there were questions that emerged as a result of what the study participants had previously said.

3.8.3 Research instrument

A research instrument is a unique tool used in a study to access information from research participants. This tool allows for systematic collection of information hence its importance (Coy, 2019:77). Because the present study relied on lived experiences, the researcher designed a semi-structured interview schedule (see Appendix C).

Interviews are used to collect data from a small group of subjects on a broad range of topics. The researcher can use structured or unstructured interviews (Adams *et al.*, 2016: 1-8). Structured interviews are comparable to a questionnaire, with the same questions in the same order for each subject and with multiple choice answers. For unstructured interviews questions can differ per subject and can depend on answers given on previous questions, there is no fixed set of possible answers (Dickerson *et al.*, 2020:37).

Draft questions were formulated to enquire about particular areas of the research topic. Nonetheless, the data collection procedure was unstructured implying that some questions asked during the interviews were dependent on the person being interviewed, the responses they gave and the emotion they exhibited.

3.9 Pilot study

A literature study on the role of women in mining was initially done to create the interview guide. Following this, a two-step procedure was implemented to evaluate the interview guide's validity and relevance. To avoid mistakes such as leading, confusing, or double-barrelled questions, the interview guide was evaluated by an expert in question design before it was given to candidates. The third step in the research was a preliminary survey done with three experienced industry experts who had years of expertise in three distinct mines. The comments they provided was included into the interview guide, which they finalized. After the questions intended to profile responders were included, the guide was completed. Also, the book discussed the significance of women in the mining sector.

Mechanization offers an opportunity for women in the sector, as the mining trends show. Other industries, especially ones dealing with resources, use a value chain that has several stages: Exploration, product handling, mineral beneficiation, etc. The activities on each of these phases will offer chances for women's involvement. A pilot research showed that the share of women at board level among JSE-listed mining firms was the highest. Female workers in human resources roles were often found at mine sites and mining firms, but never near the rock face. Over time, this has altered.

Women's abilities have developed greatly over the past decade, resulting in a large number of well-experienced senior executives working in major mining companies throughout the country and across the world. The industry has changed so drastically in regards to gender equality over the last several decades.

3.10 Data analysis

Data analysis is the process of cleaning data collected for the purposes of finding information that answers the research questions (Coy 2019: 109). There are several types of qualitative data analysis, all of which serve different purposes and have unique strengths and weaknesses (Bleiker *et al*, 2019: 235). These: include content analysis, narrative analysis, discourse analysis, thematic analysis, grounded theory, and interpretive phenomenological analysis (Bleiker *et al*, 2019:2001). This study adopted thematic analysis.

Thematic analysis looks at patterns of meaning in a data set – for example, a set of interviews or focus group transcripts (Barnes, 2018). A thematic analysis takes bodies of data (which are often quite large) and groups them according to similar themes (Bleiker *et al*, 2019: 283). These themes enable the researcher to make sense of the content and derive meaning from it. Since thematic analysis is an exploratory process, it is not unusual for one's research questions to develop, or even change as one progresses through the analysis (Hochbein & Smeaton, 2018: 163). While this is somewhat natural in exploratory research, it can also be seen as a disadvantage as it means that data needs to be re-reviewed each time a research question is adjusted (Bleiker *et al*, 2019: 225).

In this study, there were three major steps in thematic analysis. These steps entailed reduction of the text, investigation of the text, and integration of the exploration. In analysing data, the researcher used data logging, anecdotes, vignettes, data coding and thematic network.

3.10.1 Data logging

Data logging was the initial stage. Interview with 15 participants produced raw data that was recorded on a recorded sheet. The researcher also documented the assumptions and views about the topic, and the emotions, thoughts, and discoveries of the research participants. The researcher recorded all the general answer for the purposes of sifting them later.

3.10.2 Anecdotes

The researcher created records from the subjects' answers after which they began preparing tales. Anecdotes are a refinement of logs written in such a way that they are read to be recorded (McLaughlin, Bush and Zeeman, 2016:11). In this process, the data log was restructured to provide a better comprehension of the data gathered. The progressive organization of transformation processes for women in mining was what emerged here. Following the study participants' narrative explanations immediately after data collection, the researcher described the sequential structure of the narrative explanation so as to avoid distorting of information. To get references as nodes, they were utilized as the resource. Thus, the researchers had to create emotions and choose the topics to investigate.

3.10.3 Vignettes

A story that re-organizes various magnitudes of the topic to capture information about the subject matter is called a vignette (McLaughlin, Bush and Zeeman, 2016:11). By using vignettes, the researcher attempted to convey richly detailed information in the form of a narrative tale. The primary objective of this was to establish the study's credibility and get a better knowledge of the topic to provide a higher degree of interpretation. The vignettes were used to offer more in-depth information to aid readers in better understanding and to assist them believe the story. It provided an added degree of knowledge of the phenomena and motifs were captured. This was done so that the readers would be able to draw conclusions about how to apply the results to other scenarios or circumstances.

3.10.4 Data coding

To get qualitative data ready for analysis, the interview answers were recorded in the form of logs and polished into anecdotes. The researcher assembled content-related data and labelled it to a particular topic or concept, these text fragments were transformed into meaningful and manageable components. These are the 'references' that may be found in the form of open data coding as 'nodes.' Using the data in mind, this helped organize, sort, manage, develop, and change the data. The goal of this was to eliminate inconsistencies for the sake of content analysis. As 'nodes' were established, they offered a central location for the relevant information described as 'references'. The fact that they are almost identical causes the new 'codes' that are constructed from 'references' to allow for the addition, renaming, and deletion of nodes while data analysis is in progress. The researcher verified the transcription to make sure it was accurate and then frequently reviewed the data to better comprehend the database. This resulted in a reduced number of refined codes, which were subsequently confirmed. The present study meticulously chose and collected data that went to great lengths to avoid repeating, but completely disregarded other data that did not properly offer support for the project's focus. From this, clear motifs developed.

