ENCOUNTERS OF WOMEN IN PHYSICALLY DEMANDING JOBS WITHIN RUSTENBURG

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Firstly, may I give honour and glory to God Almighty who promised us that all things are possible for those who trust in Thee.

To my mother, Moratoe Elizabeth Ntusi, thank you for your undying love and the reassurance you persisted to instil in me even when times were tough and giving up seemed the only option, may the good Lord keep and bless you.

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ABSTRACT

The South African government through the 2004 mining charter stated that all mining companies must be transformed and empowered such that 15% black ownership is realised by 2009 and a final target of 26% black ownership by 2014. The target was not achieved, reaching only 9% in 2009, this trend was observed in the proportions of women representation in physically demanding jobs. The research methodology employed was that of a quantitative nature, a survey questionnaire was utilized in gathering the research data from respondents; research tool used was a questionnaire using a Likert-5 type rating scale in order to accomplish the research objectives.

The basis of the research was centred on women development, contribution women make within the businesses, women's specific needs, programmes addressing the skills gap between men and women, and leadership care for women's career progression. The study objectives were to among other things establish if the current network structures and sex-specific reward systems kept women in subordinate professional positions, and how key technical competences previously constructed as masculine can include women from new professions emerging from technological innovation.

Findings briefly showed male employees as the ones who were more favoured to being promoted into executive positions; stereotypes still exist regarding women's capabilities, with unconscious bias being reflected. Inherent cultural practises also compelled discrimination towards certain gender roles, thus subtle manifestation of prejudicial bias with undeserved effects on women employees working in the physically demanding jobs.

Conclusions and recommendations showed that women form the most essential component of the work force in South Africa. To attain best results on the success and sustainability of the economy, the society, and the industries at large; a renewed commitment by all stakeholders on the development and nurturing of women in the jobs that require physical strength was found to be imperative. Measures to promote co-existence between men and women, improved ergonomics to meet women's physiological basic needs, together with recognition and award systems need to be implemented, consequently improving numbers and retention of women in physically demanding jobs.

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LIST OF ACRONYMS AND ABBREVIATIONS

Acronym	Description
AA	Affirmative Action
BEE	Black Economic Empowerment
CPS	Current Population Survey
ECSA	Engineering Council of South Africa
MIGDETT	Mining Industry Growth Development and Employment Task Team
MiHR	Mining Industry Human Resources Council
OHS Act	Occupational Health and Safety Act
PDI	Personal Development Indicators
PPE	Personal Protective Equipment
STATS SA	Statistics South Africa
UCSD	University of California, San Diego
WIM Canada	Women in Mining Canada
WimSA	Women In Mining South Africa

CHAPTER 1

THE NATURE AND SCOPE OF STUDY

1.1 Introduction

Issues of transformation were being examined in order to identify what has not been achieved and how to advance the cause of transformation in South Africa. The Mining Industry Growth Development and Employment Task Team (MIGDETT) has stated in the 2004 Mining Charter that all mining companies must be transformed and empowered, and that it was expected that every mining house achieve an interim target of fifteen percent (15%) black ownership by 2009 and a final target of twenty six percent (26%) black ownership by 2014. Reaching only 9% in 2009, the target was not achieved. (Badenhorst 2012:25).

Looking at transformation, the issue of human resources as per Charter targets saw companies employing more white women. In the South African constitution, the issue pertaining to the women in the industry is not based on colour. The mining industry has manipulated the clause and has used white women to achieve their targets. Govender (2005:31) stated it clearly that even though both black and white women were and still remained to be the minority group in decision making; it was alarming to discover that white women retained more management power than black their black female counterparts and that their positions were equivalent to that of black men.

It is necessary to make sure that more black people are involved in the industry, in both the technical and professional areas. MIGDETT also needed to look at the allocation of scholarships applied by mining companies to young black people and to women. For the study on women in physically demanding jobs, the intent was to highlight and describe the feelings and experiences of women in physically challenging jobs on a day to day basis.

The effect of encounters on women employed in physically demanding jobs within Rustenburg industries, mining and engineering companies is a major contributing factor towards their social perception. From the results, it was suggested that 43% of new female recruits are found not to be fit for physically demanding work in the mining industry as stated in (Badenhorst 2012:25).

De Klerk, (2012:28) indicated that mining and hard manual labour had always been associated with masculinity, and that women differ from men, both physiologically and physically. It has been indicated that some workplaces which included technology, were previously designed to accommodate male employees and were found to be unsuitable for women, in some instances. The implications for the said environment's management, is that certain work categories do require a minimum output level in terms of physical capability.

If the females do not deliver the required outcomes, the potential impact will be loss of production, increased risk of injury and may require more employees to perform the same output levels as previously achieved by male employees, thus a higher labour cost component. (De Klerk 2012:26). There is undoubtedly a need for stride interventions in addressing the impact of challenges that women working in the mining, engineering and industrial environment face.

1.2 Purpose of the research

This research study was prompted by the general perception that women do not necessarily do well, develop, adjust to, and/or advance in physically demanding jobs; especially in the mining industry. The research topic is therefore aimed at investigating whether or not there are factors which prove or disprove this perception. The main research objectives will therefore be to:

i) Analyse the prohibiting factors to women's development.
ii) Verify if management supports the course of women advancement.
iii) Adjudicate the impact on productivity levels and social perspective once diversity is embraced.
iv) Enumerate the effect of encounters experienced by women employed in physically demanding jobs.

Mihail (2006:386) argued that barriers towards women's advancement are an inclining trend on a global scale, even though a source of talent which is relatively untapped is represented by women in the workplace, in the midst of the progress that has been made over a lengthy period of time. Some women in male dominated industries may feel threatened by negative stereotypes reinforcing their intellectual and physical inferiority, reducing the extent to which they build their self-esteem, hence leaving their work positions for more feminine ones.

It is a known fact that the operations within mining do not occur in isolation, and do have an impact on the environment and society in which they function. For survival and sustainability, a more attractive development and the industrial competitiveness for female human resources confirm that the environment and society are dependent on each other. (Mashiane, 2009:52).

1.3 Problem and sub- problem statements

The intention of the study was to investigate certain problem statements which, among others, include the genetic predisposition of female employees, who are at a disadvantage due to the nature of their bodies; especially when performing work in the physically demanding workplace. This is mainly due to a work place design that currently caters for a greater percentage of the male population. The study also aimed to research the impact on the work-home lifestyles these female employees tend to lead, as it is suspected that these women have a less active social lifestyle than their male counterparts. McCulloch (2003:418) in his research stated that mining and hard manual labour has always been associated with masculinity.

The statement was corroborated to by alluding that women differ from men both physiologically and physically by Greene (2006:75) who stated that women acknowledged that in some cases they had less physical strength than that of the men they worked with, or less physical strength than was required to perform certain tasks. It has been discovered that some workplaces including the technology employed in them were previously designed to accommodate male employees and were found to be unsuitable for women. Although some women may describe themselves as less capable or less strong physically; they have however described themselves as more innovative and mentally cleverer.

The self-descriptive assertions were based on the nature of work which was physically demanding and would be difficult for women to perform in a conventional manner. The women therefore opted to utilize self-devised strategies which deviated from the male traditional ways of accomplishing work. In the face of challenges, women were steadfast that they had the tenacity to carry out any task issued them despite their physical strength, this was because they were determined to figure out ways to accomplish the task at hand (Greene, 2006:76).

The stereotype perception regarding women's potential within such environments could be that: certain work categories do require a minimum output level in terms of physical capability and if the females do not deliver the required outcomes; that would perpetuate a stereotype perception regarding their potential. The impact of this was perceived possible loss of production, increased risk of injury and a requirement for more employees to perform the same output levels as previously achieved by male employees alone; thus a leading to higher labour costs. (De Klerk 2012:32).

Due to the inherent responsibilities that women carry for nurturing their families, they would sacrifice their well-being in order to get their salaries and be able to take care of their families. Ntombela said in the article "Inside Mining" (2014) that she believed that it could take yet another decade before women are truly acknowledged as an imperative part of the mining and engineering industries, especially in the deep level mining industry.

According to Blaisdell, it was highly likely to have women engineers who originated from high socio-economic families, with their father's likely being employed in the engineering or science field of work, or even better, their fathers being even more highly educated. "Female engineers typically either have masculine perception interests and activities. However, women engineers score significantly higher on feminine and androgynous scales and lower on masculine scales than male engineers" (Blaisdell, 2006).

There is undoubtedly a necessity for advanced involvement by authorities to address the impact of challenges faced by women working in the physically demanding job environments. The research has gone above and beyond the examination of the gender composition effects. It has instead, also taken into consideration some variables, including effective leadership and efficient productivity of gender groups, which if combined, would lead to shrinking the effects of stereotypes in mixed genders, leading to a better environment, and improved efficiencies and confidence levels amongst women working in physically demanding jobs. This would subsequently yield a homogenous and highly productive work environment for all.

The effect of prejudice, bias and discrimination hinders the career growth of women in the male dominated industries, and of women in workplaces which require physical strength, thus women tend to be seen threatened by negative stereotypes, alleging their intellectual and physical inferiority. Thus, support from all stake holders involved in organisations together with leadership to embrace diversity in order to improve talents; could play a pivotal role in assisting with the reduction of women's challenges in the workplace.

1.4 Research Design

The research method that was utilized is that of a quantitative approach, and the design is the survey design; this approach contained two significant advantages. Firstly, it can be swiftly managed and secondly, it can be evaluated quickly. There was no necessity to devote time at the various organizations prior to administering the survey; hence it was possible to achieve tabulated responses in a reasonable space of time.

Comparisons between organizations or groups, was facilitated through this approach by which numerical data was obtained. It has enabled the determination of the extent of agreement or disagreement, amongst respondents (Choy, 2014:99).

The legitimacy of quantitative data was found to be an advantage in that, data was rigorously collected, using appropriate methods and ensuring critical analysis of data, yielding to reliable outcomes ACAPS (2012:6). The quantitative method was preferred because of its nature of stating the research problem in a relatively precise and rigid manner. This is accomplished by clearly and precisely stipulating the two variables being investigated which are known as being dependent and independent, in firm accordance with the original set of research objectives; subsequently leading to substantively objective conclusions.

The target population that was considered in this study is as stated below and consisted of :

i) employees working at a Platinum Mine in the Rustenburg area
ii) Eskom Distribution employees in the Rustenburg Area
iii) Rustenburg city industries

In this study, the determination of the sampling method was quite a challenging exercise, especially within the mining industry which recently experienced large-scale employee strikes, with the engineering sector also being affected. The expectation was a reduced number of participants in the study. To avoid any unwelcome results in this study, the sampling method employed was the convenience sampling, a procedure that is used to select units for analysis and examination on the basis of accessibility, ease, speed and low cost.

As indicated by Leedy and Ormrod (2005), when taking samples, and sampling units are about 5000 or more and beyond a certain point; it becomes almost irrelevant to consider population size, therefore a sample of 400 could be regarded as adequate. The study population consisted of around 240 employees and the target audience were men and women from various mining, engineering and industrial business units within the Rustenburg area.

A measuring instrument plays a critical role in data collection and the obtaining of reliable and valid results, hence an appropriate instrument is required. The validity of the study may be compromised if the selection of instruments is incorrect and may present invalid conclusions about the investigated topic. Various types of instruments which were available are presented below for the purpose of the research.

Paper pencil questionnaires and web based questionnaires, are the two most popular techniques. Questionnaires were however, found to be the most appropriate tools to be used, as most participants found them user-friendly. The research questionnaire of this study met the minimum requirements for face validity because it accurately measured what it has been intended to measure. To meet the expectation that the measurement instrument would yield the same results for both the pre and post-tests; validity determination, in the process of data gathering and data analysis had to be carried out in a demeanour that could not allow extortion of the chosen instrument in any way (Changing Minds, 2012).

1.4.1 Statistical Data Analysis

As in Mashiane (2009:33), statistical data analysis was conducted such that research objectives reflect the summary of data responses, standard deviation, summary of results in percentages, graphical illustration of results and analysis of graphical results according to standard deviation which led to the established conclusions. Pilot testing was undertaken with the first 10 (ten) prospective participants from the targeted employment sites, and it turned out successfully.

As the research study is based on quantitative research methods, quantitative data collection method was the focal point, meaning that; the questionnaire was developed in order to gather the necessary information that consisted of open and closed questions. In order to have a fully representative and reliable sample, about 250 permanent employees of the selected mine, engineering and industrial sites were approached to complete the questionnaires.

A questionnaire was used on a scale of 1 to 5, choosing from strongly disagree, disagree, agree, strongly agree, and no opinion. The drawing up of the questionnaire included the use of key dimensions grouped together according to various themes for the establishment of the objectives. The questionnaire is divided into 5 sections. Section A : gathering biographical data, Section B : information gathering on participant's qualifications and their experiences. Sections C, D and E comprised of the actual questionnaire, with questions per section; all items totalling 29 when grouped together.

1.5 Potential benefits and importance of study

The plan is for the anticipated results to be shared with relevant stakeholders, especially for providing awareness to the change drivers, i.e. the relevant management teams where these women are based. Hopefully the new results could benefit six areas of business ethics research, these being:

i) trust,
ii) moral decision-making,
iii) organizational justice, and increased productivity,
iv) moral development,
v) the ethic of care,
vi) and female management styles.

In her speech, Susan Shabangu, Minister of Mineral Resources in *Mining Media* (2010) stipulated that they will be reviewing the act as a whole and will look at the type of legislation needed for the industry to move forward. This was apparently done during a difficult time of a new democracy and there was no trust amongst industry, government and labour. The chapter has therefore investigated the underlying causes of this lack of trust amongst all stakeholders. Sturk (2011:4) said: "Once in a while, there are challenges along the way." Initiatives such as "Explore for More" were initiated to help develop the mining industry's brand for increased career awareness, with the intention of transforming the perceptions of people about mining. One element which has risen from this study was the "disconnection" between the female worker and the employer.

This phenomenon reinforces the reality that there are barriers in the workplace, thus the investigation intends to reveal the business stance on moral development and moral decision-making. The minerals sector committee chairman, Andile Sangqu; of the Chamber of Mines state intervention; alluded in *The Citizen* (2013:4) that the industry needed to concede it was facing a crisis. "The tensions in mining right now mean the stakes are high and the need for resolution is urgent," he indicated.

