The perceptions of the work environment of women in core mining activities

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Mini-dissertation submitted in partial fulfilment of the requirements for the degree ***Master in Business Administration***
at the North-West University, Potchefstroom Campus

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November 2012

ABSTRACT

Until 1996, all women in South Africa were prohibited, by law, from working underground. With the introduction of the Mining Charter all this changed and companies started hiring women for different positions. The objectives of the study were: to determine the perceptions of the working environment of women in the mining activities, to establish what changes were made to accommodate women in this specific mine and to establish if women can advance in this company. A field study was done at a chrome mine and a random sample of 100 employees participated. The central research tool utilised was a questionnaire using a Likert-type 5 rating scale. The findings were that mining companies will have to work hard on the perception that women are not wanted in the industry, but that a lot has happened since 1996. As expected the study found that there are significant resistance towards women working in the core mining industry. Mines are making changes to accommodate women. Women are receiving a lot of support from management to become part of the mining environment. Different programs are being implemented to develop skills of women and ensure their progression within the mining companies. The study concluded with recommendations as to what can be done to improve the perception of the working environment of women.

Keywords: Perceptions, women, mining, transformation, skills development.

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CHAPTER ONE

NATURE AND SCOPE OF STUDY

1.1. INTRODUCTION

Historically the mining industry has been dominated by the perception that it was exclusively for male workers. This perception was even enforced by legislation set out by various governments. In the early 1900s, Article 2 of the International Labour Organisation's (ILO) Convention 45 of 1935 came into play, forbidding the inclusion of women in underground mining. The article stated, "No female, whatever her age, shall be employed on underground work in any mine." (ILO, 2012). In South Africa, legislative barriers also prevented women from working underground until relatively recently. The South African Minerals Act (Act no. 50 of 1991) banned women from working underground (Simango, 2006:15; SA, 1991). In 2002, the South African Mining Charter was instituted to address the imbalance that existed in the industry (AngloGold Ashanti Annual Report to Society, 2007). The Charter required mining companies to ensure that 10% of their total workforce were women by 2009, as compared to only 2% in 2000 (Mlambo, 2011). The charter also allowed women to work underground, rather than only on surface. This change created various new challenges to the mining community. Regardless of all these challenges, according to statistics from the Chamber of Mines, in 2000 only 3,2% of mineworkers were women, a figure that rose to 10,1% in 2010, in line with government's goals, outlined in its 2010 Sector Skills Plan draft paper, 10% women in mining by 2013 (Chamber of Mines, 2010).

1.2. PROBLEM STATEMENT

The inclusion of female workers underground was not without considerable resistance. Because of females' special needs, mines had to make changes to accommodate female workers. Suitable toilets and change rooms needed to be set up (AngloGold Ashanti Annual Report to Society, 2007). The protective gear that is worn underground also presented challenges, such as

being one-piece overalls, the women needed to remove the entire suit to use the toilet (Mlambo, 2011). Other challenges that face women are, for example, the extreme heat that miners have to work at underground (Mlambo, 2011). Probably the biggest challenge that mines faced was the inadequate and inappropriate housing that they provide for workers (Mashiane, 2011:3). The main problem with the forced implementation of female workers into the mining area is that there are still severe challenges and perceptions that women do not belong in a physically tough work environment, such as underground mining. Across all cultures, there is still the expectation that women should have children early, but in doing this; they will not be in a position to attend to their original professions. Women obtain degrees but once graduated they marry and have children (Campbell, 2007:8).Therefore, the perceptions need to be investigated, that exist about these women.

1.3. OBJECTIVES OF THE STUDY

The objectives for this study are:

1.3.1. Primary objective

To establish what are the perceptions of the work environment of women in mining.

1.3.2. Secondary objectives

- To establish what changes were made to accommodate women in this specific mine.
- To establish if women can advance in this company.

1.4. RESEARCH METHODOLOGY

The research comprises a literature review and an empirical study. The aim was to determine factors that influenced the number of women in mining and to find a solution that will lead to an increase in the number of women in the mining industry.

1.4.1. Literature review

Phase 1: Literature review

The study is based on a well-developed literature study. This research will be focused on information that already exists, and will include mediums such as:

- Computerised databases
- Books
- Research articles
- Internet search results; and
- Other, such as popular articles and magazines.

The aim of the literature review is to gather essential information in order to develop a questionnaire and make recommendations.

1.4.2. Empirical study

Phase 2: Study population

In research, the word population is used to mean the total number of people, groups or organisations who could be included in the study.

Sampling involves making decisions about which people, settings, events or behaviours to observe. According to Cooper and Emory (1995:196), a population is the total collection of elements about which one wishes to make inferences. An element is the individual on whom the measurement is being taken and is the unit of study. For the purpose of this study, the population of this study is defined as all full-time employees, employed at a chrome mine in North West Province. The sample was a census of one hundred (100) permanent employees.

Phase 3: Questionnaire

Data collection involved the administering of questionnaires to the employees of the selected mine in North West Province. A questionnaire was developed in order to gather the necessary information that consist of open and closed questions. In order to have a fully representative and reliable sample, one

hundred (100) permanent employees of the selected mine were canvassed to complete the questionnaire. The objective was to have all one hundred completed questionnaires returned, and all of them were completed and returned in the available time.

Phase 4: Statistical Analysis

A statistical analysis of data was conducted in co-operation with statistical consultants from the North-West University.

1.5. LIMITATION OF THIS STUDY

This study will only focus on one mine; this can lead to results that are not reflective to the whole industry. The second limitation is that certain respondents were unwilling to answer questions and only replied with no comment.

1.6. CONTRIBUTION OF THIS STUDY

This study is to be used to evaluate what the perceptions of women in mining are. Not many research studies have been done on the topic, specifically in the chrome mining industry. The study also aims to assist government and business in handling the challenges as its results may reveal where the challenges are and may lead to recommendations to address these challenges.

1.7. LAYOUT OF THE STUDY

The mini-dissertation consists of five chapters.

Chapter One – In Chapter One, a general introduction to the study will be given, providing aims, problem statements and limitations of this study.

Chapter Two – In Chapter Two, the different elements that influence the perceptions of women in mining will be highlighted and its importance to an organisation. An in-depth literature review that will consist of general theories will focus on the problems as identified in Chapter One.

Chapter Three – In Chapter Three, the empirical study and statistical analyses of the data undertaken will be discussed.

Chapter Four – In Chapter Four, current situations will be discussed in order to form a synthesis between the literature study and the survey results.

Chapter Five – Chapter Five will conclude with recommendations on the perceptions of women in mining.

1.8 SUMMARY

The chapter outlined the background of the research, the problem statement, objectives, framework of the study, methodology, and the layout of the study. The next chapter comprises the literature study pertaining to women in mining.

CHAPTER TWO

LITERATURE REVIEW

2.1 INTRODUCTION

The mining industry has been known globally as a male dominant industry throughout the ages. In 2002, the South African Mining Charter was instituted to address the imbalances that existed in the industry (AngloGold Ashanti Annual Report to Society, 2007). As previously stated, the objective of this study is to evaluate the perceptions of women in mining. In the following chapter we will present the theoretical framework of the study under the following headings: Global Perspective, South African Perspective, and Industry Perspective. The study will also investigate certain factors having an influence on women in mining in South Africa.

2.2. GLOBAL PERSPECTIVE

Globalisation has not only altered the environment for doing business in South Africa, but also quite dramatically exposed inherent fault-lines in business organisations in the country. Globally, the environment has become more competitive and dynamic, so that various leaders throughout the world have realised the need to make changes in their way of operating if their organisations are to survive (Kotter, 1990).

According to Mihail (2006), on a global scale, women represent a relatively untapped source of talent in the workplace albeit progress has been made over the last decades; barriers to women's advancement continue to persist.
Burker (2001) argued that the trend of women entering the workplace have increased in numbers over decades in all developed and developing countries: their pursuits of education have shifted to the professions of business management, engineering and computer science. Burke (2001) further confirmed the level which women have made great strides in entering management in various professions; however, this has not transformed the way in which business perceives women globally.

According to Kephart and Schumacher (2005), women have been struggling within all types of organisations for equal roles and equal respect alongside their male counterparts for years. The South African mining environment is no different when it comes to inequality of gender. The South African Minerals Act (Act no. 50 of 1991) banned women from working underground (Simango, 2006:15). In 2002, the South African Mining Charter was instituted to address the imbalance that existed in the industry (AngloGold Ashanti Annual Report to Society, 2007).

2.2.1. Ethical and cultural factors influencing females

According to Kaplan (2001:221), women in the world, who are lacking rights, are more oppressed and subordinated within familial and cultural relations. This argument is extended by Wilson (2001:25) who states that, globally, 'rights' have become the archetypal language of democratic transition. Rights have come to signify the terms of democracy, morality and social justice, the notion of equality. Especially the rights of women are on the foreground at the moment. Historically, women stayed at home and looked after families, but that all changed since women's rights became a priority. Singer (2002:1) indicated that social responsibility remains a big challenge for women because the majority of women in mining are single mothers, and often these women have limited schooling. He also refers to income comparisons and states that women working underground potentially earn up to two-thirds more money in wages than compared had they been employed as maids in households or as farm workers. Forastieri (2002) indicated that women's responsibility towards their own households involves that they need to perform a large part of household duties on their own and as such, these women suffer from excessively long working hours per day inclusive of the underground shift work. Forastieri (2002) stated that women, if exposed to the abovementioned working hours, could suffer the following effects: health problems such as stress, chronic fatigue, premature ageing and other psychosocial and health effects. The tension between cultural and gender rights should be framed in pragmatic, political terms, rather than moral terms. This was the basis of the development legislation to address inequality and subordination of women in general (Deveaux, 2003:1).

Gouws (2005:27) explains that, “(t)he social and cultural diversity amongst South African women, the vast inequalities in livelihoods and social capital, the array of political-ideological positions and the violently-imposed, radicalised fissures of apartheid. Women are divided by race, class, ethnicity, region, religion, sexuality, and generation.” Gouws (2005:1) further states that, “Women have expressed a great gender awareness and activism during the transition period to democracy and have managed extremely high levels of gender based violence such as rape and domestic violence.” Gouws (2005:36) also indicated that African women living under customary law and traditional law are deeply associated in terms of equality rights and cultural rights. She also argues the opposite of equality is inequality. Ignoring women's differences with men reinforce and reintroduce inequality; these differences can lead to another form of exclusion through which non-dominant groups or groups within non-dominant groups, such as black women could be excluded from development. Campbell (2007:8) reported that, “In South Africa, across the cultural spectrum, there is still a social expectation that women should have children early, but if they do this, they will have no time to establish themselves professionally and it is not clear whether they will afterwards be employable in their original speciality.” Campbell (2007:8) continued by saying that, “There is strong social support for women to get university education, but once they have graduated, the pressures to marry and have children pile up again; this is a cultural issue and so difficult to overcome.”

2.2.2. Retention

As indicated by Campbell (2007:8), the percentage of women working in the mining industry is increasing. Mining companies employ a vast number of women, but in support functions, such as administration, human resources, public and investor relations, finance, audit and legal. The consensus of women in mining is that participation should refer to women employed in technical positions and in the productive workforce. Considerable progress has been made in attracting young women to study mining engineering at university (Campbell, 2007:8). “The real problem the industry is now discovering, is retaining its female technical and production staff” (Campbell,

2007:8). Campbell (2007:8) states that it is not only other mining companies that poach the female mining engineering graduates, but by companies in completely different sectors of the economy. These companies offer less physical, more comfortable jobs, with higher salaries and higher social status and are more family friendly.