Interview text (anecdotes) was broken down into understandable and digestible text chunks to reduce the data. The researcher collected or "tagged" relevant data around a particular topic or concept using the method.

3.10.5 Thematic network

The thematic network consists of three phases, the first two of which focus on fundamental and organizing topics. When the researcher analysed participants' speech, the researcher investigated the connections that exist between the explicit assertions and the implicit meanings. This was useful in bringing together ideas and helping with their interpretation and arrangement. A thematic network was created starting with the fundamental topics and then progressed 'inwards' to a final topic.

3.11 Validity and reliability

The following elements were considered for trustworthiness of the study and adhered to in the present study:

a) Credibility (in preference to internal validity);

This refers to a person's belief in the validity of a study's results. Findings are credible when they can be backed up by evidence collected from participants' original data, and interpreted correctly based on their perspectives. The researcher utilised extended interaction and triangulation of researchers to guarantee the validity of the present study.

b) Transferability (in preference to external validity/generalisability);

Transferability refers to the extent to which qualitative research findings can be applied to new situations or settings with new participants. The researcher made it easier for a potential user to make a transferability decision by providing a lot of detail.

c) Dependability (in preference to reliability);

Dependability is the consistency of findings across the course of research. Trustworthiness involves participants' assessment and interpretation of findings as well as research suggestions that are backed up by the collected data from study participants. It was possible to assure dependability by using an audit trail.

d) Confirmability (in preference to objectivity).

Other researchers could confirm the extent to which the study's conclusions were confirmed. When it comes to confirmability, the goal is to show that the data and interpretations drawn from the findings are in fact based on the data itself. The researcher had to once again rely on audit trail to ensure conformity.

3.12 Ethical considerations

- Permission to conduct study was sought from UNISA.

- The researcher sought explicit, informed consent to use personal data from the participants. In cases where there was no consent the researcher provided justification and explained all the measures that were taken.
- The researcher ensured that research data subjects received the following information: information the researcher held about them; how that information was going to be used; all the other parties that would have access to this information.
- The researcher also tried to handle the least amount of personally identifiable data possible.
- The researcher had written procedures setting out how the personal data was to be handled, stored and accessed.

3.13 Limitations

Unfortunately, the study's data collection coincided with the unanticipated COVID-19 restrictions, which had an influence on participant availability and limited the researcher's options for follow-up interviews, as some participants were retrenched before the study was completed. The mining industry's instability at the time also contributed to the amount of value participants placed on the research, since some were more concerned about job security than career progression at the time. During the data collection process, it became clear that some participants were hesitant to share critical information for fear of being victimized, highlighting the industry's culture once again. Some suggestions need proper feasibility studies and financial resources to implement; as a result, it is suggested that the mining industry warrants more research to explore particular concerns that require more attention.

3.14 Chapter summary

The present chapter has provided a contextual overview of how data in the present study was collected, analyzed, interpreted and presented. One outstanding feature of the present chapter is that methods and tools have a justification. Conclusively, the present

study adopted an interpretivist philosophy, relativist ontology and subjective epistemology. The research approach adopted and discussed in this chapter is inductive reasoning while methodological choice is qualitative. In a nutshell, the chapter included the people involved in the study, how data was collected from them and how data was analysed against the existing research objectives.

Chapter 4 - Data Presentation and Analysis

4.1 Introduction

In the present chapter, the presentation of data is detailed. Thematic analysis adopted in this chapter implies that after data collection from interviews, presentation follows a manner whereby data that speaks the same language is put together and interpreted. Direct quotations from interviewees are noted as a way of support each theme presented. In light of research ethics, each direct quote in this chapter is assigned to a pseudo name so that the identities of the study participants are protected. When it comes to qualitative analysis, the researcher discovered that theme analysis was a flexible method that allowed for the development of new ideas and concepts from data. The chapter is subdivided into the participant's demographics, presentation of themes and chapter summary.

4.2 Participants demographic data

Characteristic	Frequency
RACE	
WHITE	8
BLACK	3
INDIAN	4
ETHNIC GROUP	
TSWANA	2
ZULU	5
VENDA	1
ENGLISH	3
AFRIKAANS	4
AGE GROUP	
20-29	3
30-39	7
40-49	5

LEVEL OF EDUCATION	
MATRIC + MINING CERTIFICATE/TICKET	7
DIPLOMA	3
UNIVERSITY DEGREE	2
HONORS DEGREE	2
MASTER DEGREE	1
WORK AREA	
UNDERGROUND	3
SURFACE	9
MANAGEMENT	3
MARITAL STATUS	
SINGLE (NEVER MARRIED)	3
ENGAGED	3
MARRIED	6
DIVORCED	3
NUMBER OF YEARS IN CURRENT POSITION	
0-2	2
3-5	9
5+	4
NUMBER OF YEARS IN MINING INDUSTRY	
2-5	5
6+	10

Table 1: Participants demographics

Source: Field survey (2021)

Table 1 illustrates the demographics of the fifteen (n=15) female research participants in the mining sector in Chaneng. Study participants were White, Indian or Black. The differences in terms of race serve to highlight on the differences of experiences between study participants. South Africa has a legacy of apartheid and this implies that in terms of work, race has played a part in how people are assigned to and how they perceive their roles. The varied perception of women's role in the mining industry in accordance with

race also has its foundation in subject epistemology which argues that people do not only have different experiences but those different experiences create different realities. Study participants were also of different age groups had different qualifications and number of years in the mining industry. These differences aided in explaining the different roles they all play and also the different perceptions they have of their roles in the industry.