The industry was inclined to speaking more meaningfully only when a crisis was experienced, and Sanqu questioned that. He asked about the effective utilization of the structures which were designed for mining transformation as a means of support. According to Sangqu (2013:4), because there could not be transformation without economic growth; it was imperative that productivity is looked at by the industry itself.

A conflict could arise with regard to creating a balance between work and family when choosing to take on roles which were outside the work environment by women; like becoming mothers, or taking on the primary responsibility of looking after their aging parents and other dependants they may have. A great challenge is realised when women attempt to juggle and create a balance between these conflicting demands of family and work, leading to the women resorting to leaving their jobs.

It is therefore imperative that the companies look into their management practices and policies for adaptation in order to illustrate their intentions of caring and being responsible for the wellness of their female employees (Women in the Workplace Research Report, 2012). The ideal circumstance would therefore be such that the implications of the intended findings for business practice, would be; allowing for men and women to be treated differently in the workplace, to prove that it may be both to their own advantage and to the advantage of the firms for which they are working.

1.6 Structure of dissertation

Chapter one of my dissertation introduced my argument regarding the study on women in physically demanding jobs, highlighting and describing the feelings and experiences of the women in physically challenging jobs on day to day basis.

Chapter two has focused on the literature review explaining the rationale for undertaking the study, , that is, the significance and the benefits of this study on the selected literature on affected women, women not affected and male counterparts, that are relevant to this research topic.

Chapter three discussed the research methodology; using quantitative methods. The rationale was to utilize the approach which is semi-structured interviews with fair discrimination that is fully comprehensive.

Chapter four is the collection and representation of data, herein pursuing the interview protocols; taking into account the thoughts, feelings or perceptions as expressed by the interviewees.

Chapter five is about my findings and arguing and supporting other authors who have conducted similar researches before. This was in order to critique or support other researchers commentary or literature.

Chapter six, the last chapter, provided a synopsis of the study by drawing conclusions from the findings, giving recommendations and sharing the study with parties concerned at the given point in time.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

Mining is an industry regarded as being physically demanding. It is known for being remote, rough and dangerous, and is also being recognised as an industry synonymous with male-dominance. In a recent study, by Women in Mining (2014), there were suggestions that women made up just 5 % of board positions in the top 500 globally-listed mining companies and for the global mining workforce it amounted to ten percent (Cook, 2013). Aligned to the fact that mining has a reputation for being dangerous, rough and remote; Le Sueur-Aquin, in Rees (2014) stipulated that: "Traditionally, the mining industry has always sourced its labour from the rural male workforce, and without the necessary mine experience, opportunities for promotion and advancement had also been restricted for women".

Rees (2014) added that while legislation now makes provision for women to work in the industry, they remain poorly represented as they (women) typically work mainly in support services." Le Sueur-Aquin indicated that more research is required in order to incorporate the recently identified theoretical frameworks such as 'person-organization fit' and 'status characteristics theory'. The research was particularly based on theoretical perspectives, like the structural hole theory, by Balkundi et al (2006) and Schwartz's value framework and Sawyerr, Strauss, & Yan (2005), which focused on positive or neutral predictions as an addition, that would be a valuable literature to gender issues in organizations.

Mining is undeniably a physically challenging environment, with men and women having different strengths and qualities. It was observed that when placed together in business, a holistic industry could be created. It was however apparent that there had been a paradigm shift towards considering women as an imperative part of the mining workforce (Borralho, 2014). The matter regarding challenges faced by women employed in physically demanding jobs was seen to be exacerbated by the experiences described by women in mining.

2.2 Factors involving statistics on women in physically demanding jobs

As traditionally known, mining has been a male dominated industry. Even though there have been, and continue to be good changes regarding the integration of women into the mining industry, as well as attempts to make mining more attractive for women to work in, there still are indications of under-representation of women within the industry itself. To get to a level of having more women as professional engineers, it would require for the population to be trained so that more mining engineers are professionally registered.

However, because of time lags, and taking into account the demographics of registered professionals, these were found to differ markedly with the demographics of the current students, and may probably differ from the demographics of women in the country, which were comparatively low regarding the pace at which women register with professional bodies like the Engineering Council of South Africa (Cruise, 2011:224). An executive research company Amrop Landelahni's statistics featured Matthews (2013) in the article who said that there were only 412 women registered with the Engineering Council of SA in the year 2010/2011 as professional engineers, giving a total of 2,8% women registered.

A challenge which is obvious for women, apart from the physical demands of the job, is having women in the minority within a male-dominated work place. The core of mining business requires hard technical skills; which are physically challenging especially to women's physiological abilities. The pipelining and retention strategies for women into the mining and engineering sectors can still be improved, as it was observed in jobs from other corporate fields like community liaison, beneficiation and environmentalism, although limited, there is some movement.

A 2010 report by "Women in Mining" from Canada, was focused on the advancement of women interests in the industry. For the year 2006 in the Canadian mining industry, 14% of the workforce was represented by women, who mainly occupied the culinary and administrative jobs. Now more than ever, the mining industry has more women in their employ, yet women are still not nearly as incorporated in the mining industry as they should be.

South Africa is one country that has managed to rectify some injustices of the past through implementing policies that has somewhat assisted the historically disadvantaged South Africans, especially women, to advance. They have insisted that mining companies are required to have women representing at least 10% of its workforce. There are still huge inequalities which exist, in particular at the senior management level. On a positive note; women were starting to be integrated (Kihn, 2010).

2.2.1 Representation of women in learning institutions

Unequivocally, women are underrepresented in the science and maths streams of the senior years of their high schooling, mainly within engineering, as engineering would not have typically been something girls may consider as a career. Those women, who are found to have qualities to pursue engineering studies, are regrettably encouraged to study engineering rather late in their schooling, sometimes as late as in the final semester before completion of their senior secondary schooling (Sturk, 2011:5).

It was also revealed that not much effect was seen on these women as a result of the male behaviours, however there was a trend that these women learnt that there is only one pattern for an engineer and no room for challenge, and that the women having this perception would not do much to stop this belief. In most instances, these women will be prepared to ignore or tolerate the unwelcomed behaviour from their male co-students even when though they are distressed by that, they still would not react. Sturk (2011:5) stated that 50% of employed female engineering students have experienced some form of discrimination or harassment, however they find it easier to just move on to another job than to try and point out faults in the system.

Furthermore, once enrolling for engineering studies, women automatically go through challenges regarding, 'real engineering' which not only encompasses certain attitudes but also certain technical skills, social behaviours and work habits which subsequently become heavily gendered; hence the new take on the old saying that women are expected to be twice as proficient to be seen to be half as good.

Cruise (2011:224) enquired if the Professional Advisory Committee for mining engineers could possibly have 50% of female component in a committee which comprises of 16 people with only two female mining professional engineers in it? The aforementioned two real-life examples representing a reduced number of women in such committees clearly exhibited the ineffectiveness of the premise that all establishments should simply resonate with the entire country's demographics. By the same token, the mining graduates' demographics are constituted by 100% black candidates, as discovered at the University of Witwatersrand, this does not necessarily reflect the demographics of the country.

2.2.2 Representation on Demographics and population for women in Mining and Engineering.

The demographics and population in the South African mining and engineering industries are not uniform and are not static, resulting in them varying with applicability and time. Currently the Black Empowerment trend as adopted by many companies is just a one-dimensional perception that the demographics of all institutions should be reflective of that of the country, and is anticipated that the application thereof should be instantaneous. This approach is, in fact, an illogical notion that will be realized when it is being applied to mining engineering.

In the "Women Stand Tall at Mining Indaba" (2013) article, it was stated that physically demanding jobs did not necessarily come as every woman's idea of a dream job. However; each day, a great number of women wake up around 4am, put on their overalls, their hard hats and boots, and take a packed lift down to some of the world's deepest, most hazardous and hottest mines. Some spend full eight-hour shifts driving gigantic trucks around dusty open pits. It is further indicated that nothing is impossible for women. Women are here and they are capable. Minister Susan Shabangu has also acknowledged the role played by Cynthia Carroll, who occupied a chief executive position for Anglo American, demonstrating that she had been a ubiquitous inspiration to women. Carroll's resignation brings the total number of female CEOs of FTSE 100 companies to only two women.

2.2.3 Discussion on statistics on women in Science and Technology

As illustrated in the 2001 Current Population Survey (CPS) data report, out of every ten employed engineers only one was a woman, while for every ten engineering technologists and technicians employed; only two were women. Considering the fields of engineering specialties like chemical, industrial and materials or metallurgical engineers; they were found to be the only occupations within which women engineers were more highly represented than the overall percent of total women engineers. In the science stream; natural scientists, medical scientists and biological life scientists represented 51.6 percent and 44.4 percent respectively of the total number of women scientists. Geodesists and geologists combined, accounted for 24.0 % with physicists and astronomers at 7.7 %, a significantly small number (Women and work, 2013).

Apparently, women were underrepresented by 14.4 per cent and that figure was well below the overall labour force average of 47.4 per cent. The other factor that was also driving the study was the issues regarding the approaching labour deficits, which were expected to be 60,000 by 2017. According to a study conducted by Sturk (2011:6) it was observed that in the years 2000-2001 a peak in female representation was observed. Now, however, there is an evident decrease in female participation, even though it may just slightly improve.

There are obvious reasons to account for the situation; as there have been some perceptions about females in engineering; that being: what requirements are there to bring about change in the Engineering profession to make it appealing to the women, and also what other means should be put in place to enable women to fit into the profession, so that they can have a sense of belonging (Sturk, 2011:5-6). Statistics in the mining industry as stipulated by Le Sueur-Aquin (2014) showed that 10% female representation is still an aspiration for the Mining Charter's baseline for women to participate in technical disciplines, with the aspired increase of around 20% in 2018.

When exploring beyond South Africa, Le Sueur-Aquin (2014) highlighted the need for more of both genders to be trained and employed to reduce the demographic imbalance that the mining industry is currently faced with, showing that there's a labour market crisis coming regarding demographics imbalance.

Therefore, the nature of this exertion is profound and too generic to what the mining and exploration industry has grappled with before (Women in Mining, 2014).

Women in Mining (2014) is in agreement with Kopamees (2014) in that; not only history has held women back but also that work in the mines is often physically laborious. The culture, folklore and convention have made most women stay clear of underground work, in order to avoid falling victim of these stereotypes. It will take responsible employers to provide support to them to counter act under-representation in the engineering and technical disciplines. The schools and universities serve as a good point of departure in order to make waves in the physically demanding jobs (Women in Mining, 2014).

2.3 Awareness and appeal for women in mining and industrial sectors

In the Mogalakwena mine, which is part of Anglo American's Platinum business; a shift supervisor Queen Hlotse, was a coach and a leader of a team of 140 operators and foremen who ensured that they met drilling targets of approximately 3 800 metres per day. As a female, Hlotse believed she was made to face more obstacles in mining as opposed to her male counterparts. "I initially struggled to carry heavy metals, and many of the males I worked with would chastise me, as they expected my strength levels to match theirs," she said (Carroll, 2012).

Thandiwe Nkambule, Pr Eng; who started her engineering career as an intern with Anglo-Plat, shared her experiences on how she learnt the ropes within a period of a year; where they were the very first group of women to work underground during that period. Her memorable experience was the one where she was expected to carry 25kg of cement to the other side of the mine and she did that with ease. Men in her midst found it difficult to believe how she managed it, since they had a preconceived perception that such a task would be daunting for a woman (Sidler, 2014).

The experience of being expected to carry a 25kg bag of cement propelled Nkambule to be proactive and generate a plan to overcome this challenge of strength and physique, and in turn that was the approach she took towards life in general, thus finding solutions in every challenge she faced, regardless of the circumstances. Badenhorst (2012:25).stated; after reviewing literature and with reference to the studies undertaken throughout the mining industry, that it is apparent that females' physiological composition is completely different to that of their male counterparts.

The capacity to perform manual tasks has a direct impact on these differences between males and females. Additionally, the equipment and machinery used in the mining industry are primarily designed to suit the male workers. Females are habitually disadvantaged from an ergonomic perspective especially when expected to use and operate machines or equipment; mainly because of the differences in body structure and size. As documented in other studies and as observed from the statistics; it is a fact that females have the ability to compensate for their physiological disadvantages by means of conditioning programmes.

Hlotse recounted her first days when she started work as a drill rig operator. She and her colleague were the only two females working in this capacity, and they were the first in the drilling department. It was not expected of them, from their male colleagues, to cope with a task of picking up drill bits and heavy cables or loading them on machines, and they doubted their ability to adequately operate a drill machine. This in turn, propelled the women to work even harder to improve their physical strength (Carroll, 2012).

Her efforts resulted in Hlotse excelling as a drill rig operator, which surprised her male colleagues; hence her conviction that programmes to make men aware around their women colleagues would be of great benefit. She believed that this could be used as a platform to discuss gender diversity and the importance of respecting all colleagues, irrespective of their gender. Hlotse felt strongly that; in as early has their high schooling; young girls should be encouraged to pursue science, maths and engineering subjects. This would be done in preparation for the exciting career opportunities awaiting women in the mining industry (Carroll, 2012).

There was a conspicuous disadvantage in both approaches with a possibility of favouring one gender over the other in terms of a narrow range of interests, aptitudes, and career aspirations. Hence it is critical that the very first foundations on which women are recruited into engineering are thoroughly scrutinized to eliminate possibilities of ineffective implementation and to ensure the correct practices which are without prejudice of gender.

2.3.1 Resisting the Matrix of Domination in physically demanding jobs

The observation was that the baby boomers are currently in the process of retiring, whilst taking into account the fact that the mining industry has a high percentage of older workers and is one of the largest industries around. Sturk (2011:6) elucidated that the bigger part of the problem emanates from educational inadequacy and insufficient awareness campaigns for mining careers to prospective students, which in turn impacts on the number of enrolments. "Explore for More" is one of those career awareness initiatives making an effort to change perceptions regarding mining in general and could help in the development of the industry's brand. One of those unexpected elements that were discovered in the study was the evident disconnection in the relationship between female workers and their employers.

Equally, on a positive note, the mining industry worldwide has acknowledged the necessity of integrating women better into the industry. Globally, many companies have embarked on the process of investigating different ways to develop the workplace and make it more attractive to women; all these would be achieved through the implementation of more flexible work practices. There are attempts by mining companies to work closely with educational institutions in raising the industry's profile and reputation, thus making the mining industry a more flattering option for women (Kihn, 2010).