Campbell (2007:8) states that issues such as the social environment underground, sexual harassment or sexual intimidation or assault, the physical challenges of working underground or the physical environment are all factors that cause women to leave the underground working environment. To improve retention, the company also needs to identify places and jobs suitable as entry-level positions for women. There are of course certain physical constraints between men and women and companies will need to manage these constraints to ensure that they retain the female miners in their company.

Ranchod (2001:29-33) advised that if a company wants to ensure sustainable development in regions where mining companies are operational, female participation must be increased to ensure that the local economies of those regions benefit by a reduction in poverty specifically amongst women.

2.2.3. Resistance to change

McCulloch (2003:418) indicated that mining and hard manual labour have always been associated with masculinity. Schutte *et al*. (2002) indicated that there are physiological issues to be taken into consideration, 'Women are not physically identical to men; specifically for mining, and the differences in physiological make-up must be accommodated. According to statistics from the Chamber of Mines, in 2000 only 3,2% of mineworkers were women, a figure that rose to 10,1% in 2010, in line with government's goals, outlined in its 2010 Sector Skills Plan draft paper, 10% women in mining by 2013 (South Africa, 2010). On this basis of deeply embedded practices the industry will therefore be very reluctant to change certain practices with specific reference to the female employment in this historical male-dominant arena of the mining industry (Fourie, 2009). Whittock (2002:449) described the phenomenon of stereotype male beliefs indicating that women do not pass the mental and

physical endurance to perform the inherent job requirements of underground work because women are too weak and thus promulgate legislation to exclude women from the underground workings. Whittock (2002:450) emphasises that assumptions related to rules, behaviour, ability and needs of women are still existing within organisations; this being said, it is clear that organisations must prioritise challenges that exist with specific references to gender stereotyping.

Lazcano (2003:4) discusses the existence of discrimination against women for reasons related to beliefs that women contaminate work processes. Mines are bastions of resistance to change.

2.3. SOUTH AFRICAN PERSPECTIVE

The Department of Minerals and Energy (SA, 2012) has made public statements in various reports, publications, conferences and seminars that it is strongly committed to resolving the issues which women experience in mining. The department acknowledges that there are a number of matters that need to be addressed, as this is a relatively new concept in South Africa.

South African society is still getting used to women in the workplace. There have been some great advancements and a number of very positive events. However, there are still a number of remaining challenges. The emancipation of women in South Africa requires national liberation, the transformation of gender relations and an end to exploitation. According to Horn (1991), this can only be addressed as part of a total revolutionary transformation of South African social and economic relations. National liberation does not automatically guarantee the emancipation of women (African National Congress Programme of Action, 1990).

Since the research problem's theme is workplace inclined, a need to start by defying legislation relevant to the study is important in order to understand the fit of the industry in question as regards compliance with legislation.

In the early 1900s, Article 2 of the International Labour Organisation's (ILO) Convention 45 of 1935 came into play, forbidding the inclusion of women in underground mining. The article stated, "No female, whatever her age, shall be employed on underground work in any mine." In South Africa, legislative

barriers also prevented women from working underground until relatively recently. The South African Minerals Act (Act 50 of 1991) banned women from working underground (Simango, 2006:15; SA, 1991). Section 9 of the South African Constitution precludes discrimination based on gender. With the adoption of the Mine Health and Safety Act (Act 29 of 1996) (SA, 1996), restrictions on women working on mines, including underground, were lifted. Current South African legislation on women and mining is more progressive than existing international norms and practices.

2.3.1. Employment Equity

South Africa's Employment Equity Act 55 of 1998 (SA, 1998) aims at "implementing positive measures to redress the disadvantages in employment experienced by black people, women and people with disabilities, in order to ensure their equitable representation in all occupational categories and levels in the workforce" and requires an Employment Equity plan (Section 17) and monitoring thereof (Section 21). The Employment Equity Act requires the employer to identify barriers for equitable relations and optimum performance by their employees as well as a draft programme, which can address and eliminate the identified employment barriers (Fourie, 2009).

Implications of the Employment Equity Act (Act No. 55 of 1998) (SA, 1998) for the mining industry include the need for training opportunities to be extended more proactively to women, and the active promotion of qualified women within the mining hierarchy. Kanter's (1997) research on women in predominantly male organisations identified a phenomenon of tokenism; that is, due to the small numerical representation of women within these organisations, that they were subjected to treatment that compromised the professional contributions they could make to their organisations. Implementation of the Act to the mining industry will ensure over time that the mining industry will gradually be transformed from a male dominated sphere into one which is more gender inclusive. It is however important that the mining industry recognise the social and economic value of employing women. Ilic (1996:1387) emphasised that, due to increased demands and external pressure, most mining companies are under severe compliance

pressure to ensure they achieve their equity targets and as such, there is a definite increase in the numbers of women being employed in the industry, and they also represent a wide spectrum of different employment. It would be unfortunate if the industry only employed women to comply with labour legislation (Mashiane, 2009:33). Ilic (1996:1402) also emphasised the enhancement of the overall technological level in the industry, which arguably facilitated the employment of women in greater numbers and in a broader range of jobs.

2.3.2. Skills development

The purpose of the Skills Development Act 97 of 1998 (SA, 1998) is to **"**provide an institutional framework to devise and implement national, sector and workplace strategies; to develop and improve the skills of the South African workforce; to integrate those strategies within the National Qualifications Framework contemplated in the South African Qualifications Authority Act (Act no. 58 of 1995) (SA, 1995) to provide for learnerships that lead to recognised occupational qualifications; to provide for the financing of skills development by means of a levy-grant scheme and a National Skills Fund; to provide for and regulate employment services; and to provide formatters connected therewith". Mngomezul (2006) states that, "The early mining industry was built on back-breaking labour by poorly paid black men, who were prohibited from rising to skilled and professional posts. By implementing the Skills Development Act, companies will be forced to provide learnerships and this way will provide better qualified individuals".

2.3.3. Mining Charter

In October 2002, the South African Mining Charter was instituted to address the imbalance that existed in the industry (AngloGold Ashanti Annual Report to Society, 2007). The Department of Mineral Resources, together with mining industry stakeholders, including the Chamber of Mines, South African Mining Development Association and the National Union of Mine Workers signed the Mining Charter. The Charter required mining companies to ensure that 10% of their total workforce were women by the year 2009, as compared to only 2% in 2000 (Mlambo, 2011). The charter also allowed women to work

underground, rather than only on surface. After five years the stakeholders met to review the progress. The results revealed that only 26% of mining companies have complied with the 10% women participation in mining. However, the average rate of women participation is 6%, the bulk of whom are represented in support functions with less than 1% in core management positions, a large proportion of which represents a preserve for white women (Mining Charter Impact Assessment Report, 2009:2). Before the Mining Charter were instituted, women were not allowed to work underground (Simango, 2006:15). The objective of the Mining Charter (2002) is to create better opportunities and benefits for women and their dependents, a group identified as historically disadvantaged South Africans.

2.3.4. Transformation

In 2002, the South African Mining Charter was instituted to address the imbalance that existed in the industry (AngloGold Ashanti Annual Report to Society, 2007). The vision of the original charter was: "To facilitate sustainable transformation, growth and development of the mining industry" (Anon., 2010a). South Africa has launched a new charter to facilitate the sustainable transformation and development of its mining industry, with emphasis on a target of 26% black ownership of the country's mining assets by 2014 (Anon., 2010b)

On 30 June 2010, the South African government, three labour unions, big mining business and small mining business have clinched a historic 13-commitment accord to grow and transform South Africa’s still-well-endowed mining industry (Craemer, 2010:7).

2.3.4.1 Commitment 1:

The first commitment points out that the declaration aims to promote investment, enhance competitiveness and drive transformation objectives; mitigate constraints limiting sustainable growth and meaningful transformation; emphasise the mutual reinforcement of competitiveness and transformation; and commitment to effective implementation of the strategy.

2.3.4.2 Commitment 2:

The second commitment recognises that infrastructure is one of the key drivers of competitiveness and that infrastructure has a material impact on its potential growth. This commitment further recognises that shortages of critical infrastructure – such as rail, ports, electricity and water supply – can constrain growth.

2.3.4.3 Commitment 3:

The third commitment takes into account the importance of mining innovation through research and technology development, cost and management efficiency as well as productivity in driving meaningful growth and transformation, and the parties thus agreed to work towards the attainment of a research driven and technology based competitive edge.

2.3.4.4 Commitment 4:

The fourth commitment is to sustainable development, acknowledging the importance of balancing economic benefits with social and environmental concerns, without compromising the ability of future generations to meet their needs.

2.3.4.5 Commitment 5:

The fifth commitment is to beneficiation and recognises the importance of translating South Africa's comparative advantage in mineral resources endowment into a competitive advantage to fuel further industrialisation and value addition to our minerals before exporting.

2.3.4.6 Commitment 6:

The sixth commitment is to create a competitive regulatory framework. Noting that an internationally competitive regulatory framework is a key instrument to promote sustainable growth and meaningful transformation of the mining industry and that negative perceptions about the regulatory framework have adverse impacts on the promotion of foreign investment.

2.3.4.7 Commitment 7:

The seventh commitment is to the development of human resources. Recognising the current shortage of requisite skills and that human resource

development constitutes an integral part of competitiveness and social transformation of the workplace and the creation of a knowledge-based industry.

2.3.4.8 Commitment 8:

The eighth commitment is to employment equity, acknowledging that diversity and equitable representation in the workplace remain a catalyst for social cohesion.

2.3.4.9 Commitment 9:

The ninth commitment is to the development of mine communities, recognising that mine communities form an integral part of mining development.

2.3.4.10 Commitment 10:

The tenth commitment is to housing and living conditions, noting that a mine community includes both a near-mine host community as well as major labour sending areas, and that mining operations are, in most cases, located in remote areas with often less than salubrious facilities for the workforce.

2.3.4.11 Commitment 11:

The eleventh commitment is to procurement. Realising that procurement provides an important market opportunity for goods and services and that lack of access to market is a major impediment to growth and expansion of the enterprises.

2.3.4.12 Commitment 12:

The twelfth commitment is to ownership and funding. Realising that equity ownership provides an effective means of incorporating historically disadvantaged South Africans (HDSAs) into the mainstream economy and that ownership can afford HDSAs an opportunity to influence the direction of a business.

2.3.4.13 Commitment 13:

The last commitment is to the monitoring and evaluation of the 13-commitment strategy. Realising that monitoring and evaluation play a vital

role in assessing the effectiveness of a strategy in terms of achieving its intended aims and that monitoring and evaluation results can highlight existing gaps and inconsistencies.

2.3.5. Affirmative Action

The Employment Equity Act (Act no. 55 of 1998) drives affirmative action (SA, 2009). The objectives of the act were later infused into the broad-based economic empowerment scorecard. They were given a range of targets spanning a period of 10 years from the date of inception. Equity is further affirmed in the Promotion of Equality and Prevention of Unfair Discrimination Act (Act no. 4 of 2000) (SA, 2000). The imperative of redressing historical and social inequalities as stated by the Constitution of the Republic of South Africa, in inter alia section 9 (equality and unfair discrimination) resides in the Bill of Rights (Fourie, 2009). Therefore, employers must give preference to 'suitably qualified people' from designated groups. Designated groups are defined as women, black and coloured men, and people with disabilities (Fourie, 2009).