4.3 Themes

The interviews that were conducted during the course of the study brought to light four major themes. These four themes have their foundation closely linked to the research objectives stated in Chapter 2 of this present study. The themes discussed in this study are representative of the discrimination towards women in the industry as they are still assigned less labour-intensive roles. The themes include leadership, research and training and awareness of the roles of women in mining.

4.3.1 Leadership

This theme largely speaks on the less labour-intensive role played by women in mining. The theme has its foundation in the role played by women mostly in top and executive positions. While the other women in the study were found to be not in leadership positions, they still attested the existence of this special role being played by women.

With regard to increasing the participation of women in the workplace, there is both a commercial and a moral duty on the part of mining firms to help make women a more equal part of society. While the corporate sector has made significant strides, the mining industry is lagging behind in the number of women employed and more so in having women in leadership positions in the industry. Additional studies have shown that employment problems in mining operations are significant contributing factors in the number of women quitting mining jobs and the number of women occupying leadership positions.

With this observation, it becomes clear that the mining industry's transformation is not just about getting more women involved, but also supporting these women to help retain their interest in the profession. The ascension of women to leadership positions in the mining industry will lead to an improved reputation for the industry, which in turn will help attract women into the profession. Attitudes must be adjusted, but structural and administrative adjustments are also necessary which implies giving women the opportunity to hold more leadership positions.

“One of the most important roles that women have is leadership in the industry. Regardless of how few we are, we have women at the top that if you have a good relationship with, you can always look up to.” Participant B

“If there is something that I am grateful as a woman was the chance to be elevated to the position of Director of Safety. Not only is this reflective of the role that women are capable but it shows that the industry is starting to have confidence in us as women.” Participant E

“The number of women taking leadership roles in the industry is steadily increasing nonetheless; the role has its own pecks. Every time you want information, reports, or presentations done for you, people will approach you with those requests. Meetings are planned as being important and taking place as long as business need them, and to leave the meeting, you'll get the 'look' or find yourself removed from critical initiatives due to your lack of 'dependability.' The Mining industry in Cheneng expects all employees to be on call around the clock, 365 days a year because of their poor planning and a widespread idea that as you rise in the ranks, everything that you do becomes a significant part of your job. The point is, we are granted vacation time, so long as our mobile phones are constantly on, since the firm needs us and we are constantly needed to provide support in regard to business choices that might impact the firm.” Participant C

Study participants agreed to the notion of women being involved and taking the role of leadership in the industry. However some participants echoed their sentiments on the need for success of women in leadership positions to be measured against the success

of men. The results from such comparisons can be used as a yardstick to measure whether or not the role of women in leadership should be promoted.

“The structural approach is to put the rules and measurements we use to judge the success of women in leadership against the rules and measures we use to judge the success of males in leadership. So, the criteria we often establish are ones that measure the amount of women in the sector, in senior management, and their representation at the board level, but by not looking at measures that evaluate risk and opportunity, we overlook the quality of these figures.” Participant F

“It is vital to ask questions that examine many regions and components of the workplace to help guarantee that the number of women assuming leadership roles improves.” Participant A

Overall, one of the roles of paramount importance taken by women in the mining industry is the role of leadership. While it is like that, there has to be a greater effort on simplifying the mining industry's initiatives to help women succeed in the workplace. By making an attempt to boost the number of women in the sector, together with choices that favor women these measures should help to accomplish this goal.

“I have been using my role as the Chief Operating Officer to implement several initiatives. These programs are focused on gender diversity and inclusion, men-centered diversity and inclusion efforts and mining-specific gender development guidelines and the introduction of KPIs for women in senior management. I ask managers to include women in senior management KPIs and review and adapt their work environments to meet the needs of women. Job shadowing, training, recruiting, retention, talent pools, and succession planning are all part of the interventions that I have been advocating for through the privilege of my position as COO.” Participant G

4.3.2 Technological advancements

For the purpose of this study, this theme is closely linked to research and leadership as it sheds light on the role of inventors played by women in improving mining operations and efficiency.

With the significance of mining continuing to grow, new and more sustainable technologies and practices are being applied. This will have a significant impact on the structure of the mining sector, with the outdated need for human workers likely to be diminished by automation and robots. There is a large amount of talk about the job catastrophe these technologies will cause, yet there is a silver lining to be found here: these technologies will undoubtedly lead to more employment in some fields. With less reliance on physical labour, and with more use of intellectual requirements, the gender mix of the mining industry is expected to become less significant.

New roles will be required as the mining process becomes more automated. As the sector moves forward with technology like as drones and data science, it will become more enticing to those with a background in Information and Communication Technology (ICT) and Science, Technology, Engineering, and Mathematics (STEM). Despite the fact that women account for the majority of graduates, very few embark into employment in the mining and oil industries, due to their negative feelings about the corporate culture. It's quite rare for women to work in the mining business, but those who do occupy the role of innovator, enhancing the current mining operations.

“Seeing how much it is difficult to get an underground job in the industry, I decided that I would study robotics at university. This allowed me to get a job in the industry as a surface worker but with a role of importance and a higher pay grade than most men. In my department, I am one of the few that are inventing the technologies that we now use in our operations at the mining plant.” Participant D

“My observations have been that it is very difficult to work in this industry which is why I decided to go back to school. My hope is that I will be able to study for something that will allow me to work in the industry that I love so much and still be able to make a contribution without discrimination standing in my way... For this reason, my studies are along the lines of technology and innovation.” Participant I

“We have long accepted that it is difficult to put men and women underground and expect them to produce the same. Men are more powerful than women; they have always been and will always be. That has been a reason enough for us to develop programs that educate women so that they lead and take the role of innovations in the industry. Those who are already leading innovation in the industry are doing a marvelous job.” Participant G

“Rather than only focusing on traditional sectors such as human resources, our measurements evaluate progress for gender equity in the sector. When we merely look at the percentage of women in mining, we mask the unique roles they are playing in the industry, as leaders and as innovators.” Participant A

The majority of the study participants highlighted that women are playing the role of innovators as a counter effort to the discrimination presented by men that they cannot work underground. To partake the role of innovators with pride, some women have taken the onus of furthering their education.