Women in Mining (2014) having been regarded as a driving force for connection of the women working in the mines, because of its global capacity in operating all over the world and in turn, drew attention to the discriminations in the industry. President of Women in Mining Canada, MaryAnn Mihychuk, has had the privilege of working in the mining industry since 1977, where she had gathered all the experience required in becoming a spokesperson on behalf of women and their role model, in the mining industry.

Two thirds of women have recognized the barriers in the sector while only one-third of employers did (Mining Media, 2010:32). This is an indication that while there is a strong social need for involving women in mining, there is an even stronger business need for the mining industry to acknowledge that they really do need a new pool of workers. Apparently only 10 per cent of female students were aware of the mining sector; in order to curb this perception, the industry will need to make greater efforts to reach out to students and collaborate with other organizations like MiHR (Mining Industry Human Resources Council) to attract new students, as illustrated by Sturk (2011:5). If maintained well, this strategy will curb the gaps left by the current attrition rates, due to retirement and other reasons.

2.3.2 Involvement and participation of countries and mining companies where mining is prevalent

According to Kweyama (2012); the number of women in the mining industry have more than quadrupled since 2007 to 2012 and women are twice as much within the Kumba Iron Ore technical support department, encompassed in the technical training centres. Kumba Iron Ore got to be introduced as a partner to South Africa's Department of Mineral Resources, in that; it was a key role player for what was understood to be a defining moment in assembling the South African women in mining together (Women in mining, 2014).

Kweyama (2012) alluded that Anglo American has also done a lot in addressing challenges that women are faced with; by passionately advocating for gender equality. In some areas they have provided childcare facilities, provided suitable washroom facilities and are ensuring compliance towards a Code of Good Practice for pregnancy in the workplace. Women are given personal protection equipment especially designed for women and tailored in appropriate sizes to suit them comfortably. (Women-in-mining; 2014)

The launch of engagements of this kind, where women's views are deliberated, was intended to be utilized as the initial step to formally acknowledge the kinds of concerns that may afford a valuable platform for the planning and implementation of interventions for developing and empowering a greater number of women in the mining and engineering industries.

Australia and Canada are some of the countries working on the needs of the industry, and are creating conducive environments for women to talk about the future. According to Kopamees (2014) many countries are mostly lethargic at inviting women into mining, yet there are others which are investing in research studies to investigate how and where women can fit in.

Kopamees (2014) argued that the first thing those studies should address are among others, the perceived ideology that things are equal within the industry, also the perception that women who are already in a mining environment have made it. This view might give a wrong impression and render the entire objective of embracing women as associates inferior or invalid. Increased publicity can be used as a major driving force to attract more women into the industry. Carroll (2012) said: "I have never heard a little girl say I want to be a miner when I grow up, women are attracted to mining when they realise that it provides very good job experience.

Community relations, project management, geological surveying, the list of roles within the mining industry is endless, and it is actually very exciting, you just need to know about them, and that is where publicity is required" (Carroll, 2012). As stated in Kopamees (2014), this paradigm shift could be achieved by refraining from being a science, logic-based industry and by isolating a prevalent perception which believes that equality is not achievable. In that way; women could make it in this industry with instituting further engagements on continuous improvements. Thus an industry specific study had to be conducted to show that, by far, barriers are still not broken yet and access is still limited, hence requiring a protracted attention to the matter.

Following the situation in India and the United States; Hafkin and Huyer (2006) illustrates that most of the global predicaments for women working in the technical environment are among others the difficulties they face with regard to attaining access to technical jobs. This is seen to be common even though there's so much variance between countries in terms of population, size and wealth. Sawyerr et al (2005), argued that the framework of value-in-diversity which suggested that diversity is associated with benefits resulting from a variety of perspectives as stipulated by Frink, D. D., Robinson, R. K., Reithel, B., Arthur, M. M., García, M. F., Paetzold, and R. L. (2005) and Singh & Point, (2006; 363) are true and correct.

According to Dr. Faloyan, person-organization fit research and status characteristics theory based on Balkundi's (2006) structural hole theory focus on neutral or positive predictions, and was regarded to be valuable. Dr Faloyan said that "lack of equal opportunities which are realised by women in engineering unduly propagated the embedded opinions that act as conceptual barriers for women who enter the profession" (Dunsby, 2013). Work-family balance gets affected by the informal "engineering culture" i.e. late night meetings; putting an inappropriate social pressure on women, especially single parents and mothers, followed by formal policies which also put additional pressure (Kelkar, 2005: 104).

Certain practices in the industry could prohibit women from accomplishing their full potential, one being the presence of outright discrimination against women in such jobs, the prevalence of which may in turn dishearten women from entering the fields of engineering and science (Hunt, 2010). The same is true for IT jobs, as in the overall; women in the technical work including highly skilled jobs such as scientific research as well as lower-level jobs which are technically inclined; are found to be somewhat unsettled (Information technology association of America – Nasscom, 2006).

Mashiane (2009:33) clarifies that most mining, industries and engineering companies are under severe compliance pressure to achieve equity targets, and it would consequently be disadvantageous to the industry if women were only employed in order to comply with labour legislation. Research has therefore supported the above theories; as there are gender dissimilarities in self-concept of the companies' aptitude in relation to expectancy, for success in different genders (Educational Research and Evaluation 2006, 359).

2.3.3 Barriers, culture and misperceptions prohibiting women in Engineering and Mining

As alluded to earlier; barriers in the sector were witnessed by more women, as opposed to their employers. This resulted in some issues not being resolved in time or at all due to the misconstrued and misaligned approach between the two parties. It is highly possible that this difference in perception is brought about by the fact that male employers are in the majority.

Other barriers which were identified were perception of abilities, inflexible work practices, as well as a lack of social networks and mentorship, according to Sturk (2011:5) who believed that this warranted the industry to start doing things differently, in order to achieve synergy in removing these barriers.

Within the industry there are partners who are working very hard in ensuring that the work environment becomes friendlier for female workers. In that, women developed some virtuous coping strategies: e.g.: accepting gender discrimination, acting like one of the boys, acceding to the advantages visa-vie the handicaps of acting manly, and assuming an 'anti-woman' position, thus working too hard to make a name for themselves.

Adversely, these tendencies become a major composition of these women's professionalization and enculturation in engineering, which is unfortunately achieved at the disbursement of their femaleness. For 'doing' engineering, often women 'undo' their gender. On the contrary, such gender performance does the opposite to challenge the status quo in engineering, and in many ways negatively complements and sustains the gendered culture which perpetuates a hostile environment towards women. (Powell, Bagilhole and Dainty, 2009:11)

In the article "Inside Mining" (2014) characters, Dlongolo and Ntombela both agreed to saying that the traditional barriers that women are confronted with in the mining industries are nowhere near elimination. The obstacles for women working underground and for those working in the commercial business sector of the mining companies can be substantial, in the Engineering field as well; women find it difficult to be accommodated in terms of the personal protective equipment they are being issued with. The concern regarding personal protective equipment being specifically designed for women will remain an issue, especially for women working underground, until it is resolved (Inside Mining, 2014).

The designs thereof, are of such a nature that they suit men and their structure. In the industrial sites also, it is incumbent upon each individual to raise their predicament regarding the clothing issued to them. The dissonance continues as to what the employers perceived as important barriers in the workplace were not the same ones viewed by female workers.

The difference in discernment could be among other reasons due to the cultural differences embedded in individuals. With many industries working hard to make the work environment more conducive for women, it is observed that some of the barriers being tackled by employers are not necessarily regarded the same by the other party (Mining Media, 2010:32). Many of the women have recognised the industry's misperceptions regarding their abilities like leadership abilities, physical strength, and willingness to leave their comfort space and travel to remote areas as being one of the major obstructions towards recruitment and retention.

It is common knowledge that legislation has not done enough to be supportive towards women in the industry; coming from the times when women were not permitted to work underground. The absence of support towards women has implicitly contributed to the difficulties in retaining female talent, as it is evident by their exodus to other industries. Though changes are happening in the mining industry and in most mining companies in the world, they are still at a very slow pace, which if handled well; they can serve as a great vehicle to get women integrated.

There are unfortunately huge hindrances still lingering, one of which serves as the biggest challenge that women face in the mining industry; that of children rearing, in an industry that often requires travelling, moving to rural areas, and having to work long and irregular hours. The above, along with the certainty that mining is a dangerous work, are the factors that women find themselves faced with when having to choose a career in mining. Further complicating the matters, is the high possibility of women leaving the mining industry once employed, unlike it is for men (Kihn, 2010).

There is a huge task ahead for the industry; which can be achieved by creating awareness as a first leap to assist companies identify alternative sources of labour for the industry. Awareness can also be beneficial to the indigenous people and women in a traditionally white male dominated work force. Emphasis is put on the fact that a male dominated workplace culture is a "huge" barrier for women, yet not many employers have considered it as such.

Conference Board numbers have depicted that a workplace culture can be influenced once there is a minimum of 25 per cent representation of a certain gender. Research has revealed that in a work place, diversity can be quite beneficial (Sturk 2011:6). "Organizations with a critical mass of women on their boards of directors, in leadership positions, and in the workforce, have better financial performance and governance," the study stipulated. As another major barrier to recruitment and retention, many women recognized the industry's misperceptions of their abilities i.e. willingness to travel to remote areas, leadership ability and physical strength.

2.3.4 Cultural Scrutiny, Analysis, Comparison and Stereotypes

In the South African context, underground mining in the deep levels of the earth is a physically demanding and a difficult industry in which women have to adapt. That is due to a number of cultural, legal and historical reasons, which included the fact that, traditionally mining is comprised of a workforce that is largely male. In actual fact, prior to 1990, no women were legally allowed to being employed in underground mining activities; this being reflective of the broader South African social inequality. The legal obstacles are no longer in existence within the South African gold mining companies; instead women are encouraged to participate actively in the industry (Women in Mining, 2014).

The table below depicts that due to cultural beliefs, the representation of clients' ratings show their preference on sectors they believe women can produce excellent services. The following stereotypes are entrenched to consider women as nurturing and caring, in relation to their male counterparts who are considered to be effective, instrumental, and competitive in behaviour; this despite the fact that all of these qualities exist in both sexes. Cultural change appears to be difficult and slow, this is according to an increasing number of analysts like Taylor (2006:2) who consistently pointed out that it will be difficult to address issues faced by women in engineering, without taking into account the cultural analysis and interventions within in the profession.

2.3.4.1 Cultural analysis graph

Annexure 1A - Cultural analysis graph

The picture above depicts that women still have a long way before they can essentially assume positions of influence in the engineering and technical fraternity of various industries. It is therefore imperative that society moves beyond treating women in engineering as delicate hothouse flowers. This can be achieved by, among other things, discontinuing the practise of focusing the gender discussions on women, instead of directing them to the actual cultural practices.

An example of this is the common impression and understanding that women are the only ones faced with family responsibilities while at work, thus making them more accustomed to family oriented policies. On the contrary, this belief gives the false impression that women in other professions are not prone to the same challenges, when in fact; these are the reasons for their attrition from their various jobs.

Eventually a cultural shift has to be attained; among other strategies the option of recruiting more women would advance the profession's performance, and as such; task co-ordination would avoid associating women with vulnerability. Due to the stereotype that this is not a women's forte, women engineers find themselves caught in the dilemma of being expected to being good at and being interested in 'relational practices'. These if not practised; women are likely to be regarded as having deficiencies in core technical expertise.

These intricacies, even without empirical evidence depicted the reality that women possess specialities which can be observed in their contributions even though it may be difficult to always demonstrate them (Xiang-Yun Du, 2006).

Most practitioners use 'Real engineering' as a heroically technical phrase, meanwhile there are other co-ordination schemes which are disregarded and are not seen to be adding value to the profession i.e. "not real engineering". This gives way to the perception that normal gender discrimination in engineering as in other technical work places; is somewhat a paradox. "Real engineering" is deemed to thwart the dead end efforts to address the gender imbalances which currently exist in the work place.

Sturk (2011:4) states that the difficulty with explaining what engineering is or what it is not is traceable from as far back as 1903, and the quote goes by: "We have the man who fires the boiler and pulls the throttle dubbed a locomotive or stationary engineer; and then we have the woman who fires the stove and cooks the dinner dubbed the domestic engineer", explains this perfectly. However, even in the medical environment, it was found that the stereotyped and narrow vision of the profession could be valuable if some changes were brought about in order to ultimately draw a workforce that is more diversified.

Women medics have specialities which relative to their status may be preferable; therefore female medics are in favour of roles with controllable lifestyles. As a result; surgery is not regarded as favourable hence it stays with greater male composition and is given the highest prominence. The medical field does however, provide women with the opportunity to thrive and succeed in their careers within amongst their male peers, the impact this has on these women is evident (Hall, 2007:37).

In the medical fraternity part-time work is now available and it is both fulfilling and well-paying. The more these opportunities are requested, the more space is created for them to grow, and in turn, the more women fill up those positions. Parallel to this, are the interests and needs of women practitioners, brought about by experimentation with methods of teaching and practice, which in turn benefit all concerned. This case scenario compares well for the fields of engineering and science.

In the science stream, the biosciences have the highest female intake yet some areas of bioscience such as genetics do not. Based on the concepts as researched by Hall, this would suggest that men would be predominant in these fields of high regard (Hall, 2007:38).

Women need to have a more equal footing in the medical fraternity; Hall alluded, in his expansion of gender-equality-in-SET vocabulary:

i) Exposure to judgemental negative stereotype on the basis of association and belonging,
ii) Threat to stereotypes – depicting signs of conscious or sub-conscious fear,
iii) This fear, in turn, affects their performance (Hall, 2007:37).

2.3.5 Scientific ability of women in a predominantly male industry

The contradictory nature of the research suggested that even where inherent gender variances exist, they get overcome by environmental factors as being immaterial, it is also suggested that females and males are alike on most, although not in all the psychological attributes. Just as is in girls and boys, as well as in men and women, they are more similar than they are different. To substantiate this; ability can only be measured by measuring performance, however in itself performance does not rest solely on ability and is therefore not a reliable indicator. In instances whereby differences caused by nurture or nature exist, people are inclined to stop seeing this as bad but as an alternative to celebrate their differences and put that to good use (Hall, 2007:37-40).

Gender equality would be to truly improve the experiences of women in science and engineering, and the consciousness to emphasize what could or could not be different about a woman's brain, but on the barriers she comes across, especially outside her head. Based on a study conducted at the University of California, San Diego (UCSD) and the surveys conducted on college students, the findings were that; female engineering students who had competence in maths and engineering had it because it was something a person was born with and they only tended to drop out of classes when faced with difficulties (Bhatia, Heyman, Martyna, 2014).