2.3.6. Black Economic Empowerment

South Africa's policy of black economic empowerment (BEE) is not simply a moral initiative to redress the wrongs of the past. It is a pragmatic growth strategy that aims to realise the country's full economic potential while helping to bring the black majority into the economic mainstream (SA, 2012). The mining industry has adopted a proactive strategy of change to foster and encourage black economic empowerment in the form of ownership, management, employment equity, procurement and rural development (Mining Charter, 2002). Ranchod (2001:27) is of the opinion that the mining industry still indicates tendencies and preferences to employ white women in the professional and more elite positions, whereas the positions in the industry relating to underground occupations are more likely still occupied by black women. Price (2002:102) concluded that race should be reflected in the design and measurement of the impact of employment schedules and programmes for both female and male counterparts alike.

2.4. INDUSTRY PERSPECTIVE

It can be said that mining was and is the foundation of the South African economy. As mentioned, South Africa is one of the world's and Africa's most important mining countries in terms of the variety and quantity of minerals produced. It is the leading source of nearly all of Africa's metals and minerals production apart from diamonds (Botswana and the DRC), uranium (Niger), copper and cobalt (Zambia and the DRC) and phosphates (Morocco).Only crude oil and bauxite are not found here.

The objective of this report, as has been stated, is to investigate the perceptions of women in mining. This study focuses on the South African experience as it is the one country in the Southern African Development Countries region where, due to constitutional changes securing gender equality, policy and legislation have been amended on an ongoing basis.

Over the past few years with changes in government policy and legislation, this situation has gradually begun to change. For at least the last fifteen years, the South African mining industry has been a job-shedding industry; hence the enabling policy and legislation allowing women to participate in mining, has not been matched by job-creation opportunities in the sector.

Compared to other employment sectors, women's integration into mining has been slow, and while some progress has been made, women working underground are very much a novelty in South Africa, with images of women mineworkers occupying headline news. This sector is often associated with unsafe working conditions, a historically unregulated policy environment and a lack of appropriate mining technology. Women enter small scale mining primarily as a means of survival.

Mining continues to support and stimulate growth and development in the country. Mining companies contribute extensively to South Africa's tax base; rail, road and port development is more often than not spurred on by the development of new and extended mining operations; new towns are established in mineral rich areas; it attracts new investment into the economy; it leads the way in empowerment, skills development and transformation; and

it injects over R40-billion into the economy via wages (Chamber of Mines, 2008).

2.4.1. Selection criteria for underground females

The underground environment can be defined as dark and damp, and with an increase in temperature relative to an increase in depth (Fourie, 2009). The circumstances include an environment in which employees are often required to work alone, work in confined spaces, sometimes without any communication technology and in the form of self-directed teams with little direction from senior supervisors (Singer, 2002:1). Working conditions are difficult and sometimes vary hazardous. Wynn (2001) considered the underground environment as harsh and it will be required of women to have a high level of overall fitness. Tasks could specifically include:

- The physical capability to perform tasks such as lifting or carrying relatively heavy objects,
- The ability to pull objects at various inclines or flat rough surfaces,
- The ability to install heavy objects considering all the mentioned requirements,
- A degree of difficulty to perform these tasks in areas of confined spaces in which the humidity and temperature are high.
- These physically draining requirements are to be performed daily for the majority of the underground shift and for extended periods.

Ranchod (2001:31) stipulated the consideration of physical facilities such as ablution facilities and change rooms specifically designed and equipped for women and bi-sexual toilet facilities.

Wynn (2001) stated that women working in physical environments such as mineral processing plants and in the underground workings of a mine do perform routine tasks; for example, conducting sample tests and carrying them through the processing plant by means of carrying bags and in doing so, require them to open ventilation doors which are under pressure. He continued to say that women do require some degree of physical fitness and strength to perform these mentioned tasks. Although physical fitness and

strength are certainly a requirement, it is also clear that different equipment requires different techniques and skills that may even vary in complexity. It is also eminent that in these environments a high degree of focus must be placed on safety and skills training.

Singer (2002:2) concurs and explains that the workload required is often gruelling. The underground mining environment has unique challenges and therefore the mining sector was not seen or marketed as a good career choice for professional women and at the lower levels; the industry has traditionally drawn its labour from a largely male workforce (Fourie, 2009). Schutte *et al*. (2002) indicated that there are physiological issues to be taken into consideration, "Women are not physically identical to men; specifically for mining, and the differences in physiological make-up must be accommodated. These are not insurmountable, but they must be managed." If this is then considered, it will be a management requirement to evaluate work categories based on physical requirements. Schutte *et al.* (2002) also indicated the following:

- There are four categories of physical constraints facing people working in South African deep-level mines: aerobic capacity; heat tolerance; functional strength and body dimensions. These all affect the ability to do work, especially in hot conditions.
- Aerobic capacity is the capacity to perform work in which the body uses oxygen, such as high physical intensity work lasting more than five minutes. "Women's maximum aerobic capacity is 15% to 30% less than men's," he reports. As a result, women doing the same physical task as men will tire more quickly. Women are also less tolerant of heat than men on average; 35% of women are heat intolerant, as against only 5% of men.
- Concerning functional body strength – important in an industry where many tasks are still manual – women have less than that of men. Women also have less lift and carry capacity, because they are generally smaller, shorter, and lighter, with shorter arms than men. The hand and arm strength of women are, on average, 70% of that of men.

However, when it comes to whole body pushing and pulling, women are at less of a disadvantage, averaging 80% to 90% of what men can do.

- Body dimensions are important with regard to the design of mining equipment, and its efficient operation. Much of the equipment used in South African mines is designed overseas for use by men (and, indeed, women) who tend to be significantly taller than the average South African woman.

It can be concluded that the mining industry is physically very demanding on all underground employees on a daily basis for extended periods, requiring employees to spend the majority of their underground shift to perform physical tasks.

Despite legislation and various other initiatives, female miners are not given any privileges. Singer (2002:2) highlighted that female underground employees must also pass the same induction and other screening tests as the male employees. The selection criteria consist of numerous physical testing such the requirement to climb up and down steps for half an hour in an acclimatising room heated to a predetermined temperature, equal to the temperature underground to test employees' capacity to perform work in high temperatures. Singer (2002:2) indicated the basic requirement to ensure employment is because the potential test candidate successfully completes the acclimatisation step test without fainting, and as such qualifies for the physical examination and is then eligible for employment.

Ranchod (2001:28) indicated that women differ from men both physically and physiologically, and a workplace or work system, including technology, designed for men could in some respects be unsuitable for women.

Schutte et al. (2002:817) referred to findings indicating that female mineworkers had difficulty in passing the standard heat tolerance test used by mining companies in South African. The consequences of high environmental heat loads can be expressed in terms of impaired work capacity, errors of judgement, and the occurrence of heat disorders, especially heat stroke,

which is often associated with severe and irreversible tissue damage and high mortality rates. Schutte *et al.* (2002:817) also concluded that the female body is significantly less adaptable to hot environments, specifically if she is in the premenstrual cycle. They continued with a generalisation that, under conditions of high ambient temperature and low humidity, thermoregulation in women is 'less efficient' than in men.

Singer (2002:2) evaluated male and female workload output and indicated that females in general find it difficult to complete certain tasks based on physiological differences. Specific reference is being made to hauling of rock and clear indications are that women cannot haul as much rock as most of the male workers do. The implications for mine management is that certain work categories do require a minimum output level in terms of physical capability and if the females do not deliver the required outcome the potential impact will be:

- Potential loss of production;
- Increase the risk of injury;
- It could require more employees to perform the same output levels as previously achieved by the male employees, thus a higher labour cost component.

McCulloch (2003:418) indicated that mining and hard manual labour has always been associated with masculinity.

2.4.2. Harrassment and pregnancy challenges faced by employing females

Whittock (2002:449) indicated that existing studies refer to numerous harassment manifestations such as threats, demands and even bodily contact. Their male counterparts who use unacceptable language and comments often abuse women in the form of verbal harassment. Campbell (2007) warned that issues that may cause women working underground to leave include the social environment underground, which is hostile to women; fear, or experience of sexual harassment and/or sexual intimidation or assault; the inability to cope with the physical challenges of working underground; and,

even if they can cope, finding the physical working environment just too unpleasant.

Conversely, the Basic Conditions of Employment Act 75 of 1997 (SA, 1997) explicitly forbids employers to make, or allow, a pregnant (or nursing) employee to do work that is hazardous to her health or the health of her child.

Mcgwin *et al.* (2002:1306) referred to statistical data released by the Department of Minerals and Energy indicating that more than one hundred miners are killed every year in the South African mining industry. They also indicated that the mining industry has the highest fatality rate per occupation and industry. This is a worrying fact as mining is seen as the backbone of the South African economy. Ranchod (2001:32) indicated that the industry will face major challenges regarding the integration of women into the underground workings and he warned that specific occupational health and safety requirements will have to be considered by the mining industry in regard to this. Keegan *et al.* (2001) made it clear that such a reform process must affect changing the culture of the industry as a priority, but in doing so emphasis must be placed on the number one priority, being achieving mining safety milestone targets.

One of the major safety concerns is that of personal protective equipment (PPE). Personal protective equipment is designed and supplied specifically for the use of the male population (Forastieri, 2002). This results in women not being adequately equipped with the right gear and as such, a higher potential realises for women to be more accident-prone. However, in research by Singer (2002:2), it was found that women are more careful towards unsafe conditions.

Another concern is that of physical hard labour that women have to endure in the mining environment. Physical hard labour could cause lower back pain and it has been found that the effects of lumbar curvature on lower back pain risk factors during repetitive postural upper extremity musculoskeletal disorders in the neck and upper limbs are common among industrial workers

with women specifically being prone to this phenomenon (Arvidsson *et al.,* 2003:309).

Appel (2009) reported on audit of the mining industry and the findings of which indicated 66% compliance to safety systems compared to the industry in the public domain being perceived as very dangerous with 34% non-compliance.

2.5. SUMMARY

Chapter 2 provided the literature study of women in mining against the backdrop of the legislation and employment conditions in South Africa. The next chapter comprises the empirical study. It presents the research methodology and results of the research.

CHAPTER THREE

EMPIRICAL STUDY

3.1. INTRODUCTION

The previous chapter discussed various aspects of literature relevant to the title of this report project. In this chapter I address the approach to the study. It provides an explanation of the details regarding the sample, means of data collection and the statistical data analysis.

3.1.1 Target population

The target population consisted of employees working at a Chrome Mine in North West Province.

3.1.2 Sampling

Sampling is the process of selecting units, for example, people from a population of interest, so that by studying the sample one may fairly generalise the results back to the population from which they were chosen (Trochim, 2006:1).

A sample group of one hundred employees from one company were selected from the mine. Employees were asked to complete a questionnaire about employee commitment during the period of September 2012.

The results will be used to make recommendations in order to improve employee commitment at this specific company.

3.1.3 Method of data gathering

After studying the different views of the researchers, a questionnaire was developed (see Appendix A). A 5-point Likert scale (strongly disagree to strongly agree) was used.