“With the number of women taking the role of innovators, there is no doubt that a change is coming in the industry. It's going at a speed most of us would prefer, but it is arriving at a far slower pace. I believe that for me, a lot of people are just trying to do the right things, and whether or not it eventually converts into reality, we'll have to wait and see.” Participant D

“Advances in technology are one of the contributing reasons that have helped mining becomes more progressive, and that more gender-role flexibility in society meant that women had always been destined to break into the industry. Inclusiveness is on the rise, as mining processes become less labour-intensive. As this happens, the mining sector becomes more gender-neutral hence the role innovators taken by women in the industry.” Participant H

“To level the playing fields in terms of perceived and real gaps between genders, it is critical to invest in the required infrastructure that makes digital tools publicly and democratically accessible. Some circumstances in the sector necessitate changes in mindset, and purposeful transformations provide an opportunity to

eliminate obstacles; many women, using the occupation of innovators, are seizing the chance to make this change.” Participant K

More and more of the mining sector is concerned with technologies that forecast, prevent, mitigate, or remedy environmental concerns. In the event that a new and environmentally sound mining process is developed, then new mining operations that may have previously been refused due to unacceptable environmental hazards may be given the green light. Technological innovations may lead to lower facility and compliance expenses as well. Ensuring the long-term maintenance expenses are considered would maximize productivity and help lower energy consumption due to increased productivity and reduced energy usage. Closure processes often have an impact on the quality of drainage water from the mine, and as a result, the usage of the land might be affected. Capitalization by interest-bearing funds is now required for the long-term treatment of drainage water from mines. With modern permanent therapies costing so much, one may assume that temporary solutions would be more cost-effective. Environmentally and economically beneficial technologies that help reduce drainage issues include “walk-away” closures. In addition, long-term strategies prevent issues from escalating rather than merely dealing with their after-effects. At the centre of the development of the technologies that make all this possible is the role played by women.

4.3.3 Research

For the purpose of this study, “research” speaks to a role played by women in mining as they work to improve the mining operations. This role also speaks of the less labour intensive role assigned to women as a result of male dominance in the industry.

Just like any other industry, the mining industry thrives very much on research. The process of digging out large amounts of earth and rock and dumping the resulting waste in a controlled manner creates large-scale surface disturbances, results in large volumes of waste materials, and exposes previously buried geologic materials to the processes of oxidation and precipitation hence the need for research teams in the industry and mining

organizations. Due to the less-labour intensive nature of research, the role doing research is often assigned to women.

“Whenever I tell people that I work in a mine, the assumption is that I work underground with men. You often hear people say, ‘Mara are you able to do all the work that men do? Do you have the strength? Why are you not looking for a job that suits a lady?’ I am always surprised that I do not have to deal with these stereotypes from work only but also from people that I meet in the community. What most people do not know and understand is that within the mining industry, there are many roles that people assume and all these roles are equally important to the functioning of any mine. My role is that of a researcher and I am one of the key people to determine whether or not we should continue mining in a place or we should shut down the place.” Participant L

“I went on a blind date with this other guy. Everything was going on well until we got to the point where we started speaking about careers. I asked him what he was doing and he told me he worked in construction. When I told him that I was in the mining industry, I could see the expression on his face change from happy to disappointment. He didn’t give me the chance to tell him what I did in a mine. I lead a research department and had he given me the chance to tell him, he would have seen what role I play and the perception that he had upon hearing that I work in the mine is the same perception that most men have. The assumption is that we all work underground and we cannot handle the work because the industry is male dominated.” Participant O

“When I got hired, the person who showed me the ropes and helped me navigate the terrain of the industry was a lady who worked in the research department. She didn’t have a fancy position but she knew so much about the industry and her advice kept me safe to this very day.” Participant C

The perceptions shared by Participants L, O and C shed light on the role of researcher played by women. The perceptions are reflective of how the mining industry is big organ

with different components all playing their various roles to the functioning and profit of the organ. This sums up the fact, “the whole is greater than the sum of its parts.”

4.3.4 Training and awareness

This theme is a highlight of the role of women in empowering other women acting as the face of the mining industry interacting with communities on behalf of the industry. The role also sheds light on the power that women are taking in sharing knowledge with other women on how they should participate in the industry.

For years, the mining industry has been sluggish to change, but today it is being acknowledged that the women who take on high roles are setting a new trend and inspiring a new generation to choose mining as a profession. Many of the impediments that women have faced as they've worked their way up the job ladder have diminished, but these hurdles remain at the upper levels. Despite the historical obstacles that males have had in recognizing various sorts of nonverbal discrimination, it's still a reality for them on a daily basis.

“When you travel to these trade conferences and exhibits, visitors flock towards your booth, but naturally direct their conversations towards the men, and pay attention to the female visitor as their personal assistant.” Participant D

“In my prior jobs, I had a mentor who helped me discover possibilities in myself that I may not have seen. Having had a wonderful experience with my mentor, I became motivated to support and nurture others in similar situations. Experience has without a doubt shown the critical value of helping others, and I'm eager to assist in that endeavor. For this reason, I utilize my voice to fight for women in the business by advocating for training and knowledge that is specific to their needs.”