The statement above can be overwhelming because its very identity is questionable," said Bhatia, (2014) who worked as the faculty advisor to the Society of Women Engineers for students at the UCSD Jacobs School of Engineering. Due to that belief; many believed that their abilities were fixed, and were not achieved through learning; therefore they tend to drop classes in times of difficulties. Based on the data supplied by (Kihn, 2010), from a study they conducted in partnership with Women in Mining (WIM) Canada, seemingly over sixty seven percent of women working in the mining and exploration sectors have managed to identify several working conditions which negatively impacted on their success in the industry.

Clearly, there were trends of more women who indicated a desire to leave mining either early or in the middle of their careers due to personal or work related factors. It is believed that there is another form of interest for engineering currently in existence, giving in to the inequalities of gender within the profession. As it is reported, the attrition rates for women in engineering are generally high. Engineering, to those who are not conversant with it, tends to be defined as being largely difficult, heavy, dirty technical outdoor work despite the fact that it involves people management, communication, and co-ordination (Sturk, 2011:4). Included in the report as some reasons for women's attrition from their work places were the following:

i) The pervasive male-oriented work culture
ii) The need for flexible work arrangements
iii) Lack of child care and parental leave.
iv) And the lack of notice and flexibility when assigned work in remote locations.

2.4 Scepticism and slow acceptance by men towards women in mining

From "Inside Mining" (2014) it is indicated that women are sometimes made to feel as the minority group when it comes to mining companies, and at times women are made to feel as though they had to prove to know what they are talking about before they would be listened to. Sometimes their knowledge is questioned by their seniors or counterparts with the assumption that women are incompetent in their field of work (Inside Mining, 2014). Arguably, South Africa is way ahead of other major countries in focusing on the mining workforce. South Africa has managed to recruit quite a substantial number of women employees into the mining industry.

In the world over, mining is well-known as an industry that is male-dominated. Debbie Ntombela thinks that South Africa leads, when coming to the development of women in mining, although it is indeed a difficult task to undertake. As an individual, a woman is expected to do ten-fold what a man should, in order to be taken seriously in the male dominated industry, said Ntombela, who is a director at a law firm, Hogan Lovells, and a mining law specialist with over 17 years' experience (Inside Mining, 2014). Some women who personally worked in the mines gave their testimonies on the cynicism to which many men had, towards their female colleagues in the mines. It was reported that in many occurrences men could not completely admit that women can be great mineworkers too; and this remains a huge challenge (Inside Mining, 2014).

2.5 Economic impact and conceivable uncertainties

Both Shabangu and Ramphele have made reference to the Dutch Disease in their dialogue about the economy of South Africa. The Dutch Disease is however an economical debate that may or may not serve any relevance to the South African spectrum. Ramphele took it a step further by suggesting the mining business need restructuring and need to be clustering with other businesses, such as manufacturing and agriculture. However, with the mining code changing, a competitive threat for Africa may be postured. Mark Bristow, CEO, Randgold Resources, describes that, while Africa has the advantage of great mineral wealth, its competitors generally have better infrastructure, greater pools of skills and more sophisticated economies (Fiscor, 2013:1).

Critics from within South Africa continually criticize the African National Congress. Dr, Mamphele Ramphele, a successful business-woman and an anti-apartheid activist, said South Africa had no choice but to make a fresh start, indicating that black elites have become part of a closed patronage system; implying therefore that the country's government will have to participate robustly in the process of value creation. The Anglo American executive, Cynthia Carroll echoed the challenges facing South Africa; which are inequality, poverty and unemployment, indicating that mining lies at the heart of the South African economy (Fiscor, 2013:2). Carroll (2012) said it was imperative for the country to realize the four essential truths prior to it becoming successful. They are that:

i) there is no future for any society without law and order.
ii) anarchy in the workplace benefits no one.
iii) modern businesses operate in a competitive global market.
iv) long-term stability will ultimately attract foreign investment.

2.5.1. Increased Profit margins with women in mining and higher returns on equity

For a number of years consecutively, it is seen that the mining industry has fewer women on boards than any other major industry, including gas and oil. Currently, only 5 to 10% of the mining industry workforce is female, which is the smallest of any major global industry. From the top 500 listed mining companies in the world, only 7.2% boasts women directors, having only 10.3% female directors within the top 100 companies, thus disclosing that only seven CEOs in the world's top 500 listed mining companies are women.

The findings indicated that in the 106 female directors featured in the top 100 mining companies; just three of them hold more than one directorship. Also, just 14 of those companies had reached the critical mass of 30% of women of all the 500 listed mining companies which were reviewed (Inside Mining, 2014). In order to increase profit margins, local companies could employ more women in the mining sector, as an increase in profit margins is witnessed in mining companies having women on their boards.

Other findings of a study by Catalyst, concurred, by indicating that companies having women sitting on their boards reported greater returns on sales, returns, invested capital and greater returns on equity. Likewise, a study by the Credit Suisse Research Institute agreed that indeed firms which have women as part of their boards constituency, delighted in higher returns on equity, higher price or book value, lower gearing, and a better than average growth. It was also revealed that the best level of female board representation were by mining companies which trade on the Johannesburg Stock Exchange, while those listed on the London Stock Exchange had the worst level of representation (McMaster, 2013:25).

More than 50 per cent levels of University representation in South Africa were observed by the end of the first quarter of 2013, while women in mining made up 11 per cent of people employed in the mining industry overall. That is found in the DMR Report and it is believed that more still needs to be done to ensure improvement (McMaster, 2013:26). Good management of the company's necessities must be in order; for flexibility to be witnessed in the work space. Lack thereof poses challenges which are daunting to the employers at times. These challenges would therefore call for women in the industry to self-introspect with regard to their contribution towards making their careers a success with the few initiatives currently on offer in the mining industry.

2.5.2. Economic influence, contribution to the GDP and wage gaps getting wider

McMaster (2013:26). Figures have showed that mining directly contributed 9.2% of South Africa's gross domestic product (GDP), and assisted to generate 18.7% of GDP in 2011. Around 13.5-million South Africans are directly impacted as their incomes are generated from the mines in which they are employed (Women Stand Tall at Mining Indaba, 2013). Enormous wage gaps were revealed in a Ramp-UP study about women in mining, the study was a first of its kind in Canada, Northern Ontario Business, and it served as a catalyst to improved measurements for the women in mining and exploration by establishing a clear baseline (Sturk, 2011:5).

According to Kihn (2010), the Conference Board of Canada engaged in the research involving four groups: employers, female employees, educators and their female post-secondary students. In the outcomes it was emphasized that wage discrepancies were some of the many barriers that contributed towards career success, with women in mining earning as an average; 32 per cent less than their male counterparts. This wage gap was 11 per cent higher than the national norm and the difference was present in most roles and occupations as well as amongst all age groups within the exploration and mining sectors.

The president of South Africa has called for sustainable jobs and to create a living wage as well as decent fringe benefits and this creates an opportunity for more professional and technical people to come into the sector.

"The participation of many companies in skills development is commendable. We are not yet there. We still need to create the jobs and grow the industry, but we are on the right track. Beneficiation will create new industries and create the needed jobs in South Africa, which will drive the economy forward." This extract is from the speech by the Minister of Mineral Resources Susan Shabangu, (Mining Media, 2010).

The wage gap was found to be 11 per cent higher than the national norm, and the discrepancies were found to exist in all age groups and in most roles and occupations within the mining and exploration industries. Sturk (2011:32) enquired whether the lower salaries for women as compared to their male colleagues were as a result of women not staying in high-ranking positions just as long as their male counterparts do. Not only are women underpaid as compared to their male counterparts, but a recent study showed that women are underrepresented in the industry. The inconsistency in the wage difference across the board is utterly unacceptable, though it's very significant in triggering the need to find solutions to alleviate these imbalances.

As an indication that the issues regarding wage gaps are related world-wide, results that were based on a Canadian population showed that the wage gap was surprisingly 32 % bigger than the Canadian national average of 21 %, these statistics are a mirror of the results seen in other countries. These results just further affirmed that indeed women are underemployed and are underrepresented in the mining and exploration industries (Kopamees, 2014). In conglomeration with MiHR and WiM, the study was piloted by the Conference Board of Canada, and the survey was performed on the four populations:

i) students
ii) women working in the sector
iii) educators
iv) and employers.

While acknowledging that the mining industry is facing a predicament, when interviewed; Carroll stated that she was against a quota: "You can't appoint women just to appoint women or just to satisfy a particular condition". She continued: "what you want more than anything is to develop women in the organisation who will, when they get to the top, be fully capable of delivering and doing the job effectively."

Carroll identified what she called the "four truths" which she believed to be imperative for South Africa to achieve progress. She indicated that, "there is no future without law and order: because public order is the bedrock without which civilisation collapses" (Women Stand Tall at Mining Indaba, 2013).

"No country is an economic island: thus the success of the country relies solely on creation of a business-conducive environment and that is appealing to international investors. Anarchy benefits no one: in the workplace the rule of law is as important as it is in every other aspect of society. Economic reality cannot be denied by anyone: much as competitiveness is a requirement for countries to thrive, so it is applicable to companies". Carroll (2012) also articulated that: "mining industry's contribution is particularly relevant in South Africa where mining is so significant and contributes significantly to the economy of this country. Over a century, mining has been one of the biggest contributors to the South African economy, and it also fuels the South African economy, thus providing the country's primary energy needs."

Twenty percent of South Africa's economy could be attributable back to the mining sector. As clarified in 2010, 9.2 per cent of South Africa's GDP has directly benefitted from the mining sector, which helped in generating more than double growth expectations to the activities in the broader economy. Also over 500 000 people are currently working in the industry, with another 500 000 jobs being secondarily reliant on mining. However; considering that it was at some point, technically illegal for a woman to go underground in a mine in South Africa as little as over a decade ago, and with women not being allowed to go underground until 1986 in Western Australia, the statement above showed that advancement was evident (Carroll, 2012).

In the McKinsey's Women Matter, it was established that for corporations to have better financial returns, they had to have more women at the top to rise above other companies and that leads to corporations being forerunners in driving towards a more gender-balanced future in businesses. The imbalance is gradually influenced by the networking and support from other women in other groups, as well as the publicity surrounding successful role models. At a young age, most women who ended up successful in the mining industry, were reared into working in the mining industries by their role models, as alluded to by Alex Atkins, Optiro associate principal and chief advisor for sustainability (Cook, 2013).

In the year 2013, the E&MJ Mining article reported that in light of the Marikana tragedy and as a result of the reforms within the mines, dialogue had taken on a new sense of urgency in the mining sector, as it will be seen in South Africa and the sub-Saharan Africa. The year 2012's anti-mining rhetoric and nationalism have provided ways to whether or not Africans can change the business model rapidly enough to remain competitive (Fiscor, 2013: 2).

Minister of mineral resources for the Republic of South Africa, Susan Shabangu, in Carroll (2012) indicated how the Marikana tragedy has inevitably contributed to the transformation of her country, and what it has experienced through the fragments of its past legacy. She said: "underprivileged background which entailed poor living conditions, improper housing, low skills levels, migrant labour system, and high levels of illiteracy are major contributors to the slow transformation."

Melanie Sturk, MiHR's director performed a study on attraction, retention, and transition, in order to demonstrate what informs the gaps found in the system. She discovered that an average of 32 % of female workers in mining get paid far less than their male colleagues. The year 2004, marked ten years after the emergence of democracy in the Republic of South Africa yet continued high unemployment rates within women were still evident, in the lower income groups and less access to assets that women experienced, as opposed to what men did (Orr, L and van Meelis T, 2011).

Makgetla highlighted the point that "racial differences were larger than gender inequalities within racial groups", meaning that the position of women in the economy can only be understood if race is also taken into account. The racial differences are largely reflective of class differences, due to the fact that for years in South Africa, there has been an inextricable link of racial differences to class. In the same wave length; Orr et al (2011) speculates that: "Gender outcomes in labour markets do not reflect natural or objective differences between men and women, but rather reflect the outcome of discrimination and disadvantage."

Occupation by Gender in 2008 and 2014

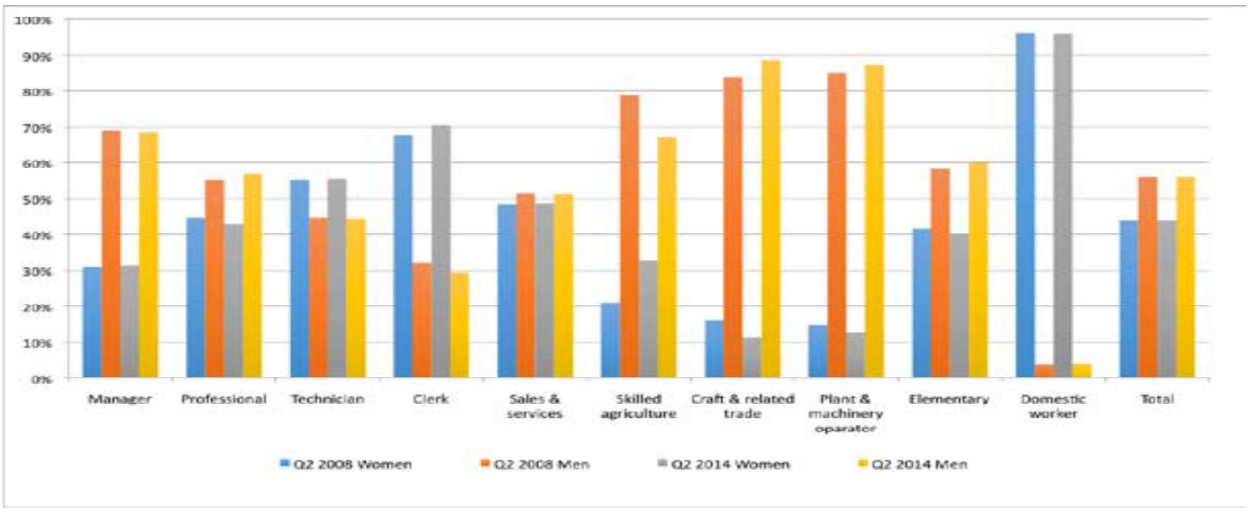


Figure 1: Gender statistics, Stats SA 2011 - Source: QLFS Q2 2008 and QLFS Q2 2014

In figure 1: Orr et al (2011) depicts in the graph how women are most likely to be clerks, sales workers, domestic and services workers. With the application of racial disaggregation, it is found that black women are predominantly employed for cleaning and domestic work. Contrary to this fact; white males are largely found to be in professional occupations as well as in management; while black men are inclined to be predominant in the artisanal, elementary and manufacturing occupations. Orr et al (2011) stated that the Gender statistics within the Stats SA 2011 reported that most black women who occupy professional positions are, in the main, doing administrative work, teaching or social work.