3.2. RESEARCH DESIGN

3.2.1. Research type

(i) Qualitative method

“Qualitative research uses qualifying words and descriptions to record aspects about the world through qualitative data, such as interviews, documents and participant observation, to understand and explain social phenomena” (Myers, 1997). According to Bless and Higson-Smith (2000), this methodology is sensitive to understanding and analysing the perspectives of human experience through a process of description that is expressive and persuasive in language.

The strengths of the qualitative method include:

- Obtaining a more realistic feel of the world that cannot be experienced in the numerical data and statistical analysis used in quantitative research
- Flexible ways to perform data collection, subsequent analysis and interpretation of collected information
- Providing a holistic view of the phenomena under investigation (Bogdan & Taylor, 1975)
- Ability to interact with the research subjects in their own language and on their own terms (Kirk & Miller, 1986)
- Descriptive capability based on primary and unstructured data.

The weaknesses of the qualitative method include:

- Departing from the original objectives of the research in response to the changing nature of the context (Cassell & Symon, 1994).
- Arriving at different conclusions based on the same information depending on the personal characteristics of the researcher
- Inability to investigate causality between different research phenomena
- Difficulty in explaining the difference in the quality and quantity of information obtained from different respondents and arriving at different, non-consistent conclusions

- Requiring a high level of experience from the researcher to obtain the desired information from the respondent
- Lacking consistency and reliability because the researcher can employ different probing techniques and the respondent can choose to tell particular stories and ignore others.

(ii) Quantitative method

The functional or positivist paradigm that guides the quantitative mode of inquiry is based on the assumption that social reality has an objective ontological structure and that individuals are responding agents to this objective environment (Morgan & Smircich, 1980). Quantitative research involves counting and measuring of events and performing the statistical analysis of a body of numerical data (Mashiane, 2009:52). The assumption behind the positivist paradigm is that there is an objective truth existing in the world that can be measured and explained scientifically. The main concerns of the quantitative paradigm are that measurement is reliable and valid in its prediction of cause and effect (Cassell & Symon, 1994).

The strengths of the quantitative method include:

- Stating the research problem in very specific and set terms (Frankfort-Nachmias & Nachmias, 1992)
- Clearly and precisely specifying both the independent and the dependent variables under investigation
- Following firmly the original set of research goals, arriving at more objective conclusions, testing hypotheses, determining the issues of causality
- Achieving high levels of reliability of gathered data due to controlled observations, laboratory experiments, mass surveys, or other forms of research manipulations (Balsley, 1970)
- Eliminating or minimising subjectivity of judgment (Kealey & Protheroe, 1996)
- Allowing for longitudinal measures of subsequent performance of research subjects.

The weaknesses of the quantitative method include:

- Failure to provide the researcher with information on the context of the situation where the studied phenomenon occurs
- Inability to control the environment where the respondents provide the answers to the questions in the survey
- Limiting outcomes to only those outlined in the original research proposal due to closed type questions and the structured format
- Not encouraging the evolving and continuous investigation of a research phenomenon.

(iii) The research method used in this dissertation

Based on the strengths and weaknesses of both research types discussed above, a qualitative research methodology using a research questionnaire (Appendix A) has been adopted to answer the research questions discussed in chapter 1.

The reason why the qualitative method was preferred to the quantitative method is that it:

- Offered in-depth examination of the phenomena
- Was not limited to rigidly definable variables
- Examined complex questions that might be impossible to investigate with the quantitative methods
- Deals with value-laden questions

3.2.2. Instrumentation

Selection of an appropriate instrument plays a key role in data collection and the obtaining of reliable and valid results. Incorrect selection of instruments can compromise the validity of the study and present invalid conclusions about the topic being investigated. Below are the various types of instruments available for research purposes.

(i) Interviews

An **interview** is a conversation between two or more people (the interviewer and the interviewee) where questions are asked by the interviewer to obtain information from the interviewee. Various types of interview include:

Face-to-face interviews have the distinct advantage of enabling the researcher to establish rapport with potential participants and gaining their cooperation. These interviews yield the highest response rates in survey research. They also allow the researcher to clarify ambiguous answers and, when appropriate, seek follow-up information. Disadvantages include impracticality when large samples are involved and the method can be time consuming and expensive (Leedy & Ormrod, 2005).

Leedy and Ormrod (2005) also state that **telephone interviews** are less time consuming and less expensive and the researcher has ready access to anyone on the planet that uses a telephone. A disadvantage is that the response rate is not as high as the face-to-face interview, but it is considerably higher than the mailed questionnaire. The sample may be biased to the extent that people without phones are part of the population about whom the researcher wants to draw inferences.

Computer Assisted Personal Interviewing (CAPI) is a form of personal interviewing, in which, instead of completing a questionnaire, the interviewer brings along a laptop or hand-held computer to enter the information directly onto the database. This method saves time involved in processing data, as well as saving the interviewer from carrying around hundreds of questionnaires. However, this type of data collection method can be expensive to set up and requires that interviewers have computer and typing skills (Leedy & Ormrod, 2005).

(ii) Questionnaires

Paper-pencil-questionnaires can be sent to a large number of people and save the researcher time and money. Because their responses are anonymous, people are more truthful when responding to the questionnaires, in particular with regard to controversial issues. The technique, however, also

has its own drawbacks. The majority of people who receive questionnaires do not return them, and those who do, might not be representative of the originally selected sample (Leedy & Ormrod, 2005).

Web-based questionnaires: A new and inevitably growing methodology is the use of internet-based research. This would mean receiving an email on which you would click on an address that would take you to a secure website to fill in a questionnaire. This type of research is often quicker and less detailed. Some disadvantages of this method include the exclusion of people who do not possess a computer or who are unable to access one.

3.3. SAMPLING

According to Leedy and Ormrod (2005), when sampling beyond a certain point (at about 5, 000 units or more) the population size is almost irrelevant, and a sample of 400 should be adequate. Sampling for this study was not an easy exercise, with the mining industry undergoing large-scale strikes. This also influenced the number of participants in the study, due to the fact that there were a limited number of employees available. The study population consisted of 100 employees. The target audience was women and men from different business units in the company. This was done specifically to ensure that different views were taken into consideration of this study.

3.4. DATA COLLECTION

Data collection is an important aspect of any type of research study. Inaccurate data collection can affect the results of a study and ultimately lead to invalid results. Since this research study is based on the qualitative research method, the focus will fall only on the qualitative data collection method, which is: the questionnaire.

The questionnaire was drawn up with key dimensions being grouped together into various themes to establish the objectives as outlined in Chapter 1. The questionnaire is divided into 5 sections. Section 1 is aimed at gathering biographical data, whilst section 2 is aimed at gathering information on respondents' qualifications and experiences. Sections 3 to 5 comprise the actual questionnaire, with a set of 5 questions per section; all similar items are

grouped together. A 4-point Likert-type scale rating was used. The scale was: 1= strongly disagree, 2 = disagree, 3 = agree, 4 = strongly agree. An additional option (5) was also included to opt out if respondents had no opinion, did not know or preferred not to answer a question for whatever reason.

3.5. RELIABILITY AND VALIDITY

The real difference between reliability and validity is mostly a matter of definition. Reliability estimates the consistency of measurement, or more simply the degree to which an instrument measures the same way each time it is used in under the same conditions with the same subjects. A definition of reliability is given by Nunnally (1967:206) as “the extent to which [measurements] are repeatable and that any random influence which tends to make measurements different from occasion to occasion is a source of measurement error”.

Validity determines whether the research truly measures that which it was intended to measure or how truthful the research results are. In other words, does the research instrument allow you to hit "the bull’s eye" of your research object? Researchers generally determine validity by asking a series of questions, and will often look for the answers in the research of others (Golafshani, 2003:599).

The research questionnaire possessed at minimum face validity because it appeared to accurately measure what it was supposed to measure. Face validity is regarded to be an acceptable point of departure in research (ChangingMinds, 2012). In addition, the measurement instrument yielded the same results on both the pre-test and the post-test. The determination of validity during research data gathering and data analysis did not reveal any threats to the instrument chosen.

3.6. STATISTICAL DATA ANALYSIS

3.6.1. Reliability and validity

TABLE 3.1: STATEMENTS AND STATEMENT CODES

Statement Code	Statement
Q3N1	In our organisation transformation is on top of our agenda
Q3N2	In my organisation Top management encourages all employees to embrace diversity
Q3N3	Top management always reminds us about the important contribution that women make in our business
Q3N4	In my organisation we have an equal number of men and women
Q3N5	I feel comfortable in my organisation
Q4N1	In my organisation changes have been made to accommodate women
Q4N2	I have been a victim of sexual or physical harassment
Q4N3	In my organisation we have protective equipment that is specifically designed for women
Q4N4	Women that are pregnant is moved to work in non-hazardous conditions
Q4N5	In my organisation the housing facilities of women are different to that of men
Q5N1	My manager supports women in our department
Q5N2	In my organisation there are programmes that address the skills gap between women and men
Q5N3	In my organisation leadership supports the acquisition of new skills irrespective of gender
Q5N4	In my organisation leadership involves women in decision making
Q5N5	My managers and leadership keep track of women's career progression

A factor analysis was performed on the data obtained from the questionnaires. A factor analysis suggests that a Five-factor solution should be considered. The five factors explain 78.3% of total variance, and all eigenvalues are greater than 1. If one groups the attributes into factors by their factor loadings, however, it dissolves into three factors.

TABLE 3.2: FACTOR TABLE

Attributes	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5
Q5N5	.940				
Q5N4	.887				
Q5N3	.826				
Q5N1	.707				
Q3N2		-.890			
Q3N1		-.877			
Q4N1		-.854			
Q3N5		-.449			
Q5N2			.770		
Q3N3			.442		
Q4N4			-.438		
Q4N3				-.673	
Q4N2				.592	
Q3N4				.389	
Q4N5					.857
Explained Variance	**5.602**	**2.223**	**1.491**	**1.389**	**1.035**
Proportion Variance Explained by Factors	**37.3%**	**14.8%**	**9.9%**	**9.3%**	**6.9%**
Cumulative Proportional Variance Explained	**37.3%**	**52.2%**	**62.1%**	**71.4%**	**78.3%**

At first glance the factor analysis seems successful. The variance explained was satisfactory as the cumulative variance explained (78%). However, when calculating the Cronbach Alpha coefficients, the reliability of the factors was below the required 0.70. In addition, a substantial number of dual-loading

questions also presented. As a result, dual-loading items were removed and the analysis repeated.

TABLE 3.3: FACTOR TABLE (REDONE)

Attributes	Factor 1	Factor 2	Factor 3
Q3N2	.886		
Q3N1	.831		
Q3N3	.701		
Q4N1	.651		
Q3N5	.541		
Q3N4	.302		
Q5N4		.834	
Q5N5		.819	
Q5N3		.763	
Q5N2		.646	
Q5N1		.581	
Q4N4			-.677
Q4N5			.442
Q4N2			.419
Q4N3			-.195
Explained Variance	**5.380**	**1.979**	**1.301**
Proportion Variance Explained by Factors	**35.87%**	**13.195%**	**11.072%**
Cumulative Proportional Variance Explained	**35.87%**	**49.065%**	**60.137%**

The exploratory factor analysis was redone, and according to the new factor analysis, all the items in Section 5 (Career Advancement) factored together. The reliability confirmed that these items can be grouped together to form a scale called *Attitude towards women* (Cronbach Alpha = 0.89). Also, according to this, all items in Secction 3 of the questionnaire loaded onto one factor (*Perceptions of Women in Mining*) together with item No.1 from Section 4 (In my organisation changes have been made to accommodate women). The factor was labelled *Transformation and Diversity* (Cronbach Alpha =

0.84). However, Factor 3 remained an unreliable factor with its Cronbach Alpha = 0.38. Another pathway to analyse this factor could be the use of individual item analysis by means of T-tests, ANOVAs and correlations.