Participant L

“However, I'm a strong proponent of growth and progress. I'd like to claim that I provide individuals with a safe area in which to explore, fail, and learn from their mistakes. And if they fail, it's not about ‘damaging their self-esteem,’ but about

figuring out 'how we go forward after the failure.' When women have historically been underrepresented in male-dominated work environments, it's beneficial for any new professional to be able to work on growing their skill set and understanding their aptitudes. Without this opportunity to fail, many leaders have noted, we're often unable to build confidence, or to take the next steps forward in a task, project, or career.” Participant A

“There are many situations in which professional women have learned significant lessons through bad experiences with mentoring: after finding a mentor in an industry, they have come to realize that mentoring relationships don't always work out, and that effort is required on both sides. In order for a mentoring relationship to be really rewarding, both sides must fully engage. A valuable mentor is someone who is understanding, eager to listen, and is prepared to provide support without demanding anything more than the happiness they've provided.” Participant F

“One piece of advice for younger professionals in this field is to do some 'shopping around' and learn about the professionals whom they admire first before making an attempt to connect with them. Whether that involves researching people online or simply meeting them at networking events, getting to know them is essential. Having become personally engaged and then incorporated training and awareness, I am ready to move on to the next phase to help prepare women for future jobs in mining, particularly those who are mentees.” Participant H

Women in senior positions have an especially crucial role to play in shaping the future of the business, as they help pave the way for the next generation to succeed. Most participants in this survey saw good results of using technology to link women working in distant locations who may not have had the opportunity to be mentored and connected if they lived in a central area. People of days can only get role models and helpful counsel through the internet.

4.4 Conclusion

This chapter has captured the essence of this research which is to understand the role of women in the mining industry in Chaneng. Responses recorded in this chapter are drawn from fifteen women holding different positions. As a result of the ethical consideration of privacy, the participants are recognized through pseudonyms, their perceptions were recorded. Four major themes have been discussed in this chapter capturing the role that women play in the mining industry. These themes are inclusive of leadership, inventions, research and training and awareness. The following chapter concludes the study assessing whether or not the objectives of the research have been effectively met.

Chapter 5 – Discussion, Conclusion and Recommendations

5.1 Introduction

This study sought to explore the role of women in the mining industry in Chaneng, Rustenburg. This chapter offers a discussion of the research findings, conclusions and recommendations. The study was qualitative with an interpretivism philosophy. The study adopted relativist ontology and subjective epistemology. The researcher used the critical

theory to guide the discussion of the study. It should be noted that the study found women to play different roles within the sector such as leadership, inventors, researchers and training and awareness. Nonetheless, the roles that women in this study play are always impeded by the challenges and segregation associated with the industry in question. The following discussions are built on the objectives stated in chapter 1. The discussions in this chapter entails the findings established in chapter 4 in terms of existing literature on the subject under discussion, objectives of the study and chosen theories. The study was guided by the following research objectives:

- To explore the role of women in the mining sector in Chaneng.
- To analyse the impact of women's participation in transforming the mining industry.
- To assess the existing opportunities provided for women within the mining sector.
- To critically appraise the extent to which women participate in decision-making processes within the mining sector.

The following research questions were used in the development of the research instrument (see appendix C).

- What is the role of women in the South African mining sector?
- What is impact the impact of women's participation in transforming the mining industry?
- What are the existing opportunities provided for women within the mining sector?
- To what extent are women participating in the decision-making processes in the mining sector?

5.2 Discussion

5.2.1 To explore the role of women in the mining sector in Chaneng

In exploring the role of women in the mining sector in Chaneng, the study reveals that women play various roles in the mining industry in Chaneng and most of these roles are less labour intensive. Some of the roles being played by the various women in this study include leadership associated roles, inventor roles, researcher roles and mentors at the

center of training and awareness. 3 of the study participants indicated to be in management a position which was translated to be leadership positions. These findings especially the role of leadership was found to be consistent with existing literature on the subject under discussion. The leadership provided by women in the industry has been found to have positive impact as it opens room for women to get employed in the industry. The leadership roles occupied by study participants included Director of Safety, Chief Operating Officer and Human Resources Manager. Participant B in the study was quoted saying, “one of the most important roles that women have is leadership in the mining industry in Chaneng. Regardless of how few we are, we have women at the top that if you have a good relationship with, you can always look up to.”

In the South African listed mining firms, there are more female senior executives. Another notable effect of more female board participation is that it may aid the mining sector in both recruiting and cost inflation (Laplonge 2017: 304-309). The solution is to include a broader range of persons in the solution, which will result in better results for both the industry and the people engaged. At this moment, it is important to encourage gender equality in recruiting and career development (Botha 2016: 1-12). When it comes to mining businesses, there are several factors at play: fewer women work in the industry, and women are underrepresented on mining company boards. To achieve senior management and board positions, the mining sector must first identify and deal with the problems that hinder women from progressing (Benya 2017: 509-522: 509-522).

Public attention has focused on demands for legislated quotas for women in top management since at least the late 1990s (Benya 2017:519). Additional research shows that, in addition to a strong argument for gender equality, higher financial performance, better governance, and lower risk of bankruptcy are all linked to the involvement of women in corporate leadership roles (Jenkins, 2017:1459). However, there are divergent opinions on how to increase gender diversity, among both men and women (Botha 2016:11).