Canadian WIM (Women in Mining) have initiated The Ramp-UP study, was the first of its kind in the country of Canada. The study was mainly concerned with the status of women in the country's exploration sector and mining. As a less renowned career path among the youth, mining was seen in the study as a career that young women never even pondered while only 10 per cent of female students were aware of it (Mining Media, 2010:32). Hall (2007:31) takes a different stance towards the theories behind low status areas of science, whereby women are low paid and they end up clustered. "Ghettoization process" as explained: The occurrence of these is dependent on three theories:

i) The devaluing of the work by the employer because it's done by women
ii) The avoidance of such work by men, due to its low paying reputation
iii) Women taking up the low paying job due to other priorities such as parenting.

2.5.3 Roles occupied by women in the industries

Women could not be regarded as the common denominator in the mining industry, since it is considered to be a space dominated by males. Although there is a rise in numbers for women in technical fields and engineering there is still however, a deficiency with regard to women representation in the executive roles. Worldwide organizations such as Women in Mining have realized this fact and are at work trying to intervene in favour of women. It might have taken years, however strides have been accomplished in the mining industry, and women are being gradually incorporated into this male orientated world (Kopamees, 2014).

In the past ten years or so, more women became qualified in male dominated technical roles such as Mining Engineers and Geologists, when previously most women in the mining industry were mostly involved and employed in administrative roles (Kihn, 2010). In mining, there are now more women whereby 10 % of the core mining jobs in Anglo American are performed by women, amounting to about 5 700 women, with women making up about 15 % of the South African workforce today. There was at some stage just about 101 women working in Anglo's Platinum business, and they were mainly found in traditional roles such as data entry positions and administration roles (Carroll, 2012).

By the year 2012, a higher percentage of women in the mining workforce were employed in Anglo American, which has more women than any other mining company. The Anglo American statistics regarding women employment stands at 15% of the total workforce across the group, which is 1 % higher than it was in 2010, making more than 22 % of are women in management positions, which has also increased by 1 % since 2010. A goal that was set by Anglo Gold for itself was to have 21% women in the workforce by the end of 2014, and to have women in management roles constituting 30 % by the end of 2014, Carroll (2012) supported to the statement.

Under-representation of women and the stagnation in numbers for women in senior leadership roles was seen to be perpetuated by a lack of programmes on women pipe-lining. Supervisor's unsupportive relationships were identified as the main cause of constant hindrance with female employee's career progression (Mining Media, 2010:32).

A research conducted by Deloitte in McMaster (2013:26) concluded that the resistance encountered by women working within the male dominated industry and on their career growth depicted the glass ceiling women have to surpass. Since the South African Mining Charter put a determination for a 10% quota for women in core mining jobs by the end of 2014, Harmony, AngloGold Ashanti, Gold Fields and Sibanye were in agreement whereby they have all set to meet or surpass the set targets.

Kephart and Schumacher (2005:14), alluded that women in most, if not all, organisations have to struggle for equal respect and equal roles alongside their male counterparts, for years. That said; the South African mining environment is not immune to issues of inequality of gender. Act no. 50 of 1991 of The South African Minerals Act had previously forbidden women from working underground as indicated by (Simango, 2006:15). Subsequently, the South African Mining Charter was established in order to address the imbalance that existed in the industry (AngloGold Ashanti Annual Report to Society, 2007).

With the above in mind, it is imperative to know which sector of the population to use for the determination of demographics within institutions. According to Cruise (2011:11) for example; when determining the demographics in the first year mining students, the sample of the population were from those students who have applied to study for a degree in mining, who have made the criteria for mining engineering and have attained a university entrance.

The country's demographics were distinctly different from the demographics of such population, thus giving a reflection of the kind of outcomes to expect, which are less numbers of women with mining degree as compared to the number of women within the population. For those who have pointed out unsupportive relationships with their supervisors and were assertive; they were seen to be consistently hindered in their career advancement. Furthermore; most women felt they were not given the same career development prospects as their male counterparts, as supported by the literature above.

2.5.4 Felt Leadership

Gradually over a decade ago; there was an observed increase of as much as more than ten times in the number of women employed in core mining positions when compared to other companies. Most importantly, changes and great strides are observed in various work places as the mining companies upgrade their facilities and adapt in creating the work environments that provide sustenance to women in the most useful of ways; thus promoting an environment within which employees are proud and comfortable to work. Equality and empowerment is clearly a thread that connects all levels of the business together, they can serves as a tool in improving health and wellness. If sustained; equality and empowerment could help to raise tolerance and understanding, and clear up differences between men and women in the work place (Women in mining, 2012).

Experience has shown that in order for these initiatives to be effective, management must be supportive, by leading with visible and felt leadership which is crucial in guaranteeing buy-in from both genders. Responsibilities of Mining houses and the Engineering community among other things are to motivate, prepare and accommodate for more women to take up senior executive positions in engineering and mining companies. If implemented, that can then provide stronger career development for women. When compared to other countries like the UK, South Africa is performing relatively well in this area; that's WIM UK Report; as mentioned in (McMaster, 2013:26). The engineering community and mining houses also provide, support, professional coaching and assign women in leadership roles to senior mentors irrespective of whether its men or women.

Deborah Valentine, the head of legal and external affairs at Rio Tinto in the junior mining company level, is yet another woman who was named as one of the major players, together with CEO of Midland Minerals, Kim Harris, alongside the CEO of Formation Metals Inc, Marianne Green. It is evident that opportunities are available out there, as is confirmed by these ladies who have managed to break through the glass ceiling in mining. Nevertheless, even in the midst of impediments in the industry, Women in Mining seek to deal with issues of diversity management as they relate to inclusion in the world (Kopamees, 2014).

Confirmed in Kopamees (2014); is that women need to acquire experience and the skills within the mining industry. She further acknowledges that in Canada particularly, there are women possessing experience in excess of 35 years, yet who have never contributed in the boardrooms. A great expectation was for Canada to lead when coming to the emancipation of women in the mineral industry since they hold the title of being the first in the world. Women can form part of the solution when it comes to the resource challenge of staff shortage; that is anticipated within the Canadian government.

Mihychuk reckons: "Women have the skill set to fill that gap." She believed that women, due to their unique nature offer a different set of leadership qualities to positions, by offering a management voice which is different; making it relevant to other women not belonging to those sectors, highlighting less- knowledgeable communities about mining thus making the industry more comprehensive to the public in general. Kopamees (2014), came to the realization that women are indeed making a name for themselves all over the globe, and with the assistance of Women in Mining to network them from all spheres of the globe; realizes that it gradually gives women a voice to proclaim their willingness to work, and the grab the opportunity they see and increase their desire to participate. These measures can be rendered even more effective if the invitation is extended to include those in less mining-centric countries, insisted (Kopamees, 2014).

Carroll's intentions as the Chief Executive of Anglo American was to produce the conditions and framework within which women could excel, in order to see the growth of women into leadership, where they would be able to make chief decisions, subsequently making a difference in their organisations. She aspires for them to become future leaders, role models and mentors. Carroll (2012) further pointed out that over the past eight years; Anglo American has more than doubled the number of female managers. In South Africa alone, it is on record that 25 % of all managers in Anglo American are female.

Chief Financial Officer of Anglo's Thermal Coal business, Deshnee Naidoo, has spent two years in the CEO's Office. She joined the corporate finance team in 2008, after which she spread her wings in the Platinum mines working as process engineering in metallurgy, and was responsible for planning in strategic roles.

Anglo's Executive Director for South Africa, elected vice-president of the Chamber, Khanyisile Kweyama, has given Anglo her widespread commercial experience from her previous roles as an executive at BMW South Africa, Barloworld, and Altech, when she joined Anglo in 2011. Kweyama is a true example of how women are progressively assisting to give character to the future of the mining industry in South Africa, she said (Carroll, 2012).

2.5.5 Leadership strategies implemented by inspiration and investing in people

It is believed that significant progress is realised due to commitment from management to invest in employees. A labour force with the correct balance of skills, experience and training is regarded as a requirement without which the industry cannot survive. The one strategy that seemed to be working was when management employed women in possession of the right credentials in crucial technical disciplines, in order to combat a huge challenge of resource shortages and also the challenge of not bringing the right women into the sector; in an endeavour to invest in people. A lot more will have to be effected in that regard.

Susan Shabangu, the minister; was quoted in her keynote address at the 2013 Indaba as having her focus on the role women played in the mining industry. The 'Investing in African Mining Indaba' speech highlighted the rise of women in an environment that has been dominated by men for centuries. Against all odds the likes of Bridgette Radebe, Susan Shabangu and Cynthia Carroll have set an example for women to follow after them. Before she moved into management, and became a CEO in 2002 with Canadian mining company Alcan, Carroll worked as a geologist in North America in the early 1980s, with an MBA qualification and a master's degree in geology. A chairperson of Anglo Platinum, being the first woman to reach the top, in 2012 Forbes Magazine ranked her Anglo's first woman CEO, as the 55th most powerful woman in the world (Women Stand Tall at Mining Indaba, 2013).

According to Carroll (2012) mining constitutes quite a critical role to the prosperity of South Africa. Passionate as she had always been with regard to mining in South Africa; in her keynote address at the Mining Indaba, Carroll said that even though in the Engineering industries there are women who took strides in the engineering sector, women engineers like Allison Lawless and Ayanda Noah have through their hard work encouraged many young and aspiring engineers to continue striving to make a difference.

These are the types of women who have functioned in the field for years and who have taken it into their strides to demonstrate that females have as much capabilities as their male counterparts, as said by Nkambule (Sidler, 2014).

The mining sector, according to Carroll (2012) is believed to have invested 4.1 billion Rand in 2011 for the development of its employees. It is said that mining companies have subsidized about three thousand one hundred mine workers in learning programmes, as well as over ten thousand students who have benefitted from bursaries and study aids. Training and development was placed at the pinnacle of a needs hierarchy.

It is encouraging that the leadership encouraged employees to take part in coaching, mentoring, training and in career path initiatives. 1 500 engineering and mining learnerships were awarded to deserving bursars who numbered more than 700 across South Africa in 2011. The majority of the beneficiaries were people with a historically disadvantaged background and South African women were the key recipients of those specific programmes (Carroll, 2012).

Minister Shabangu has acknowledged the need to develop skills and improve training in South African mining; she has also been encouraged by the number of students enrolling for engineering qualifications; which has been significantly increased. "Female enrolment had doubled since 1996, this suggests that the base skill requirements for the sustainability of the industry are being built, but these skills must be nurtured and protected", Shabangu said (Women Stand Tall at Mining Indaba, 2013). The absence of good mentorship and coaching programmes limits women's progress opportunities in relation to their preparation for occupying future leadership positions, and there is still strain due to infrastructure and equipment designs which are still mainly masculine inclined.

2.5.6 Women involvement in policy development, and mentorship

There is a need to conduct continuous research on the ergonomics of operating underground plants and machinery and there is a great desire for the development of women; also for women to play a role in policy development.

These policies would address issues as follows: the sexual harassment awareness would be intensified, maternity issues will be addressed, and the diversity programmes about workplace attitudes and culture will be fortified. The involvement of Women in Mining South Africa with organisations such as Women in Mining UK, allows them to listen to women within the industry on a global scale, develop objectives and address their concerns accordingly.

Building partnerships and collaboration institutes a vital part of South Africa's progress. This is, according to (Kweyama, 2012). Although the major part of female under-representation in mining could be linked to working culture, legal constraints; broader social inequalities, physical and health issues, and workplace facilities which are not compliant to women needs, but these are by no means insurmountable (Women in mining, 2012). The 2013 Women in Resources Champion Crown Award winner, Julie Shuttleworth; who is the Granny Smith Mine General Manager for Barrick Gold Corporation, gathered an experience of around 18 years in the gold and copper mining in the industry of Australia, China and Tanzania.

Carroll (2012) affirmed that: "Withstanding all challenges; successful women in mining have managed to perform their job, they have received recognition for their leadership skills and technical abilities and their performance towards the business requirements," she also supplemented her statement by saying that having self-confidence and positive attitude is key (Carroll, 2012). According to Shuttleworth, a combination of things like supportive mentors, individual career development plans, and good sponsorships, would be some of the most efficient ways to have more women on management boards of many businesses.

As for attracting more women into mining, the process must start from schools, where role models connect with parents, teachers and students, using positive media and targeting the general public. In the 18 years, Shuttleworth shared, she managed to progress from being a plant metallurgist to becoming a general manager, and was resolute that "gender issues does not cross her mind when she does her job," she labelled mining work as challenging, exciting, fun and very rewarding.

General Manager of the Anglo American's Thabazimbi mine, in South Africa, Cornelia Holtzhausen, fully concurred with the idea that mining was really about people. "We're not at a point where full transformation is achieved, but acceptance is growing for what women can bring," she said. Saying that women must realise the opportunities being offered and challenge their own comfort in the mining environment, a change of attitudes of both males and females require guidance from the pioneers in the environment as quoted in (Carroll, 2012).

2.5.7 Opportunity, talent development, and conclusion on mentorship

Throughout the years, lack of understanding of what the profession is about; could be detected in new entrants into the profession who are young people. Those coming from under-privileged backgrounds; are uninformed about the different disciplines that are part of the profession. For such students to make informed decisions with regard to choosing the correct career path, it is imperative that the predecessors are available to educate the youth.

A candidate engineer can be accelerated to the next level of being a professional engineer more hastily by mentoring and coaching. This is imperative to circumvent candidates from making unnecessary mistakes and misinformed career choices in future. Mentoring and coaching will also assist in ensuring that upcoming engineers have an informed person to talk to, with regard to their plans for the future (Sidler, 2014).

As indicated by the Chief Executive of Anglo American, Carroll (2012) confirms that there are many opportunities available, like diverse and fantastic career prospects which can be offered to girls and young women who envisage building a career in traditional roles of the mining sector. Included are fields like research and development, geology and exploration, metallurgy, sales and marketing as well as mine engineering. New Denmark colliery hosts more than 700 senior students on a two day exhibition annually, where these careers are showcased.