TABLE 3.4: RELIABILITY OF FACTORS

	Items	Cronbach alpha	Average inter-item correlation
Factor 1	6	0.839	0.459
Factor 2	5	0.890	0.629
Factor 3	4	0.380	0.131

3.6.2. Descriptive analysis

TABLE 3.5: DESCRIPTIVE STATISTICS

		N	Mean	Std. Deviation	p value
Transformation and diversity	< 20 yrs	8	2.4375	.59052	0.00
	21 - 30 yrs	26	2.5026	.56670	
	31 - 40 yrs	41	2.7890	.43623	
	41 - 50 yrs	19	3.0947	.46192	
	51 - 60 yrs	6	2.8500	.42098	
	Total	100	2.7482	.52764	
Attitude towards women	< 20 yrs	8	3.1000	.61412	0.17
	21 - 30 yrs	26	2.6308	.72209	
	31 - 40 yrs	41	2.9537	.58324	
	41 - 50 yrs	19	2.9053	.56835	
	51 - 60 yrs	6	3.1000	.54772	
	Total	100	2.8810	.62864	

Q4N2_Recoded	< 20 yrs	8	3.6250	1.18773	0.26
	21 - 30 yrs	26	3.9615	1.14824	
	31 - 40 yrs	41	3.9756	1.10652	
	41 - 50 yrs	19	4.5263	.61178	
	51 - 60 yrs	6	4.1667	1.60208	
	Total	100	4.0600	1.09008	
Q4N3	< 20 yrs	8	1.88	1.126	0.37
	21 - 30 yrs	24	1.92	.717	
	31 - 40 yrs	36	2.17	.878	
	41 - 50 yrs	18	2.28	.895	
	51 - 60 yrs	5	2.60	.548	
	Total	91	2.12	.854	
Q4N4	< 20 yrs	8	3.50	.535	0.79
	21 - 30 yrs	25	3.32	.627	
	31 - 40 yrs	38	3.39	.595	
	41 - 50 yrs	19	3.53	.513	
	51 - 60 yrs	6	3.33	.516	
	Total	96	3.41	.573	
Q4N5	< 20 yrs	6	2.50	1.049	0.12
	21 - 30 yrs	14	1.71	.726	
	31 - 40 yrs	18	2.17	.786	
	41 - 50 yrs	16	1.69	.602	
	51 - 60 yrs	3	2.00	1.000	
	Total	57	1.95	.789	

According to the p-values in Table 3.5, we can see that Transformation and Diversity has a small effect (p=0) when it comes to age. Attitude towards women has a little bit higher effect (p=0.17) than Transformation when it comes to age. Q4N2 has a medium effect (p=0.26). Q4N3 also has a medium effect (p=0.37). Q4N4 has a high effect (p=0.790 and Q4N5 has a small effect (p=0.12).

TABLE 3.6: DESCRIPTIVE STATISTICS (SIGNIFICANCE)

		Sum of Squares	df	Mean Square	F	Sig.
Transformation and diversity	Between Groups	4.753	4	1.188	4.949	.001
	Within Groups	22.808	95	.240		
	Total	27.562	99			
Attitude towards women	Between Groups	2.527	4	.632	1.640	.171
	Within Groups	36.597	95	.385		
	Total	39.124	99			
Q4N2_Recoded	Between Groups	6.258	4	1.564	1.334	.263
	Within Groups	111.382	95	1.172		
	Total	117.640	99			
Q4N3	Between Groups	3.151	4	.788	1.084	.370
	Within Groups	62.519	86	.727		
	Total	65.670	90			
Q4N4	Between Groups	.567	4	.142	.422	.793
	Within Groups	30.589	91	.336		
	Total	31.156	95			
Q4N5	Between Groups	4.547	4	1.137	1.951	.116
	Within Groups	30.295	52	.583		
	Total	34.842	56			

3.7. SUMMARY

Chapter Three presented the empirical study. The chapter employed exploratory factor analysis to analyse the data and extracted five factors at first. After elimination of low reliability statements and factors, the factor analysis finally identified three reliable factors. Inferential statistics were also employed to analyse the data.

The next chapter continues to analyse the data, and provides the demographical profile of the respondents.

CHAPTER FOUR

RESEARCH RESULTS

4.1. INTRODUCTION

The aim of this chapter is to report the results of the empirical study of perceptions of women in mining and to form a synthesis between the literature study and practice.

4.2. BIOGRAPHICAL DATA

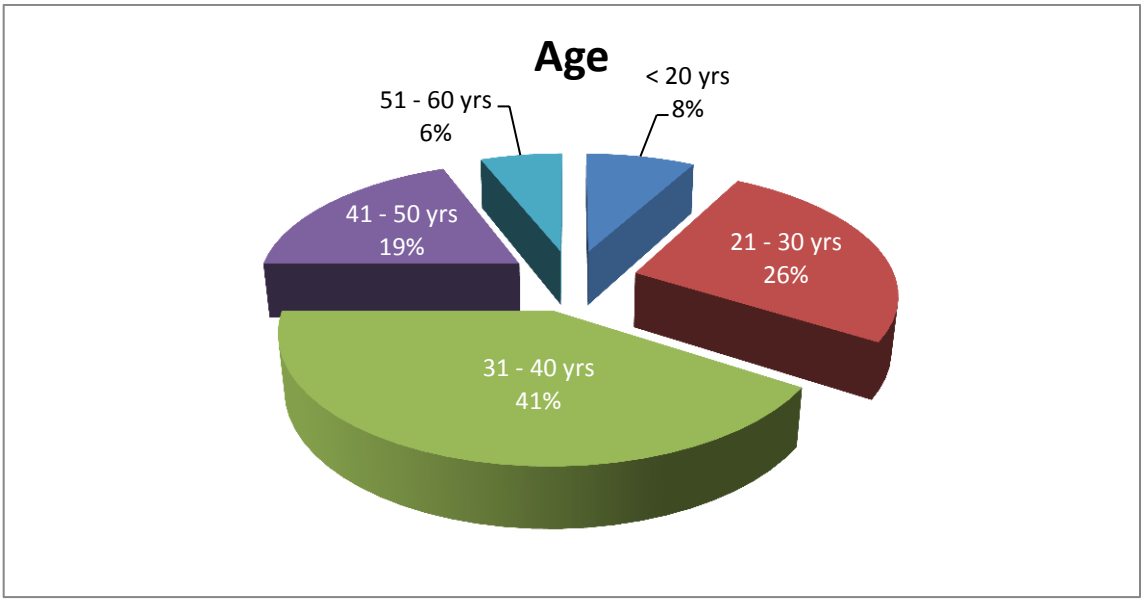
This section highlights the overview of the respondents from a stratified sampling perspective. Participants represent a mix of gender, race, occupational grading levels, experience, qualifications and unionised/non-unionised status.

4.2.1. Age

TABLE 4.1 AGE OF RESPONDENTS

Ages	Number of respondents
< 20 years	8
21-30 years	26
31-40 years	41
41-50 years	19
51-60 years	6
TOTAL	**100**

FIGURE 4.1: AGE OF RESPONDENTS



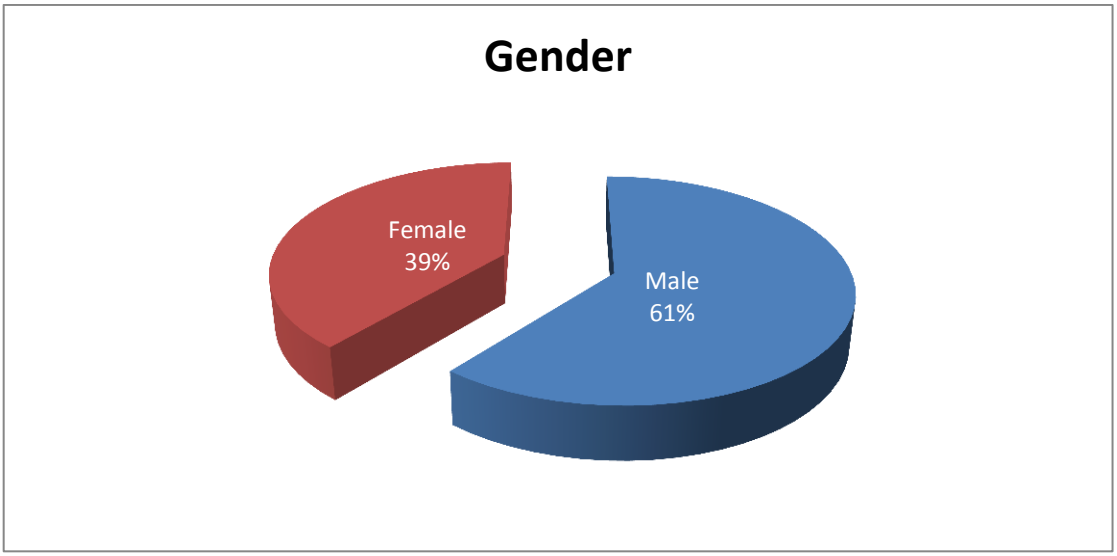
As indicated in Table 4.1 and Figure 4.1 the majority of respondents were in the age group ranging from 31 to 40 years (41%). 26% between 21 and 30 years, 19% respondents between 41 and 50 years, 8% younger than 20 years and 6% between 51 and 60 years.

4.2.2. Gender

TABLE 4.2: GENDER OF RESPONDENTS

Gender	Number of respondents
Males	61
Females	39
TOTAL	**100**

FIGURE 4.2: GENDER OF RESPONDENTS



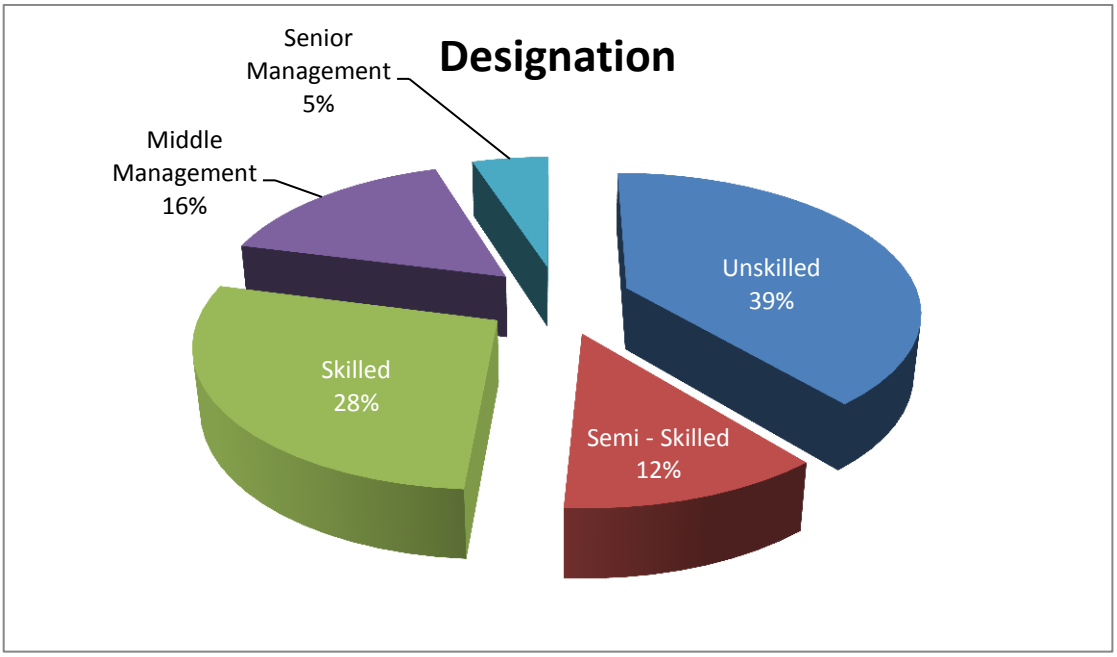
As indicated in Table 4.2 and Figure 4.2 the majority of respondents were males (61%), while (39%) of the respondents were females. This is a true reflection of the industry gender demographics being dominated by men.