From the participants that participated in the study, 3 participants occupied management positions which further cements that leadership is one of the roles that women play in mining. Regardless of the preceding finding, there are claims that barely 10% of the worldwide mining workforce is female (Botha 2016:255). This certainly has a modest

impact on the percentage of women who hold senior executive roles; women occupy just 5% of the top 500 mining company board seats. A total of 10% of all employees in the mining sector are women (Sesele, 2020:17). In 2010, worldwide, the median percentage of female graduates rose from 51% to 54% when the statistics from UNESCO revealed that the proportion of female graduates had increased from 51% to 55% in the previous decade. Because fewer than half of the workforce is being used, mining firms are sourcing their employees from the less than half of the total labour available (Jenkins and Boudewijn, 2020:303). Even when women comprise a majority of the mining workforce, there remains an underrepresentation of females on mining boards. Only 4% of board seats in the mining sector are held by women. We face unprecedented difficulties as we look for talent in the mining sector (Pretorius 2019:671). Mining firms have a much harder time finding the specific skill sets they need to satisfy the increasing demand for natural resources as demographics shift and resource demand grows. For this challenge, mining firms will have to broaden their recruiting methods.

Women have been found to exceed men on seven of the top ten leadership characteristics, and for the most part, in a research study performed at INSEAD (a non-profit, private university with locations in Europe, Asia, the Middle East, and North America), they exceed men on team building and emotional intelligence (Pretorius 2019: 657-670: 657-670). There are many stakeholders in the global mining industry, including governments, investors, lenders, workers, community members, non-governmental organizations, and the environment (Eshun, 2020, p 158). Based on the findings found in the INSEAD study, it may be beneficial to women in the mining industry. When gender balance in the mining sector is improved, this increases the chance that more gender-balanced leaders will be present, however, business organizations also have to promote gender-balanced leadership approaches (Eshun, 2020, p 158).

Assessing these findings in terms of critical theory reveals that systems-control thinking dominates modernist definitions of leadership. This conceptualization reduces leadership to a set of technical skills designed to control the productivity of human labour. This kind of observation therefore makes it possible for most of the study participants to be in

leadership positions because it foregoes the ideas of gender and focuses on technical skill.

5.2.2 To analyse the impact of women's participation in transforming the mining industry

In identifying the impact of women in the transformation of the mining industry in Chaneng the study reveals that most women are using education to become innovators. Innovation in this study was found to be transforming the operations of the industry while opening opportunities for tech-savvy women to get involved in the industry. To buttress this idea, one participant indicated, "seeing how much it is difficult to get an underground job in the industry, I decided that I would study robotics at university. This allowed me to get a job in the mining industry as a surface worker but with a role of importance and a higher pay grade than most men. In my department, I am one of the few that are inventing the technologies that we now use in our operations at the mining plant."

Existing literature on the subject matter concurs with this study. Analysts of the mining industry agree that in the not-too-distant future, women will be occupying more roles related to transforming the mining industry through technology (Eshun, 2020:158). Mining can only continue in one of two directions: decline or adaptation. The sector must shift gears, embracing change instead of resisting it (Laplonge 2017:307). It is important that a readiness to change should extend to outmoded notions of mining being a male-dominated sector, and individuals in positions of decision-making should work to renovate the sector. One outstanding feature in the way the mining industry is transforming is that women have taken note of the shift being brought by technology to the industry and they have taken the onus to drive technology in the industry bringing transformation and impact (Laplonge 2017:307).

The goal of critical theory is the transformation of society as a whole so that a just society with peace, wealth, freedom, and self-fulfillment for all can be achieved (Fraser & Jaeggi, 2018:25). A precondition for such a society is the abolition of classes, exploitation, and all forms of domination. The involvement of more women in the mining industry leads to

the abolition of existing classes in the sector and increased competition between men and women makes it even more difficult for men to dominate women in the sector.

5.2.3 To assess the existing opportunities provided for women within the mining sector

In assessing the existing opportunities provided for women within the mining sector in Chaneng, the study discovered that there is on-going training and awareness of the roles that women can play in the industry. The provision of training and awareness is done in schools and in workshops. Women executives from the mining sector in Chaneng get to attend career guidance programs where they share their experiences and roles with young girls and women who are unemployed. The motivation is to ensure that there are more women aspiring to get involved in the sector. The training and awareness is also targeted at men in the industry to ensure that they have an appreciation of the role their counterparts play in the industry. Training and awareness for men also ensures that they treat women as their equals and not subordinates based on the notion that women are equally competent. These findings can be summed through the words of Participant L, “in my prior jobs, I had a mentor who helped me discover possibilities in myself that I may not have seen. Having had a wonderful experience with my mentor, I became motivated to support and nurture others in similar situations. Experience has without a doubt shown the critical value of helping others, and I'm eager to assist in that endeavor. For this reason, I utilize my voice to fight for women in the business by advocating for training and knowledge that is specific to their needs.” Another participant who shared the same sentiments is participant H, “one piece of advice for younger professionals in this field is to do some ‘shopping around’ and learn about the professionals whom they admire first before making an attempt to connect with them. Whether that involves researching people online or simply meeting them at networking events, getting to know them is essential. Having become personally engaged and then incorporated training and awareness, I am ready to move on to the next phase to help prepare women for future jobs in mining, particularly those who are mentees.”

To ensure that law offers a clear foundation for the development of workplaces in which female mining professionals may flourish, there is need to offer mentoring and support for women in the sector. A history of gender-based exclusions is reinforced by the law in the mining sector (Eshun, 2020:158). Before 1996, women were not officially permitted to work underground in South African mines. Institutional exclusion may be remedied via a multi-layered strategy like WiMSA's that looks at human needs at the beginning and then establishes rights in law that allow employees to succeed (Laplonge 2017:308). When she joined the organization in 2017, Briony Liber started to learn more about how the mining sector might be changed at a structural and human level (Liber, 2017:12). There has to be a balance between legislation and policy on one hand, and enforcement policies and programs on the other. To enable us to understand what helps a flourishing, equitable industry, implementing and measuring industry standards are an important part (Laplonge 2017:308).