Their specific target group is girls; this is in order to publicize careers in mining to them. On the other hand, Anglo does invest in new early childhood centres, primary and secondary schools, and centres for adult basic education and they also believe that women constitute an enormous pool of talent which cannot be ignored, as they form fifty per cent of the global population. In the rural communities that host various mines operations in particular, women are a very stable population (Carroll 2012).

2.6 Diversification is necessary for gender and racial transformation of mining and engineering in South Africa.

The current mining workforce is aging, especially in the powerhouse mining countries like Australia and Canada; therefore for its sustainability, mining industry will have to consider the adding diverse groups of employees to its business. Kopamees (2014); advocates that although it might seem like an exaggeration, it is the truth; the future of the global mining industry is dependent in the availability of women in these industries.

South Africa was deemed to be a non-racial country, since the official end of the apartheid legislation in the early 1990's. Contrary to the latter, the re-introduction of racial awareness into the country was witnessed with the implementation of Affirmative Action (AA) legislation and the Black Economic Empowerment (BEE). All organizations found themselves obliged to reflect compliance of racial and gender transformation in their population demographics, which was not truly beneficial to its intended cause (Cruise, 2011:224).

In South Africa, the rate of transformation for gender and race in organizations has been measured against the scorecards that were drawn up. Taking up the lead in these scorecards and transformation legislation was the mining industry. An analysis was undertaken by Cruise on the demographics impact on the graduating mining students at the membership of the Southern African Institute of Mining and Metallurgy, the South African universities offering a degree in mining engineering, the professional registration body of mining engineers, and the Engineering Council of South Africa (ECSA).

An observation was made on the relationship between education, vocational institute for mining engineers and professionalism and their effect on racial and gender transformation within mining engineering (Cruise, 2011:223).

Through MIGDETT, the government was examining issues of transformation to identify what has not been achieved and how to advance the cause of transformation. As it is stated in the 2004 Mining Charter; all mining companies must be transformed and empowered and it was also expected that every mining house achieve an interim target by reaching 15% of black ownership by the year 2009, ultimately reaching a black ownership target of 26% by 2014. In 2009 only 9% was reached, meaning that the target was not achieved (Engineering and Mining Journal, 2011:88)

Looking at transformation, the issue of human resources as per charter targets evidenced that companies were employing more white women. In South Africa, our constitution pertaining to the issue of women in the industry is not based on colour and the mining industry has manipulated the clause and has used white women to achieve their targets. It was demonstrated that the racial quotas and absurdity of gender were solely based on the current population demographics within South Africa, taking into account the conversion of mining and engineering perspective in accordance with both gender and race of the workers.

It is therefore imperative to ensure that more black people are involved in the industry in the technical and professional areas. The minister indicates a necessity to scrutinize the manner in which the mining companies apply scholarships to young black people and to women. It was discovered that the issues for sustainable development were very weak and not occurring in a coherent way.

2.6.1 Legislative compulsion to accommodate women and black ownership in the mining industry

Previously, mining was seen as a 'man's game'. The 1911 Mines and Works Act, as stipulated in the history of South Africa; had barred women explicitly from working underground thus imposing gender and racial discrimination.

The drive was because of the humane view of that time, of protecting children and women from being exploited in the workplace. Not only was mining regarded as a fully fleshed male territory in South Africa, but the upper tier of the mining management was an 'all-white' stronghold (Cruise, 2011:224).

The all-white bastion emanated from the 'Colour Bar Acts' of the 1911 Mines and Works Act which was promulgated in reply to Lord Milner's importation of a Chinese labour force on the mines, which reinforced the apartheid age's racial discrimination in the mines. It was clearly stipulated in the legislation that certificates of competency could be offered in any occupations as in the regulations within paragraph n of subsection 1; province, area or place specified therein unless otherwise indicated it shall be granted only to persons of the following classes:

(i) People who were born, and are ordinary residents in the Union, and are part of the class or race referred to as Cape Malays or Cape Coloureds.
(ii) The persons born in the Union who are named St. Helena people, Mauritius Creoles or in their lineage.
(iii) Europeans

Since time immemorial, the Mining Charter required that 10% of the total workforce must be female thus setting out the obligations for mining companies to abide by and comply with and this obligation has gradually came into play. The evidence of that is having women working in various parts of the mine: from the surface, in support services, to operating machinery underground; and in the number of mining professions, that is according to (Matthews, 2013). The Minister of Mineral Resources Susan Shabangu, indicated that the success story of history and evolution in the mining industry of South Africa, during an extremely difficult time, is yet to be realised.

During the era leading up to 2004 the ministry succeeded in profiling mining. With the end of Apartheid, the laws of the country were rewritten and the Mineral and Petroleum Resource Development Act (MPRDA) was created to replace the Minerals Act of 1991. Minister Shabangu alluded that many gaps have been identified in the act and believes that the mining industry is the backbone of South Africa, admitting that the government has to determine how best the sector is grown.

According to Shabangu, South Africa had set a target of 26% black ownership of its mines by 2014 and current reports indicate that it is not achieved yet (Engineering and Mining Journal, 2011:88). Bridgette Radebe is passionate about the interests of junior and emerging miners. As a president of the South African Mining Development Agency, and a founding member of the New African Mining Fund; there were funds raised to a value of millions of rand by Radebe for the junior mining sector.

Radebe was part of the team which was involved in the making of the Minerals and Petroleum Development Bill, and she also took a major part in the development of the Empowerment Mining Charter, partnering with businesses, the government, and unions. Radebe was adamant that if legislation was to give meaning to transformation, it would have to be intensely implemented; this can also be achievable with investors' commitment to compliance to the rules set out for them. It has been researched that only about 2.7% of South Africa's mining wealth is black-owned (Women Stand Tall at Mining Indaba, 2013).

2.6.2 Gender-Diversity management, Underlying Differences between men and women

A workplace filled with a culture that is male oriented is a massive barrier for women's advancement in a workplace, yet is not always regarded such by most employers. Conference Board numbers has depicted that a workplace culture can be modified only as soon as at least 25 % representation of a specific gender is realised. Research concurred that a workplace with greater diversity is mutually beneficial to both employers and employees (Mining Media, 2010:32)

Bhatia et.al (2014) said that if despite challenges of anxiety males may have in their studies in the colleges, instead of accepting defeat, they should resort to seeking alternative ways of solving their problems like putting more efforts into their studies. The study also revealed a gender tension between male and female engineering students, wherein female students believed they are expected to do more in proving that they are worthy to be doing engineering. This is despite being highly and unfairly scrutinized in comparison with their male counterparts, while male students believed that females are given more breaks (Bhatia et.al, 2014).

Mining as a business has to make itself attractive to the business community; the industries' only hope of survival would be to diversify. Providing a totally new perspective, the aspect of diversity can be imperative in creating new opportunities, a better business environment and ensuring well implementation of corporate social responsibility strategies. For the latter statement to materialize; a sizeable number of new and diversely experienced workers may have to be introduced into the industry for it to grow and not stagnate, Sturk (2011:4) pronounced.

At Rio Tinto, women make up 18% of the entire workforce, with the percentage of women in senior management being 15% and on the board being 14% with a target to have 20% for women representation in senior management by 2015. In contrast, countries like Chile and China have their female representation as low as zero to one percent (Cook, 2013). It is expected that there will be different progress for different companies with Anglo American having well above 15% of their work-force as women, and the company had aimed for 30% by 2014.

2.6.3 Retention strategy for women in physically demanding jobs, self-confidence and Employment equity

For the industry to change, women have to be unapologetically expedient, particularly those women in the forefront occupying positions of leadership. It is incumbent upon them to raise awareness in an endeavour to deal with the issues existing in the work place; they need to develop their skills sufficiently in order to demonstrate competence. Women have to create support structures in order to share their experiences and become positive role models to younger women coming into their organisations, so as to empower them. The business also has a mandate to accelerate programmes targeted at recruitment. Over the past six years; reports have indicated an increase almost tenfold the number of women in Anglo Platinum's core functions from 405 in 2005 to 3,872 in 2011.

It was also found that women were under the impression that career development opportunities granted to the male colleagues were somewhat different to those given to them (Mining Media, 2010:32). "We cut ourselves off in the beginning, and once we get in, there are challenges along the way", reported (Sturk, 2011:4).

Retention and Transition with the Mining Industry Human Resources Council (MiHR); whereby women represented 14 % of the sector, which was found to be lower than the national average of 47.4 %, even after there was an increase from previous years. In 2009, the mining sector saved 20,000 jobs which could have been lost in the financial crisis, to accommodate women. Women were said to be receiving a lot of support from management to become part of the mining environment (Kopamees, 2014).

As a thrust to a retention strategy, different programmes were being implemented to develop the skills of women and ensure their progression within the mining companies. Minister of Mineral Resources, Susan Shabangu, said: "Now South Africa has reached a point of maturity and we have identified many gaps in the act. We believe the mining industry is the backbone of South Africa, so now we have to determine how best we grow this sector" (Mining Media, 2010).

There is a humble truth in relation to employment equity, mostly for women working in the mines. The reality is that lowering working standards and increasing employment equity cannot equate to a demographic employee count. It should not be about reducing job requirements to make it easier to employ women, nor should it be about giving unearned opportunities. However, in essence, employment equity needs to be used as a vehicle to encourage team work, respect, diversity, and equal opportunity, it should be reflective of a societal culture and company values that recognise the substance and worth of women that can be added to the traditionally male-dominated environments (Women-in-mining, 2012).

2.7 Health and safety – Occupational injuries, amenities and security

It has been over a decade since women have started working in underground mining; for women this practice is associated with a process of some sort, towards a social experiment; the results of which now need some careful evaluation. This indicated that there should be certain statistics made available in relation to occupational injuries and diseases. This can be achieved by tracking trends and keeping records of whatever incidents and issues of concern may be, in order to get rationality on whether the issues about the safety of women miners in the underground mining environment is being addressed (Govender, 2013:74).

In order to meet the very basic requirements for facilities utilized by female employees in the mining environment, it will be essential to address the following issues : privacy, clear signage, childcare facilities, sufficient locker space and the maintenance of the facilities and amenities. According to internal audits regarding the provision of facilities for female employees, a need to upgrade existing facilities has been indicated in order for female employees to have access to safe and comfortable amenities. As reported by Kweyama (2012), young women in particular, are victims due to social and cultural norms, lack of awareness as well as limited education leaving them especially susceptible to HIV and Aids.

Prevention programmes and education can be a passage to encourage young women to understand their rights, Anglo have introduced their HIV and Aids testing centres and treatment programmes, great accomplishments were achieved when free anti-retroviral treatment was provided to approximately 100 000 employees, their families and contractors who were also tested as were around 4 000 additional people. HIV/Aids treatment is offered to the towns of Kathu and Thabazimbi where the Kumba Iron Ore mining businesses are situated (Carroll 2012).

The clinics built by Anglo provide the local communities with general healthcare and wellness services including mobile health units, delivering free primary and secondary healthcare to up to 15 000 people in isolated villages in the Northern Cape. The morale of women could be lifted while at the same time reducing the period it takes for women to change clothing before and after shifts, that can be achievable if the female facilities are upgraded. The safety and security of the women require great improvements in order that it would become more convenient for them and should therefore enhance their working conditions (Women-in-mining; 2012)

2.7.1. Design and Re-engineering of facilities to accommodate women's physique and improved underground technologies

Accidents and diseases that mine workers are exposed to may be due to the known fact that underground mining is a hazardous environment. It remains questionable if matters of safety for women miners in the underground mine work environment are sufficiently addressed.

Govender's (2013:74) finding was that; not much is said about these challenges in the public domain. In Australia, back in 1986, amenities like ablutions facilities and work methods were previously intended for men only, thus in the recent years men working in the mines were against their women colleagues, Atkins alluded in (Cook 2013).

The truth regarding physical aspects of the mining operations for women, continued to be unwelcoming. There are still some physical conditions under which women work, which are often inappropriate, to mention one case in point; whereby the use of ablution facilities was expected to be used by both genders. Regarding the ablution facilities; in South Africa there is minimal to no provision at all for women who work in the electrical substations performing duties that may require them to be on site for over 4 hours. It is then expected of them to either stay remain uncomfortable or to travel to the nearest filling station which may be kilometres away, due to the unavailability of ablution facilities out in the field.

Mine managers, drillers, plant operators, shot firers, and supervisors, those were positions that over the years were previously occupied by male employees. That sentiment has mostly degenerated, as it is today; when visiting a mine these days, a good number of women could be seen performing duties which were not considered for women before the 1990's (Cook, 2013). Govender's background as a medical doctor; helped her focus on dealing with justifiable solutions which are applicable in addressing the issues beyond policy matters. She arrived in the industry of the multidisciplinary world of ergonomics, a hospital environment which ignited her drive after identifying design problems in the field. Her inspiration came from a fuller appreciation of design re-engineering which would lead to the utilization of technology in finding permanent solutions.

Intercessions at empowering women in the physically demanding work place may come as imperative in the maintenance and sustenance of inspired and self-driven attitudes amongst employees; which will, in turn, increase performance. The introduction of a well-stablished bursary scheme was advisable in order to develop prospective employees who are currently students; into future professionals. The introduction of a rehabilitation functional assessment system was needed in order to reduce constrictions prohibiting new female recruits who were not physically fit, for the demanding work in a mining environment (Women-in-mining, 2012).

With a Master's degree in ergonomics, Govender (2013:75) highlights that mechanisation in mining is ripe for discussion that is relevant to the advancement of the underground mining sector. It is envisaged that it would lead to a greater involvement and commitment by an increased number of females in mining, as mechanisation advocates less work which may require strong physical attributes. The platform would necessitate open engagement and a safer environment for open dialogue. For South Africans, there is a great scope for spearheading this research and development concerning suitable technologies for women, which will be favourable to their physique and in support of pioneering new roles in the challenging underground setting.

The South African ideology in truly addressing matters of equality in various industries would not only give benefits to women, it may result in the South African experience being shared with the rest of the continent and even other parts of the world, as men will be the beneficiaries of an involvement that is valuable, Govender asserted. The work initiated by Dr Govender was to make this suggestion a reality, such that a voice was granted to women to present for themselves, among other industry patrons, in a forum where familiarities can be articulated, in a constructive manner, to productively achieve synergy. On a positive note, since the Mining Charter committed to recruit more women in previously dominated industries, their employment share in this sector grew from less than 3% to over 10% overall (Govender, 2013:75).