4.2.3. Designation

TABLE 4.3: DESIGNATION OF RESPONDENTS

Respondent's designation	Number of respondents
Unskilled worker	39
Semi-skilled worker	12
Skilled worker	28
Middle management	16
Senior management	5
TOTAL	**100**

FIGURE 4.3: DESIGNATION OF RESPONDENTS



As indicated in Table 4.3 and Figure 4.3 most of the respondents (39%) are unskilled workers. 28% are skilled workers, 16% are middle management, 12% are semi-skilled and 5% are senior management.

The mining industry is very highly labour intensive. This is shown by the high percentage (51%) of workers that are unskilled or semi-skilled. The (28%) skilled workers consist of miners and engineering personnel.

4.3. QUALIFICATIONS AND JOB EXPERIENCE

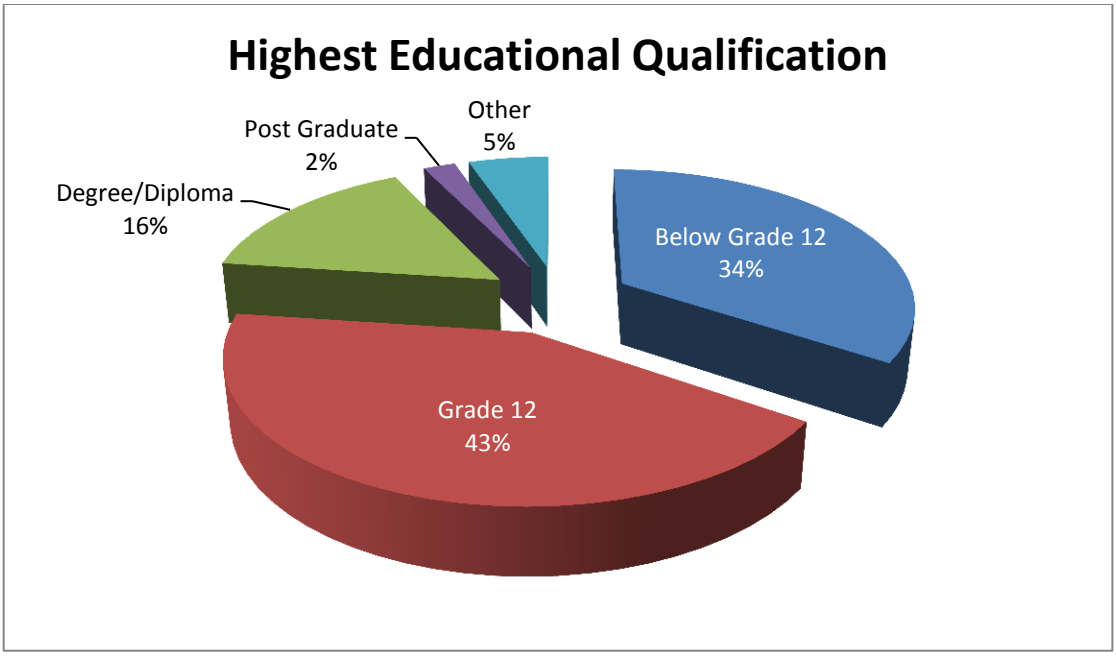
This section shows the relationship between qualifications and respondents' experience within the mines.

4.3.1. Highest educational qualification

TABLE 4.4: HIGHEST EDUCATIONAL QUALIFICATION

Highest educational qualification	Number of respondents
Below Grade 12	33
Grade 12	41
Degree/Diploma	15
Postgraduate degree	2
Other	5
TOTAL	**96**

FIGURE 4.4: HIGHEST EDUCATIONAL QUALIFICATION



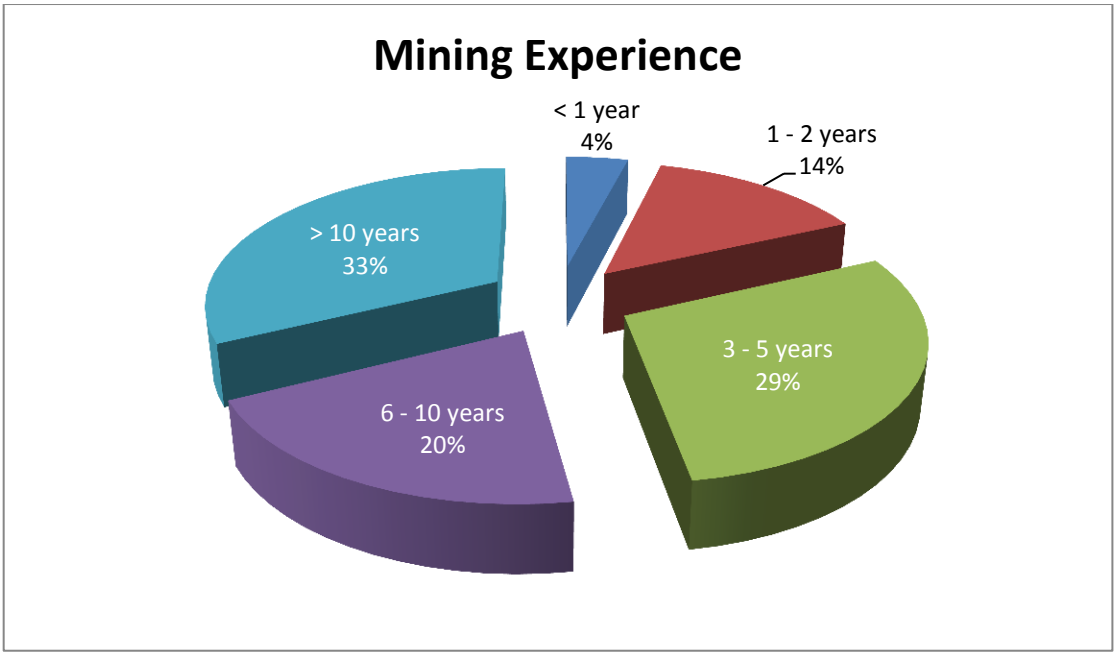
As indicated in Table 4.4 and Figure 4.4, the majority of respondents (43%) passed Grade 12. (34%) of the respondents possessed a qualification below Grade 12, whereas (16%) of the respondents had a degree or diploma. (5%) had qualifications that were not stipulated in the questions, these were mostly technical qualifications such as artisans. Only (2%) of the respondents had post graduate degrees.

4.3.2. Experience in the mining industry

TABLE 4.5: EXPERIENCE IN THE MINING INDUSTRY

General mining experience	Number of respondents
< 1 year	4
1-2 years	14
3-5 years	29
6-10 years	20
> 10 years	32
TOTAL	**99**

FIGURE 4.5: EXPERIENCE IN THE MINING INDUSTRY



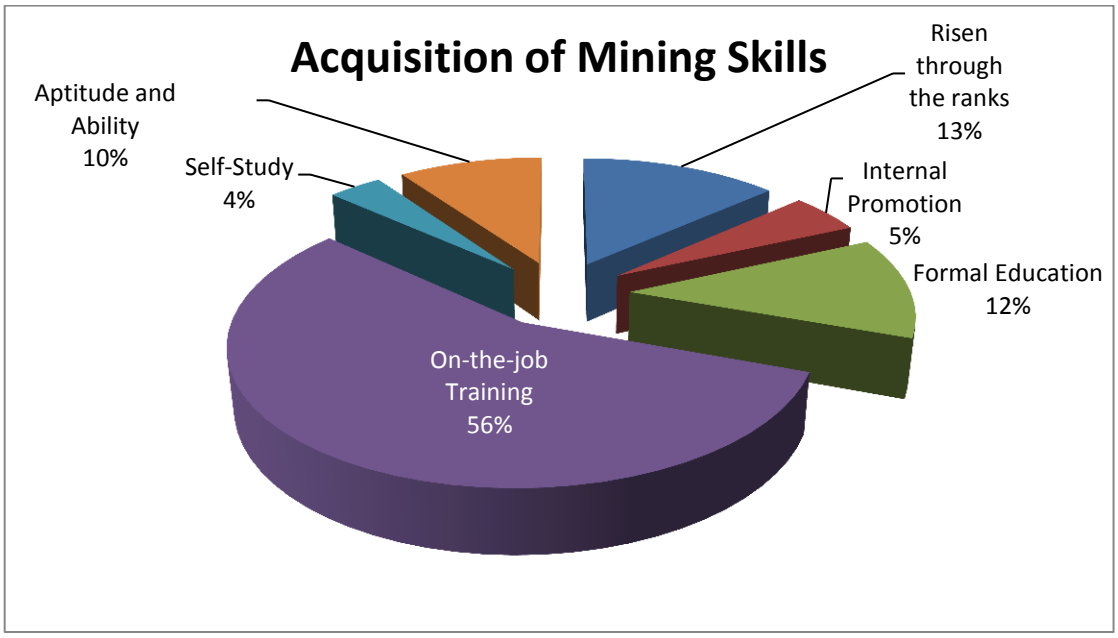
As indicated in Table 4.5 and Figure 4.5, (4%) of the respondents had been working less than a year, (14%) of the respondents had been in the industry between 1 and 2 years, while (29%) of the respondent had been working in the mining industry for 3 to 5 years. (20%) of respondents had been working 6 to 10 years, whilst the majority (33%) had been employed in the mining industry for more than 10 years.