Another possibility for women to close the gender gap exists, which is being able to fix imbalances in the gender mix. Men are being taught on appropriate conduct and to be aware of repercussions for failures in this respect, while women are learning to understand their right to work in an atmosphere free of discrimination and abuse. In addition, students should learn to speak out if they see a violation (Botha 2016:9). Men have a critical role to play in creating an atmosphere that allows both genders to fully express their talents and grow (Benya 2017:517). Men must consciously fight unconscious gender prejudices and instead see women as co-workers who are to be treated with equality and respect. To assist women, males must also learn about the problem of gender equality (Jenkins, 2017:1459).

Many of the Mineral Council's member businesses have implemented steps that are constructive. Women in the workplace have measures put in place to assist them, including rules, hotlines for reporting abuse, and workplace improvements that encourage safety (Botha 2016:10). Stop Abuse is a brand new campaign from the Minerals Council that's built on the previously successful Khumbul'Ekhaya safety campaign. This was created to help women in the workplace and give them more ability and motivation when it comes to sexism, sexual harassment, and workplace violence (Laplonge 2017:309).

In support of this project, the Minerals Council of Canada asked member companies to commit to ensuring that their workplace is free of violence, intimidation, and harassment, and to involve women in the development of policies that will make them feel safe, and to train men and women alike to understand what behaviors are unacceptable (Laplonge 2017:309). The council also recommended that companies include women in the design and implementation of policies that protect them, and to make it clear to men that they will be held accountable for their bad behavior (Laplonge 2017: 304-309: 304-309). Last, the organization urged companies to implement a transparent reporting system that protects the identity of those who report incidents, and to offer counseling for those who need it. A large portion of the commitments include inherent practicality; businesses must include violence and other forms of harassment against women in their risk management, adjust their infrastructure, and accurately report on the state of women's safety, just as they do with other aspects of workplace safety and health (Laplonge 2017: 304-309: 304-309).

Critical theory asserts that in dominative societies, domination tends to be masked by ideologies that present reality not as it is, but in mythologized, inverted, and distorted ways. This was found to be true as evidenced by the words of research participant D who said, "When you travel to these trade conferences and exhibits, visitors flock towards your booth, but naturally direct their conversations towards the men, and pay attention to the female visitor as their personal assistant." The words of this participant are reflective one thing found in critical theory which is that people from outside the industry have a myth that the industry is about men hence even when they are talking to a woman expert, they tend to want her to speak to what men can do.

5.2.4 To critically appraise the extent to which women participate in decision-making processes within the mining sector

From the participants of the study, 3 indicated to be working in management and 2 in senior positions. This observation was translated into the assumption that to a certain degree, women are involved in the process of decision-making in the sector. Participant E indicated that, "if there is something that I am grateful as a woman was the chance to

be elevated to the position of Director of Safety,” while participant G indicated that she holds the position of Chief Operation Officer. The positions listed by the participants are a highlight of the decision-making roles that women play which implies that women are definitely involved in decision-making even though it is difficult to establish the extent to which they are involved. This observation when analyzed in the context of existing literature was found to be a little bit contradictory.

In the mining sector, most women have had to continually defend their positions and show that they can do the job. It is an established fact that diverse businesses perform better than non-inclusive ones, and the Covid-19 issue has proven that nations headed by women are successfully handling the situation. Although many historical variables are at play when it comes to gender equality, many people fail to consider them. Today, women's views are drowned out by male colleagues who make all the decisions. Women must use their strength to bring about more gender diversity in the workplace, and enable the sector to flourish.

The majority of women have made it to where they are now by blending their dedication to their work with being assertive. It is fair to say that many women do not lean in quite as far as they should, but for the most part, women are very brave. There is greater industry support now (Sesele, 2020:14). There must be clear limits, since many women have worked according to the rules of men in which males mistakenly think they are offering great suggestions. As a first step there is need to address the narratives of women; in particular, there is need to give them the chance to be disseminated and accepted as dominant (Sesele, 2020:14). Success stories need to be found, and there has to be a place where these tales can be told.

Women rarely reach the corridors of authority in organizations (Pretorius 2019:33). In order for the advancement of women to be realized, males must stand aside and allow them to have equal opportunities; we must see more women in board rooms; there must be more substantive action and less empty talk (Pretorius 2019:33). It would be interesting to observe how men and women can collabourate. Every man must serve as an advocate, sponsor, and creator of a safe and supportive environment for women to thrive.

With this new advancement, women may rise up the ranks only because they are female, and this is demeaning and perhaps setting them up for failure. On both an individual and a team level, finding methods to better integrate the talents of both women and men is critical to moving ahead.

5.3 Conclusions

The role of women in mining is one which is of paramount importance yet again this role is not widely recognized because of the challenges that impede a lot of women from participating in the sector. The challenges impeding women from getting involved in mining have their foundation in the historical context of mining which established mining as an industry for men. By interviewing fifteen women in this study, the researcher unearthed valuable roles that women are playing and the mechanisms they have adopted in dealing with the challenges that stand in the way of them executing their roles. The study did not only critically appraise existing literature but it also employed the critical theory as a way of establishing why it has been difficult until now to see the role that women play in the sector under the question. Women have been discovered to play leadership roles and they are using this same role to bring more women in the industry. Furthermore, the study has established that women are using technological advancements to get involved in the industry and to make an impact by transforming the industry. There is in existence training and awareness occurring within the sector and this training and awareness is in two parts. The first part is the in the awareness of the role that women are playing and this role is played by women in motivating other women involved in the sector. The second part of training and awareness is towards men in making recognize the valuable efforts of women and how the two genders can co-exist together. These findings have their foundation in critical theory which advocates for the abolition of classes and the recognition that all people can dwell and prosper together as one society. More so, the study observed that the existence of women in leadership positions such as management serve to highlight their involvement in decision-making even though it is difficult to establish the extent to which they are involved.