Alluding to facility improvements and adaptation like others in the industry, Carroll (2012) reported that Anglo Platinum business have given its all to overcome legacies of the past in order for women to work in environments that are better suited for them. Suitable PPE was provided as well as change houses which were appropriate, great investments were seen in the provision of childcare facilities and efforts were made at most operations in setting up women's forums.

2.7.2. Under-representation of technicians defining the role of women in the mining industry

Lack of technicians is the cause of a definite crisis according to Professor Fred Cawood; Head of the Mining Engineering School at Wits University in McMaster (2013:26).

Cawood believed that the challenge in the sector was not transformation, nor did he regard upper level graduate investment or the creation of new Mining Engineers as a predicament, rather a failure in strategy by the mining industry to develop medium to lower level skilled technicians and artisans for future.

When speaking about under-representation of women in mining, Avril Cole who was an associate in the banking and private capital group with Macleod Dixon, deliberated on the evolvement of the industry, compelled by the demand, and not necessarily due to ordinary effects. Cole provides a unique viewpoint; taking into account her strong international mining interest at large. Cole explains that there was a bull run in the economical state which ended in 2008, whereby it was not as easy to acquire male workers by a clear drop in numbers. To combat the skill shortage, companies realised that their main optimism would be if they increased the probabilities of involving more women in the industry.

Albeit slowly; many countries whose evolution were dependent on the mining industry had started to positively respond to the need for women. Bridgette Radebe, a champion of junior miners, started her career as a miner and recently held another position as a high-profiled innovator in the industry. Radebe who now relishes her own mining company called Mmakau mining, is a vocal champion for the rights of junior and emerging miners. She is the first black South African deep-level hard rock mining entrepreneur who started her career in the 1980's. Her entrepreneurship appeal was fuelled by her background for doing good initiatives for the society (Women Stand Tall at Mining Indaba, 2013).

In 1976, Radebe was part of the mine protest to demand her family's royalty payments for the mineral rights leased to a Canadian mining company. Without fear she defied the regulations which had forbidden women from owning mining rights or working as miners. That is where she worked to shape her career as a miner, and her company, Mmakau Mining, which subsequently contributed to the platinum, coal and chrome mines. Now she is counted among Africa's richest women (Women Stand Tall at Mining Indaba, 2013). In the African continent, countries like South Africa for example, employed Cole's services on enforcing the government's program to accelerate the development of previously disadvantaged South Africans, within a category including women in mining companies.

Although there are not as many women at the top levels in mining, it became unmistakably clear that with South African mining; the responsibility lies with companies to intensify the participation of women in decision making positions. At the very least, mining companies are beginning to be more inclusive from the bottom up. Indeed some influential women who are at the echelons of mining like Cynthia Carroll, the then CEO of Anglo American, are moving the business forward by changing the game plan (Kopamees, 2014).

2.7.3 Real life Experiences of women at the work place

For many years, women worked very hard to create space for themselves in the mining and oil and gas sectors. Though the industry is challenging to pierce through, another challenge is getting the statistics on the industry about resources affecting women. The reality is that; although women have the know-how, the skills, and the instinct to play major roles in the commodity businesses, they are in the very least not nearly as connected to the industry as they should be; this is according to (Kopamees, 2014).

During a discussion with Virginia Tyobeka, head of human resources at Kumba Iron Ore, in a mining symposium on women; she asserted that the desired solutions could not be achieved by using a one size fits all approach. She said: "Back then we missed the opportunity to influence young girls and I believe we're still doing that today. A 10-year-old girl knows she can become a doctor, a teacher, a nurse, but not necessarily a mining engineer." She therefore emphasized that the mining industry needed an urgent overhaul, quality joint collective with labour unions and enhanced living conditions for workers, (The citizen, 2013).

A lady miner shared, as captured on the video caption in Bekker (2014), that working above the ground was much better, as women do not work extremely hard because most of the stuff is not so heavy. "Some men undermine us and tell us to our faces that we are weak, that we are not here to work but to use them, although a few other men are still considerate. "These conditions affect us, so often so we end up getting our menstruation earlier than we are supposed to, and to add on that predicament; these chemicals really eat up our bodies" (Bekker, 2014).

In an interview by Women in Mining (2014); Hilda, the lady mine worker shared; "The mining industry is a hard-hitting one. But as a woman, if you are willing to work hard, and overcome any perceived challenges, you can succeed." As a leader, she carries herself in an exemplary manner, by treating everyone equally and respecting other people's cultures. She elaborated further by saying; "We need to understand that mining can be a challenging environment for women to work in, but with the right training, skills development, and support from employers, it can be rewarding too."

2.7.4 Under reporting of incidents

Borralho (2014) conducted a study that comprised of 242 respondents, 51% were ranging in the ages of 26 and 35. Industry professionals made up 9%, while operational posts were occupied by 77% and 89% of them were professionals in the industry. Borralho (2014) stated that, between the years 2010 to 2013, the percentage of women students who enrolled in mining had amplified from 33% to 37%, "a result which could be attributable to the last few mining Ministers in South Africa being women," she added.

Concurring with the assertions from Bekker (2014), there is a list of several challenges currently faced by women in the industry, among others, a lack of guidance, lack of coaching, little or no mentorship, shortage of workplace support and hygiene facilities, as well as insufficient career and development supervision. The statement also highlighted women's concerns about health and safety risks related to mining and the fact that many women in the industry felt that most opportunities are unjustifiably given to their male counterparts, based on their gender. Sexual Harassment is a pre-cursor to rape.

Bekker (2014) affirmed that she personally experienced sexual harassment while working at Sasol Mining's Syferfontein mine in 1999. She was almost raped. No one believed her, as it was her word against her perpetrator. In 2012, Pinky Mosiane was murdered and allegedly raped underground in Rustenburg by a mine health inspector. The statement above depicts the preceding circumstances before the undesired state in a work environment (Inside Mining, 2014). Clearly; female workers in the physically demanding jobs still have mammoth challenges to deal with, from an unfelt leadership support, a lack of facilities which are suitable and inappropriate protective clothing, to outright sexual harassment.

In its various forms, sexual harassment is regarded as a very serious problem, affecting both men and women who work underground and even the office based employees. Bonita Meyersfeld, director of the centre for applied legal studies; describes underreporting as very real as there are no suitable platforms to report these matters which may in turn result in the same woman who is reporting the incident finding herself alienated. Female miners are subject to unfair discrimination, sexual exploitation and violence in the mines. According to Elize Strydom, senior executive in the Chamber of Mines, women work towards little targets due to their psyche and how they are perceived by fellow male colleagues and thus projecting a link towards their wages being negatively affected (Bekker, 2014; video 2014).

Clearly, there are still issues regarding safety when women need to access the toilets, hence the rise in rape cases, assaults and murder in the workplace. Add to this, the perception of women being unsuitable for physically demanding jobs which is interlinked with their strength and physique. The impression that engineering is a masculine career can be revised while a number of approaches may have to be employed to try and intensify the number of women entering engineering education and an engineering work environment, so as to improve their success and unleash their potential. At the same time, management's demeanour towards the presence of women in physically demanding jobs has to be such that they refrain from disadvantaging and discouraging women by improving the way gender is perceived at the workplace, which will subsequently promote the diminishing of inequality between the sexes.

2.7.5 Beneficiaries of Employee development strategies and investments

Queen Hlotse, a distinguished female worker in the drilling department at Mogalakwena platinum mine worked as a senior shift supervisor. Hlotse commenced her duties on a learnership to become a drill operator at Mogalakwena Mine from the year 2003. She took advantage of the opportunities which were presented to her without hesitation. She completed her adult basic education course level 3 in communication and maths while continuing with training on the mining surface until she attained her blasting ticket in 2004 (Carroll, 2012).

An exceptional example of how mining can improve people's lives, as perceived by Carroll (2012) was when Queen and other members of the Mogalakwena mine team local had an opportunity to present to the officials of a Congress of the Obama administration and the EPA regarding their mining projects in Washington DC. They got acquainted with the First Nation's communities of Anglo American, and they got an opportunity to be informed about Anglo's values and the method it employed to enable stakeholder engagement and sustainability.

Carroll's Anglo American had invested an estimated 1.9 billion rand for community development in South Africa between the years 2008 and 2011. This record breaking generous contribution was the largest of its kind this country has ever seen from any company. It translated into more jobs, greater educational prospects, and healthier communities with an improved infrastructure. The impact of mining in this country ought to go beyond just the gates of the mines. When firms plan to open new mines they are expected to look further than the perimeter fence and take into consideration the plight of the communities around them, including the society close by and the impact on the environment.

Approximately 125 million tonnes of coal was used to generate 94 % of South Africa's electricity in 2011. It is great to announce that women are considered have played a pivotal role in it, due to their nature and instincts of keeping families and communities together. Women's uniqueness place them at a favourable position to greatly assist Anglo in sustaining a resilient and contemporary mining industry, that will empower the entire community, including to assist children to reach their potential (Carroll, 2012).

2.7.6 Social Responsibility by ploughing back into the community through entrepreneurship

The mine managers and mining engineers have in the recent years been seen as front runners when it comes to stakeholder engagement. They also serve as a strong technical foundation, they need to have the skill of understanding people, be prepared to give an ear to the issues raised, and allow a platform for negotiations if probable so that win-win solutions are achieved.

As communicated by Carroll (2012) Anglo CEO, who indicated that as a mining company they have engaged upon human capital investment, reciting that mining cannot be regarded as being just about the past and the present but as being interested in South Africa's mining future. The assertions were proven in the statistics which depicted that South Africa as a country was accorded the greatest mineral endowment of resources to 2.5 trillion dollars as an estimated value (Carroll, 2012).

The recent outbreak of intimidation and violence as encountered at various mining operations, have caused reason to panic, raising questions on how South Africa will turn out in the future and the role mining will play at the time. According to Carroll (2012); the recent breakdown of law and order left the country's economy bleeding, when hundreds of millions of Rand in revenues and taxes were lost through mine stoppages. Investors were recurrently required to think twice about their investment protection in the South African economy, which left the entire economic growth negatively affected.

Anglo supported the entrepreneurs' with "Zimele", a development initiative which forms a portion in its enterprise, having an approximately 40% women representation. "Zimele" initiative was aimed to providing initial capital to individual entrepreneurs who aspired to establish their own small business but did not have the funds to do so. The placement of these enterprises was strategic in their positioning; they are based in the disadvantaged rural communities for easy access. Anglo's philanthropic endeavours did not end there; they have also introduced the Olwazini fund for the provision of training lessons as well as small loans to South African communities coming from previously disadvantaged backgrounds, most of which were women (Carroll, 2012).

Thermal Coal funds were used to recognize high schools' extraordinary performers in the vicinity of the Witbank operations by initiating accelerated programmes. In warranting a channel for talent, education programmes were expedited in local communities to nurture the future of young women in particular; by affording unrestricted access and making them part of the beneficiaries of these programmes. It was apparent that Anglo had constructed many schools within South Africa, with girls making around 50 % of the children attending these schools, having the intention to encourage them further in considering mining as a viable future career. As an advantage; the schools are situated just outside major urban centres where girls may be less likely to attend school (Carroll, 2012).

These great initiatives will in future assist in bringing a more diverse workforce, ranging from people from all spectrums, compelling the mines to devise renewed plans to manage the increasingly complex world of mining. At Met Coal based in Australia, 10 % of their workforces comprised of women in the past eight years or so. In 2012 they were still sitting at 14 %, making up 24 % of the entire population in the coal industry. Peace River Coal mine is an open cut mine near a rural community of around 7,000 people. Anglo has given bursaries to 50% of Met Coal's graduates during the 2013 who were female, 20 % women operators and 30 % staff members while giving scholarships to 55 % of the women and around 50 % of apprentices who were women as well (Carroll, 2012).

2.8 Solutions - Evaluation of systems to increase the number of women in physically demanding jobs

The South African government, industry and unions hold the solutions towards a resilient future for mining in the South African landscape, which means putting their differences aside and building synergy for the attainment of ordinary people's genuine aspirations which is a better life for all. This could be achieved by generating jobs for young South Africans including young women, making them the main beneficiaries of a strong, developing mining industry and in the process fostering an internationally competitive mining industry (Carroll, 2012).

Another problem identified was the lack of mechanisms for an annual evaluation of target performance. The current mechanisms has been put in place by the government in ensuring that on an annual basis targets are met, enabling the ministry assist to identify, check and ascertain challenges in the implementation of the programme (Engineering and Mining Journal, 2011:89)

Heyman (2014) said that women feel that in order for them to fit in, they are compelled to produce more than their male peers and when facing difficult circumstances, most females become uncomfortable to indicate their challenges, thus becoming fearful and doubtful about their potential. This often results in them not standing up to people who may be interrogating their engineering competence, leaving them prone to scepticism and degradation from stereotypes, subsequently making them to start believing that, themselves.

The research concluded that positive role models at critical intervals of their time at college or university could act as a catalyst in equipping female students and that could help to attract and preserve women in the fields of engineering. Socializing with other women or students in engineering sharing their familiarities; could bear great results for these women. (Bhatia et.al, 2014)

2.8.1 A different perspective – Women can solve the skill challenges facing mining currently

Anglo American has, for decades now, made a real difference in the communities adjacent to their mines by positively impacting the lives of South African people. A few hundred thousand women in South Africa have been assisted to realise their full potential through the efforts undertaken by the mining industry. A real and positive difference was brought into the people's lives through housing, training, education, jobs and career development. "When you are a miner you get an opportunity to work with a diverse range of people possessing many sets of skills, you get exposure to outdoor experiences and never stop learning new things". Carroll added that attitude is everything, as she personally does not feel like she was exposed to more difficulties as a female employee, even though the industry can be dangerous and remote (Carroll, 2012).

Perceptions still exist by individuals who believe that women whose physical strength do not allow them to lift a core box by themselves; could be a sign that physically demanding fields or mine sites are not places for women to work in. However, trends showed that these sentiments are slowly vanishing with those stereotypes from the old school of thoughts, as said by Amanda van Dyke; Chairman of Women in Mining (UK) and Mining Specialist Equity Sales at Dundee Securities Europe, who also worked as a gemmologist trading diamonds.