4.3.3. Acquisition of mining skills

TABLE 4.6: ACQUISITION OF MINING SKILLS

Acquisition of Mining Skills	Number of respondents
Risen through the ranks	11
Internal Promotion	4
Formal Education	10
On-the-job training	46
Self-study	3
Aptitude and Ability	8
TOTAL	**82**

FIGURE 4.6: ACQUISITION OF MINING SKILLS



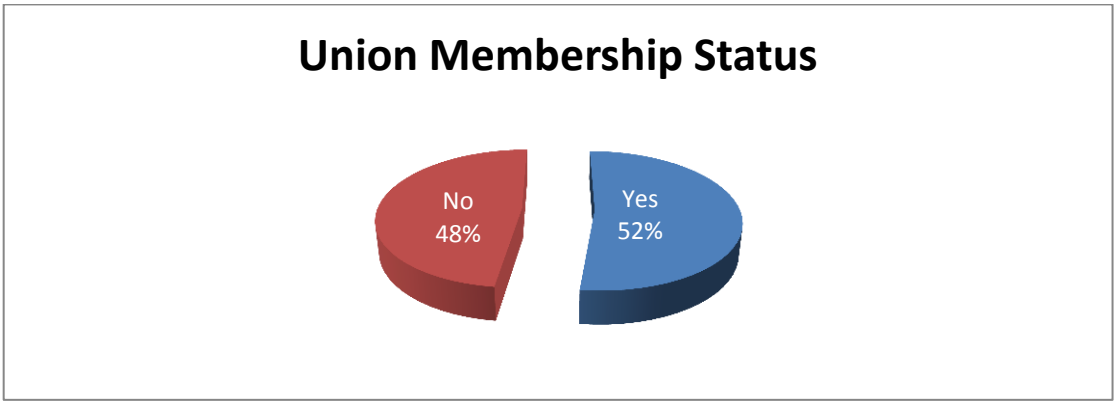
As indicated in Table 4.6 and Figure 4.6, (13%) of the respondents acquired mining experience by rising through the ranks, another (5%) were promoted internally, (12%) gained experience through formal education, while (56%) of the respondents acquired their skills through on-the-job training. (4%) acquired these skills through self-study whereas (10%) acquired these through aptitude and ability.

4.3.4. Union affiliate

TABLE 4.7: UNION MEMBERSHIP

Union Membership Status	Number of respondents
Union Members	52
Non-Union Members	48
TOTAL	**100**

FIGURE 4.7: UNION MEMBERSHIP



As indicated in Table 4.7 and Figure 4.7 (52%) of the respondents are union members, whilst (48%) hold no union membership.

The section above offered an overview of the respondents' biographical data. The next section is aimed at highlighting the actual responses regarding the objectives being investigated.

4.4. SUMMARY OF RESULTS

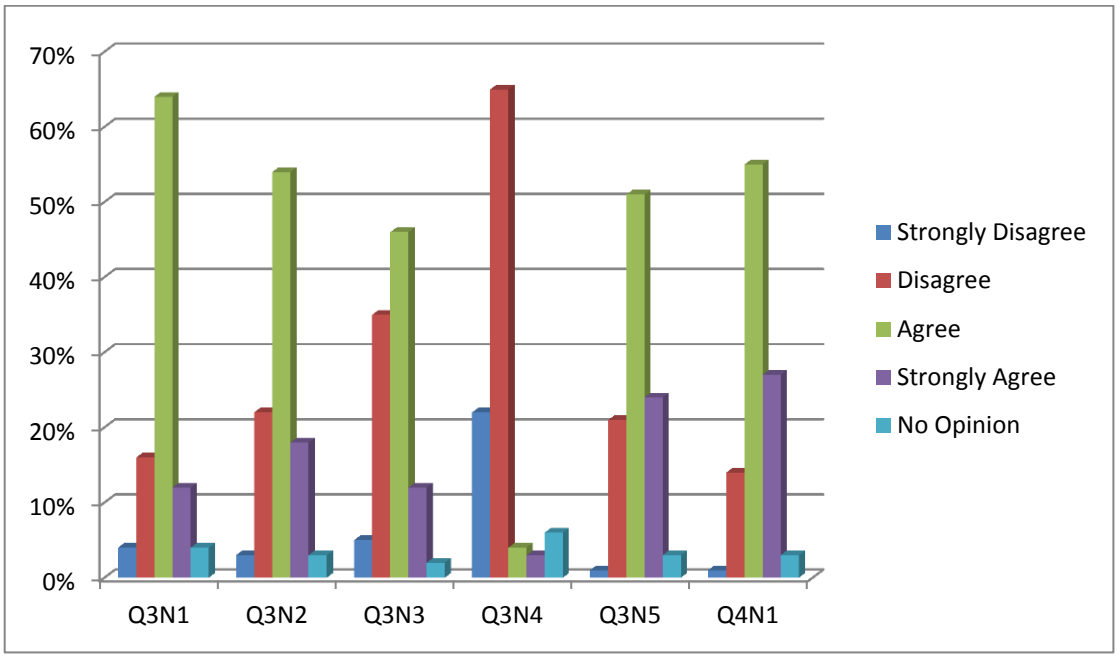
TABLE 4.8: SUMMARY OF RESULTS IN PERCENTAGES

		SCALES				
		Strongly Disagree	**Disagree**	**Agree**	**Strongly Agree**	**No Opinion**
Q3N1	Transformation and diversity (Factor 1)	4%	16%	64%	12%	4%
Q3N2		3%	22%	54%	18%	3%
Q3N3		5%	35%	46%	12%	2%
Q3N4		22%	65%	4%	3%	6%
Q3N5		1%	21%	51%	24%	3%
Q4N1		1%	14%	55%	27%	3%
Q5N1	Attitude towards women (Factor 2)	3%	15%	50%	26%	6%
Q5N2		7%	26%	42%	17%	8%
Q5N3		2%	14%	62%	19%	3%
Q5N4		2%	21%	56%	17%	4%
Q5N5		7%	27%	44%	15%	7%
Q4N2	Individual analysis	43%	36%	8%	10%	3%
Q4N3		21%	45%	18%	7%	9%
Q4N4		0%	4%	49%	43%	4%
Q4N5		17%	28%	10%	2%	43%

Table 4.8 is drawn up to show all the results of the questions obtained from the questionnaires. The table is divided into three parts according to the factors obtained from Table 3.3. The following three figures will illustrate the results obtained for each factor.

4.4.1. Transformation and Diversity

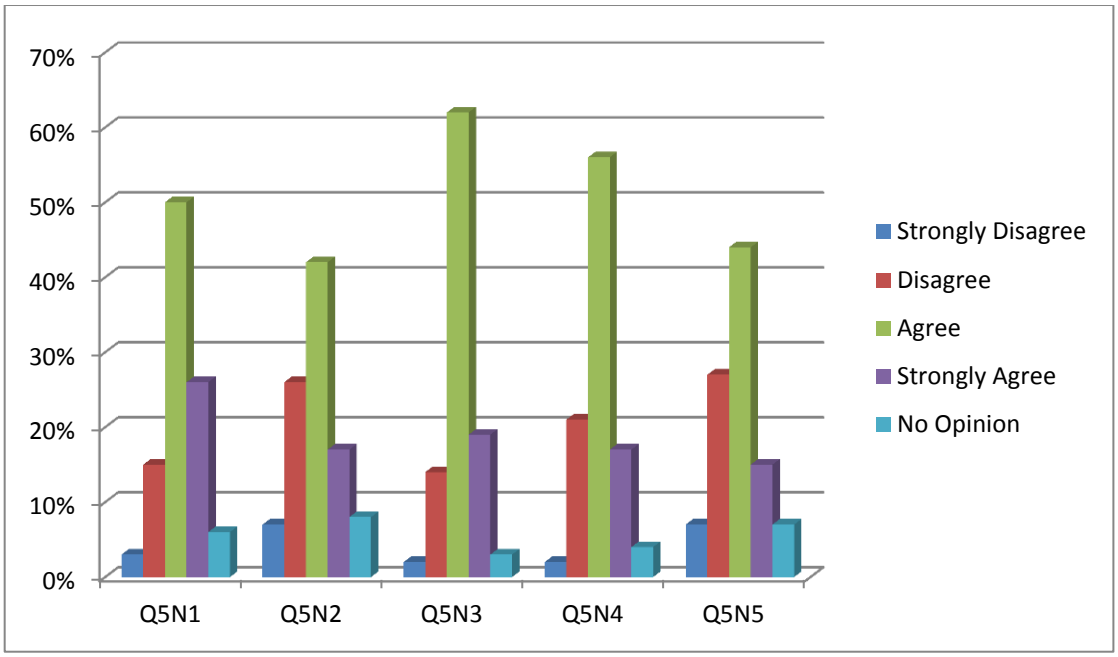
FIGURE 4.8: TRANSFORMATION AND DIVERSITY



Some 64% of respondents agreed to Q3N1 (In our organisation transformation is top of our agenda), which shows that the company is doing a lot to make sure that transformation is taking place. 54% of respondents agreed to Q3N2 (In my organisation top management encourages all employees to embrace diversity) and 18% strongly agreed, we can therefore see that the company is serious to diversify. To Q3N3 (Top management always reminds us about the important contribution that women make in our business) 46 agreed, that shows that the position of women (the perception of the respondents) is prioritised by management. Q3N4 (In my organisation we have equal number of men and women) confirms the mining workplace phenomenon throughout the country. However, although this positive perception on women in mining exists, the reality is that there are still very few women in the mining industry. 75% of respondents gave a positive response to Q3N5 (I feel comfortable in my organisation). 82% of respondents agreed that changes have been made to accommodate women (Q4N1).

4.4.2. Attitude towards women

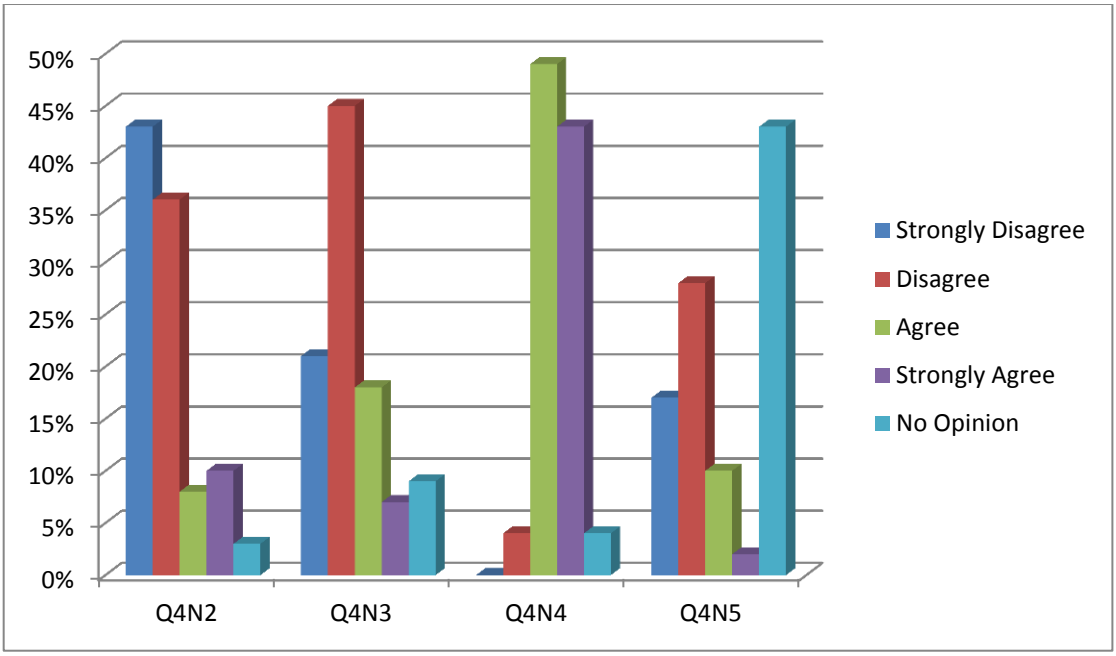
FIGURE 4.9: ATTITUDE TOWARDS WOMEN



50% of respondents agreed to Q5N1 (My manager supports women in our department) and 26% strongly agreed with this statement. This shows that the respondents perceives management to have a good attitude towards women. Some 42% agreed that there are programmes that address the skills gap between women and men (Q5N2). 62% of respondents agreed to Q5N3 (In my organisation leadership supports the acquisition of new skills irrespective of gender). From this result we are able to say that women are able to advance in the company. 56% of respondents agreed to Q5N4 (In my organisation leadership involves women employees in decision-making), which confirms that the company has a high regard for the views of women in the company. 44% of respondents agree that their managers keep track of women's career progression (Q5N5).