5.4 Recommendations

In consideration with the findings in the study, this section offers some conclusive recommendations which can be beneficial towards the enhancing of the role of women in the mining industry.

- Regardless of changes in policies that govern mining work, the number of women participating in the industry is still limited hence there is need to revise the existing policies and involve more women in the sector. The Mining Charter which requires that 10% of the mining workers in the industry should be women is not in line with the current trends which are focusing on equal participation hence the present study recommends a revision of the Charter whereby the percentage increases to one which shows equality and equity.
- The study discovered that women are making meaningful strides in the industry and for that reason, there is need for government funding towards the training of women to participate in the industry. There is need for trainings for men in the industry intended to redress their misconceptions about the role that women are playing in the industry.
- There is no clear definition of the role of women in the mining industry and for that reason, the present study recommends that schools of thought interested in the subject of women in mining should provide a concrete definition on the meaning of the role of women in mining. The provision of a new definition will ultimately lead to a better understanding of what women do in the mining industry and will transform the lenses through which women in mining are observed and addressed
- The study noted that the mines that women are working in have conditions that limit them mostly to surface jobs. This in a way limits the potential of women or in other words, it creates a barrier to women in showcasing what they are capable of hence there is need to improve the environments through which all mines operate so that the environment does not become a hindering factor for women in mining to exploit their talents.

- Women in mining are not treated the same as men in mining by the general public and this goes to shed light on the fact that the perceptions of the general public are that men are doing more than women and that the job of men is more significant than that done by women. This therefore calls for a need for programs that educate the public on the significance of women in the workplace, not in a way of overshadowing men but in a way of making sure that the public give equal treatment to male and female mine workers.

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Appendices

Appendix A: Ethical clearance



COLLEGE OF HUMAN SCIENCES RESEARCH ETHICS REVIEW COMMITTEE

01 December 2020

Dear Isaac Eazy Phiri

NHREC Registration # :
Rec-240816-052
CREC Reference # :
2020-CHS -64013871

Decision:
Ethics Approval from 01 December
2020 to 31 November 2023

Researcher(s): Isaac Eazy Phiri E-mail address: 64013871@mylife.unisa.ac.za

Title: *The Role of women in the Mining Industry in Chaneng, Rustenburg, North West Province*


Degree Purpose: Degree

Thank you for the application for research ethics clearance by the Unisa College of Human Science Ethics Committee. Ethics approval is granted for three years.

The **Low risk application** was reviewed by College of Human Sciences Research Ethics Committee, on **01 December 2020** in compliance with the Unisa Policy on Research Ethics and the Standard Operating Procedure on Research Ethics Risk Assessment.

The proposed research may now commence with the provisions that:

1. The researcher(s) will ensure that the research project adheres to the values and principles expressed in the UNISA Policy on Research Ethics.
2. Any adverse circumstance arising in the undertaking of the research project that is relevant to the ethicality of the study should be communicated in writing to the College Ethics Review Committee.
3. The researcher(s) will conduct the study according to the methods and procedures set out in the approved application.



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4. Any changes that can affect the study-related risks for the research participants, particularly in terms of assurances made with regards to the protection of participants' privacy and the confidentiality of the data, should be reported to the Committee in writing, accompanied by a progress report.
5. The researcher will ensure that the research project adheres to any applicable national legislation, professional codes of conduct, institutional guidelines and scientific standards relevant to the specific field of study. Adherence to the following South African legislation is important, if applicable: Protection of Personal Information Act, no 4 of 2013; Children's act no 38 of 2005 and the National Health Act, no 61 of 2003.
6. Only de-identified research data may be used for secondary research purposes in future on condition that the research objectives are similar to those of the original research. Secondary use of identifiable human research data require additional ethics clearance.
7. No fieldwork activities may continue after the expiry date (**31 November 2023**). Submission of a completed research ethics progress report will constitute an application for renewal of Ethics Research Committee approval.

Note:

The reference number 2020-CHS-64013871 should be clearly indicated on all forms of communication with the intended research participants, as well as with the Committee.

Yours sincerely,

Signature : 

Dr. K.J. Maleski
CHS Ethics Chairperson
Email: maleski@unisa.ac.za
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Signature : PP 

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Appendix B: Turnitin reports

The role of women in the Mining Industry in Chaneng, Rustenburg, North West Province

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Appendix C: Research instrument

Section A: Demographic Characteristics

Name:

Surname:

Age:

Marital Status:

Race:

Position at work:

Years in the mining sector:

Section B: Interview Question

1. What is the general atmosphere where you report for work every day?
2. Based on your experiences ever since you started working within the sector, what changes have you seen and have those changes been supportive of your growth as a woman in mining?
3. How would you describe the workplace culture particularly in the mining sector?
4. Is the culture of work within the mining sector supportive of women advancing their careers?
5. Do you think that the position you currently hold is commensurate to your qualifications and expertise?
6. How would you describe the working conditions at your mine in respect to your position?
7. What role do you think you play within the sector?
8. Has the role assigned to you within the sector served as yardstick to measure how far women can go in terms of career development in mining?
9. How do you think men treat you at work considering your gender?
10. How are your thoughts and ideas received by your counterparts during decision-making process?

11. How do you interact with other women within the sector?

12. How does your position influence your workplace interactions with the opposite gender?