4.4.3. Individual analysis

FIGURE 4.10: INDIVIDUAL ANALYSIS



The four questions in this section was analysed individually, due to the fact that they could not be grouped together and contain important information individually. 43% of respondents disagreed with Q4N2 (I have been a victim of sexual or physical harassment). 45% disagreed with Q4N3 (In my organisation we have personal protective equipment that are specifically designed for women). 49% of respondents agreed and 43% strongly agreed to Q4N4 (Women that are pregnant are moved to work in non-hazardous conditions). 28% disagreed with Q4N5 (In my organisation the housing of women is different to that of men), but we also see that 43% of respondents did not have an opinion on this question, or opted not to answer this specific question.

4.5. SUMMARY

Chapter Four provided the demographic profile of the study and also indicated the perceptions of respondents on women in mining. The next chapter is the final chapter. It draws final conclusions and offers recommendations based on the results of the study.

CHAPTER FIVE

CONCLUSION AND RECOMMENDATIONS

4.1. INTRODUCTION

This chapter outlines the findings of this study and their relationship to the relevant theory. Based on the results obtained from the study, a discussion of the theoretical and practical implications is presented. Recommendations to management of the selected company are also presented.

4.2. OVERALL FINDINGS

From the data that were received certain findings can be concluded. The age of respondents was relatively young, with 75% under the age of 40. This will have an effect on the results that are obtained, because the younger age group tends to be more acceptable to women in the workplace and also to changes in the workplace.

61% of the respondents were male which corresponds with the literature review that reveals there is a shortage of women in the mining sector. The fact that there is less women in the study will have a major impact, due to the fact that the study is focussed on the perception that exists towards women in mining activities.

It is clear by the responses of participants that transformation plays a large role in the company, with 64% of respondents agreeing that it is top of the agenda. This might be due to the fact that the mining charter has very specific targets that must be met. The results also show that employees are encouraged to embrace diversity. With regard to the question whether there are equal number of women and men, it shows that there are less women than men. This result confirms what is stated in the literature review. Out of the participants, 82% felt comfortable in the organisation. This is a very good sign for any company, especially for a mining company that is faced with difficult challenges regarding women.

76% of respondents agreed that their managers support women in their department. Management has a big responsibility to lead by example. By showing workers that they support women, they are changing the attitudes of workers towards women. From the data we see that there are programs to address the skills gap between men and women, managers also keep track of women's career progression. Probably the best results that are obtained from the study are that in the company women are able to advance and that they are involved during decision-making. By including women in all facets of the company the attitude towards women will be changed.

Four questions were analysed individually, due to the fact that they could not be grouped together and due to the fact that they contain important information. These four questions are some of the most challenging that exist in the mining workplace at the moment and has a major impact on the attitude towards women and the rate of transformation. Sexual harassment is a major problem that women in the mining sector have to cope with. There is a small number of participants that agreed to being sexually or physically harassed. From the literature review we anticipated a higher number, but this figure still shows that the company definitely also deals with the same problem. Another big issue that women in mining encounter is that of personal protective equipment. Over the years personal protective equipment was made only for men and only to the specific dimensions of men, but with women starting to work in mines it can be seen that this is a problem. There will have to be attention shown specifically to designing clothing for women. Pregnant women will always be a topic while women work in mines. This is due to the fact that pregnant women must work in non-hazardous conditions. This forces the company to move these women to different sections.

4.3. RECOMMENDATIONS

The following recommendations can be made from the survey results:

- Programmes will have to be implemented to address the perception of the male workers that women does not belong in an underground mine, there are still certain issues such as culture and workplace environment that need special attention.

- Workers will have to informed and trained on the sexual harassment policy of the mine.
- The company will have to look into specific health and safety issues pertaining to women, such as personal protective equipment and housing.
- The company must make sure that women that are fast-tracked are specifically looked after and that management are aware of their progress at all times.
- The company will have to make sure that gender equality keeps on staying a priority, as this can have a major influence on the progress that has already been made.
- Employees must be promoted within the ranks on an equal basis and on ability.

4.4. FUTURE RESEARCH PROSPECTS

While I have focused on some of the issues regarding the perceptions of the workplace of women in the mining industry, it is also important to note that some of the issues were not fully investigated due to limited scope of the research, time constraints, and the availability and willingness of respondents to participate.

Further research is suggested as regards to the impact that pregnant women have on a company, women artisans in the mines and women within the mining community.

4.5. CONCLUSION

The effects that the positive and negative issues have on women largely depend on issues of equity. As inequities are challenged, gender roles will inevitably evolve, and women in mining will be better equipped to support sustainability in the communities where the challenges occur. The more the problem is brought to the public domain, fully researched and debated, the more the leadership in the said companies will be open to constructive criticism and consequently embrace the phenomenon of women in mining. Women's capability to work in mining will open more opportunities, leading to

increased confidence levels in the industry regarding their employment and promoting diversity in support of the country's government. This should create a sustainable business model that will both encourage and retain women as employees and managers within their respective operations.

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APPENDIX: QUESTIONNAIRE

Dear Participant

My name is Ian de Klerk, a third year student pursuing a Masters in Business management at the Potchefstroom Business School. I am currently conducting research on the following topic: “The perceptions of the work environment of women in core mining activities”.

In this survey my purpose is to find out what is your perception of women in mining in relation to your observation, opinions and experiences.

People have very different opinions about these issues, ranging from very positive to very negative. Whether you agree or disagree with my statements, I would like to know what you think.

Please be advised that your response wil be kept highly confidential for the purpose of this study. Under no circumstances will this information be divulged to other individuals except to the Potchefstroom Business School and University Management.

Kind Regards,

Ian de Klerk

Quality Assurance and Logistical Manager

Tel: 012 259 0398

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Email: ideklerk@memorsa.com

SECTION 1: BIOGRAPHICAL DATA

1.1 Age				
< 20 yrs	21-30 yrs	31-40 yrs	41-50 yrs	51- 60 yrs

1.2 Gender	
Male	Female

1.3 Please indicate your designation in Patterson Grading				
A	B	C	D	E
Unskilled worker	Semi-skilled worker	Skilled worker	Middle management	Senior management

SECTION 2: QUALIFICATIONS AND JOB EXPERIENCE

2.1 Please indicate your highest educational qualification (use equivalents where necessary)				
Below Grade 12	Grade 12	Degree/Diploma	Postgraduate degree	Other (Please specify)
2.2 Please indicate your current role				
Graduate/Learner Official	Miner	Shift Boss or Mine Overseer	Manager Mining	Other (Please specify)
2.3 Please indicate your experience in the mining industry				
< 1 year	1-2 years	3-5 years	6-10 years	>10 years
2.4 What is your total experience in the chrome sector				
< 1 year	1-2 years	3-5 years	6-10 years	>10 years

2.5 How did you acquire mining skills					
Risen through the ranks	Internal Promotion	Formal Education	On-the-job training	Self-Study	Aptitude and Ability

2.6 Do you affiliate to a union	
Yes	No

SECTION 3: PERCEPTION OF WOMEN IN MINING

In this section you are required to circle one number only for each statement.

The following are the selections and their description:

1=strongly disagree

2=Disagree

3=Agree

4=strongly agree

5=no opinion

3.1 In our organisation transformation is on top of our agenda				
Strongly disagree	Disagree	Agree	Strongly agree	No opinion
1	2	3	4	5
3.2 In my organisation Top Management encourages all employees to embrace diversity				
Strongly disagree	Disagree	Agree	Strongly agree	No opinion
1	2	3	4	5
3.3 Top management always reminds us about the important contribution that women make in our business				
Strongly disagree	Disagree	Agree	Strongly agree	No opinion
1	2	3	4	5
3.4 In my organisation we have equal number of men and women				
Strongly disagree	Disagree	Agree	Strongly agree	No opinion
1	2	3	4	5
3.5 I feel comfortable in my organisation				
Strongly disagree	Disagree	Agree	Strongly agree	No opinion
1	2	3	4	5

SECTION 4: CHANGES MADE TO ACCOMMODATE WOMEN

In this section you are required to circle one number only for each statement.

The following are the selections and their description:

1=strongly disagree

2=Disagree

3=Agree

4=strongly agree

5=no opinion

4.1 In my organisation changes have been made to accommodate women				
Strongly disagree	Disagree	Agree	Strongly agree	No opinion
1	2	3	4	5
4.2 I have been a victim of sexual or physical harassment				
Strongly disagree	Disagree	Agree	Strongly agree	No opinion
1	2	3	4	5
4.3 In my organisation we have personal protective equipment that is specifically designed for women				
Strongly disagree	Disagree	Agree	Strongly agree	No opinion
1	2	3	4	5
4.4 Women that are pregnant is moved to work in non-hazardous conditions				
Strongly disagree	Disagree	Agree	Strongly agree	No opinion
1	2	3	4	5
4.5 In my organisation the housing of women is different to that of men				
Strongly disagree	Disagree	Agree	Strongly agree	No opinion
1	2	3	4	5

SECTION 5: CAREER ADVANCEMENT

In this section you are required to circle one number only for each statement.

The following are the selections and their description:

1: Strongly disagree

2: Disagree

3: Agree

4: Strongly agree

5: No opinion

5.1 My Manager supports women in our department				
Strongly disagree	Disagree	Agree	Strongly agree	No opinion
1	2	3	4	5
5.2 In my organisation there are programmes that addresses the skills gap between women and men				
Strongly disagree	Disagree	Agree	Strongly agree	No opinion
1	2	3	4	5
5.3 In my organisation leadership supports the acquisition of new skills irrespective of gender				
Strongly disagree	Disagree	Agree	Strongly agree	No opinion
1	2	3	4	5
5.4 In my organisation leadership involves women employees in decision making				
Strongly disagree	Disagree	Agree	Strongly agree	No opinion
1	2	3	4	5
5.5 My managers and leadership keep track of women's career progression				
Strongly disagree	Disagree	Agree	Strongly agree	No opinion
1	2	3	4	5

APPENDIX B: DECLARATION BY LANGUAGE EDITOR

November 7, 2012

To whom it may concern

Re: Letter of confirmation of language editing

The MBA mini-dissertation "*The perceptions of the work environment of women in core mining activities*" by Ian de Klerk (12600245) was language, technically and typographically edited. The sources and referencing technique applied was checked to comply with the specific Harvard technique as per North-West University prescriptions. Final editing and printing remains the responsibility of the student.

Antoinette Bisschoff
BA (Languages); MBA
SA Translators' Institute (SATI)/SA Vertalersinstituut (SAVI) Membership: 1001891
Officially approved language editor of the NWU