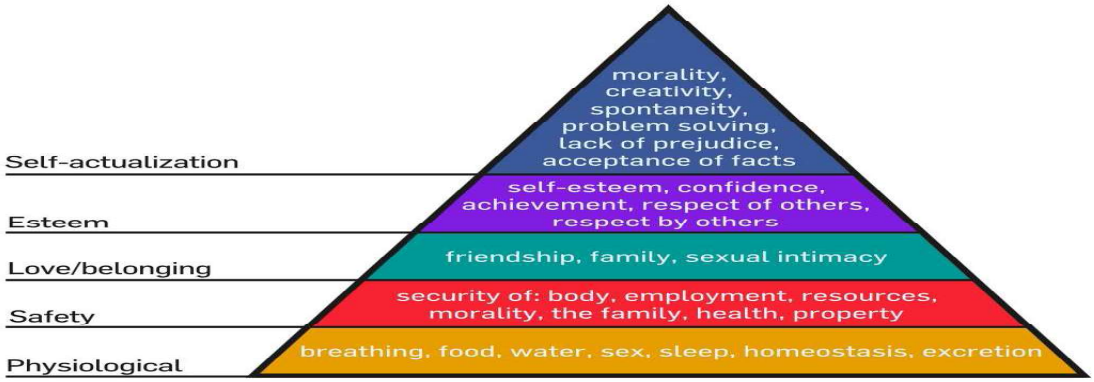
Sharing her personal experiences of dealing with some challenges in her career which were posed to her merely because she was female; she still however believes that being different may be a positive as well as a deterrent; taking into account that more female employees are being introduced and advocacy levels are increased in favour of women in mining, thus impacting on the diversity balance and she also believes that change takes time.

The initial reaction to a woman who is expected to work in the mining environment can be a look of askance. However; it should not matter whether you are male or female as long as the job is done effectively (Carroll, 2012).

2.8.2 The impact of personal status on women's progress in a workplace

Kopamees (2014) explained that the movement called 'Women in Mining organization' was originally created to give women opportunities and to minimize challenges in order to incorporate them into the mining industry, which is pagued with so many trials on a daily basis. This would be from the moment one puts in an application for the social license to operate, to working with the public members who generally lack understanding regarding the mining operations.

2.8.2.1 Maslow's hierarchy of Needs



Annexure 2: Maslow's Hierarchy of Needs

As depicted here above, Johnson (2011) shows Maslow's arrangement on the various kinds of needs on the pyramid of five layers: which are Physiological, Safety, Love/belonging, Esteem and Self-actualization. Many examples of these types of needs are explained on each layer (Johnson, 2011). A challenge that career women are practically faced with in every industry, is to be expected to raise children whilst pursuing their career aspirations within an organization. It is common knowledge that having a responsibility to raise children as a woman working in a physically demanding environment can have its own trials. There is a belief that the industry is commonly sympathetic to mothers who want to keep their mining careers going, as long as the arrangement fits into their business plans.

Founder of Women in Mining in Western Australia, Sabina Shugg, Momentum Partners Head of Mining, was in March 2010 named the inaugural Women in Resources Champion in the Chamber of Minerals, agrees that approaches towards gender diversity are evolving. "Industry groups are leading change and creating initiatives to improve awareness of issues around attitudes towards gender diversity," she said. Born and bred in Kalgoorlie and then Perth, Shugg was firstly an exploration field assistant prior to working with geologists. In her career of exploration; Jubilee gold mine was newly opened in assay plots with plenty of opportunities for those who were prepared to go an extra mile and show that they are self-starters which she did; hence she advanced fairly rapidly on the corporate ladder (Cook, 2013).

"Men demand sex in exchange for helping female colleagues with strenuous tasks." The study collected observer's data that shift bosses did engage in sexual intercourse with their female colleagues, this is in exchange for assistance through the physically demanding jobs. "Men still see women as sexual objects; as a result transactional sex is on the rise." It said. "Sexual favours are very common underground." This was shared by Khumalo (2015:13) in the interview on the Anglo American's Bathopele Platinum miners. Khumalo further elucidated that a veteran mineworker with 22 years of experience who explicitly uttered how the ball rolls by saying: "I do your job, you give me something – it's like that". The veteran also believed that women were not appropriate to work in the mines and should not be given access to go underground.

This in the long run confirms that there is still a long way to go before the male counterparts believe that female workers are strong enough to succeed in the physically demanding jobs. However, a female shift supervisor; Bernice Motsieloa who throughout the interview indicated no sign of being sexually abused nor finding herself in a compromising situation, where she had to do anything astray to get her way. She and her other lady colleague confirmed though, that for a woman to be recognized, they had to do twice as much to prove they are capable.

Traditionally, mining is known as a labour-intensive, male controlled industry, but times have changed. Recently, technology is at the centre of mining. As the advancement of the industry is quite rapid, it becomes extremely imperative for the human resource subdivision of the industry to be prepared to endure, support and sustain the envisaged changes.

Change takes time, however adaptation of companies to become more women-friendly is crucial, as it is affirmed by the Women in Mining who represent thousands of world-wide spokespeople for women; there is definitely a place for women in physically demanding jobs, mining included.

The reality is that opportunities are in abundance out there for women, and therefore women should get involved, be change drivers and optimistic, so that greater changes would be demonstrated (Sturk, 2011:4). The general and basic idea with the connotation above is to comprehend Maslow's logic clearly alluding that; the bottom row is representative of the more basic needs. Meaning that before an individual can move up the hierarchy, the lower level needs must be met before progressing to the next level. For instance, it is common to see someone sacrifice personal safety in their quest to find food, alternatively with some people in a certain culture, to firstly gratify a basic sexual desire in an unexpected relationship, prior to seeking a serious commitment (Johnson, 2011).

2.9 Conclusion

In this chapter, the review of literature was quite broad and a vast inferences and references were explored. It is therefore evident that the first step to correcting the problem of having fewer women in physically demanding jobs is by recognizing the challenge itself through establishments like "Women in Mining" and MiHR. This gesture will allow the global industry to adapt; the other trial in awareness campaigns could be that the mining industry had tendencies to invite undesired publicity, like commodity crashes or environmental issues, leaving very few people to hear about their interventions for diversity in mining (Sturk, 2011:4).

It is advocated that women are diligent, loyal, hard workers, and are committed meaning that; if there were more women in the industry, the intensity of the strikes would be minimised. In turn, that would result in more efficient ways of salary negotiation processes among other interventions. Women in non-traditional majors typically have more egalitarian sex role attitudes and believe that women have a right to contest for jobs which were traditionally assigned to men (Blaisdell, 2006). Disagreeing with male dominated cultures is often seen as a hurdle to getting promoted in the workplace.

Therefore, it is important to investigate the reasons behind people's outlook towards fear or uncertainty, and also to find solutions. Sometimes it is reported that women are being intentionally omitted from engaging in informal networks, and that suppresses their career growth. For women to survive, they have to develop self-esteem, assertiveness, and confidence; for them to thrive and grow into seniority levels and embracing diversity (McMaster, 2013:26)

This showed the confidence from the ladies occupying higher positions, regarding their self-reliance in their duties; however the contrast could be seen if the same questions were to be asked to women in lower positions where lower confidence levels would be echoed. Maslow's pyramid of needs postulated that the compromise of one's morals in order to secure their jobs for sustaining their families, health and other valuables depended around where on the pyramid they are situated. (Johnson: 2011). Henceforth, a lot should still be done in emancipating women in the physically demanding stream.

Employment equity is a reality and needs to be embraced by people who fully understand that advancing the role of women at all levels of the organisation contributes not only to the capability, health, and competitiveness of a company, but also to the company's profit. Companies that stifle the truth about the need to grow employment equity are bound to stagnate and stand a chance to lose out on a few points on their checklists (Women-in-mining, 2012). For any industry it is imperative to have a talented, loyal workforce, as well as a high degree of labour movement in order to address the skill shortages facing the industry around the world (Carroll, 2012).

Lastly, when mentorship is enforced; confidence levels in the women can increase and make it possible for women to add a huge value to the occupation by being in leadership positions. Now, that is an ideal that can be altered over time with companies and government working together improving the female workers conditions, to create an environment that is conducive for women to succeed.

CHAPTER 3

RESEARCH METHODOLOGY

3.1 INTRODUCTION

Literature's various aspects were discussed in the previous chapter with relevance to the research topic: "Encounters of Women in physically demanding jobs within Rustenburg." This chapter intends to address the procedures and research methods found in this study comprising of research design, collection of data, analysis of data, limitation and delimitations of the study, as well as ethical considerations.

Research is a process which encompasses attaining scientific knowledge by means of numerous objective procedures and methods. Research methodology entails the explanation of the reasons behind the research, with taking into account the methods and techniques to be utilized. Five sources of non-scientific knowledge are as follows: opinions of peers, authority, debates, accidental observation and traditions, which is often just accepted on the base of the authority of some other source. The preferred approach will be scientific; it is imperative to check the way in which findings are attained and not accept them merely because they originate from a so-called expert. Therefore, with every claim made, the proof must be examined (Welman, Kruger, Mitchell, 2007:13-21).

The significance of this chapter was to ascertain the applicable research methodology as well as the appropriate techniques for the researcher to utilize when selecting the accurate research methodology to suit the study. Even though better results could be offered by a complementary approach in both quantitative and qualitative research methodologies; the other extent was to discuss the development and design of a questionnaire, and the type and sequence of questions to be used for data analysis (Choy, 2014:104).

3.2 Quantitative Research

Quantitative research is mainly about measuring and counting of events, together with performing the statistical analysis of a particular population of numerical data. Due to its reasonable and particularistic nature; quantitative research is based on the formulation of the research hypotheses and practically verifying them on a definite set of data. It gives the researchers the leverage of assessing the communication process without having any contact with the actual persons involved in the line of communication, making the information tangible and concrete to be able to analyse it (Mashiane, 2009:51).

Factorial designs are some of the many complex experiments with many variables with which quantitative strategies have been involved. The purpose of survey research is to offer a quantitative or numeric description of sentiments, approaches or trends of a certain population by reviewing a sample of the population being surveyed. Quantitative research involves cross-sectional and longitudinal studies whereby the use of questionnaires or structured interviews is vital for data collection. This is performed from a sample to a population with the aim to generalize the information (Mazibuko, 2011:134).

Researchers are keen to find complex and affluent understanding of people's experience instead of obtaining information that has a possibility of generalizing it to other bigger groups. Generally, quantitative research is associated with the positivist or post-positivist model. These types of researches are commonly used in the collection and conversion of data to numerical form in order to perform statistical calculations drawing findings into conclusions (Bryman, 2012).

The Research Method used in this Dissertation is quantitative research methodology, utilizing a survey questionnaire in order to satisfy the research intent as discussed in chapter 1 and 2. Among other reasons, quantitative method was preferred because it achieved high levels of reliability on gathered data and that was due to controlled mass surveys. Elimination or diminished subjectivity of judgment is as a result of having allowed longitudinal measures of succeeding performance based on the research subjects.

3.3 The Research Instrument

There were 25 items which the research instrument contained, having levels of measurement at nominal or ordinal level. There were five sections which were encompassed in the questionnaire within which the intention was to capture as much information in order to obtain clarity regarding the workplaces where women were employed and in turn address the objectives of this research. The research tool showed that it took on average 5 minutes to answer all the questions asked.

The sample; a total of 240 questionnaires were despatched and 226 of those were returned which gave 94% response rate. Of the 226 questionnaires received, 12 of those were found to be erroneous with some being spoilt with some questions unanswered, others totally unmarked and other questionnaires missing a page or so. Thus a total of 204 respondents' answers to the questionnaires were used for this research. The sections of a questionnaire were divided into 5 questions and they measured numerous subjects as demonstrated below:

1. Section A - Biographical data
2. Section B - Qualifications and Job Experience
3. Section C - Perception of women in mining
4. Section D - Changes made to accommodate women
5. Section E - Career advancement

Quantitative research which usually involves the collection and conversion of data into a numerical form to allow statistical calculations, are performed in order for conclusions to be drawn (*The four main approaches*, 2014). In order for the objectives as outlined in Chapter 1 to be established, key dimensions were assembled together in a certain pattern and several themes were used to draw up the questionnaire. Herewith attached is the questionnaire as appendix I. Several types of letters were arranged for the participants to request the opportunity to participate in the research within their workplace and to attain the necessary approval.

These letters vary from appendix I to appendix IV, that is:

APPENDIX I – Letter of information regarding the study

APPENDIX II- Request to participate

APPENDIX III- Letter of Consent

APPENDIX IV – Research questionnaire

The questionnaire consists of Part A, in which the initial section of the survey is divided into 5. Section 1 is meant to collect the biographical data, while in the 2nd section the information on respondent's qualifications and experiences was collected. From the 3rd to the 5th sections the questionnaire itself was included, wherein all themes which were similar were grouped together.

A 5 scale rating Likert type system was used, stretching from 1 to 5, where: Strongly disagree is (1), Disagree is (2), Agree is (3), Strongly agree is (4), and No opinion is (5). Based on the positioning of the industrial sites and mines being wide spread all over Rustenburg, some challenges were posed for the researcher to conduct the interviews. The objective was to establish if there were support systems and if the talent management systems implemented were effective.

For the administration of questionnaires; as a result of the hectic schedules of the sample population for this study, e-mails were used to send the questionnaires to the respondents. Where necessary, follow up calls were needed, to serve as a reminder for the respondents to complete the questionnaires. This has also assisted for clarification purposes, on the glitches experienced during the completion of questionnaires. The questionnaires maintained the option of anonymity in order to accommodate respondents who may not have been comfortable to share their personal details.

3.4 Data collection

Taking into cognisance the target population; i.e. mining, engineering and industrial; it was advisable to consider an appropriate size of the population in order to accomplish the study intent. Thus it was a matter of great significance for the sample population to be isolated; this was to necessitate the required generalizations of the total population. When the total population represents the sample well it usually gives a meaningfully impact to the value of the information being solicited; that is according to Strydom, Jooste and Cant (2003: 160).

The research being deemed relevant to industries, constituted a large number of workers, it was therefore considered not rationally practical to undertake study on the whole population within all subdivisions, i.e. Engineering, mining and industrial sectors, not only because they are scattered all over, but also to smoothen the data management process, which if mishandled, can get out of control. Therefore, the target population were the employees working in the mining, engineering and industrial sectors within Rustenburg, as it may as well provide reasonably coherent and similar information regarding the experiences of workers as intended by the study.

3.4.1 Sampling technique

The sample population for this study was comprised of respondents who were mainly from the following groups: ordinary managers, supervisors, ordinary employees in mining, engineering and industrial sectors within Rustenburg. The researcher, however, believed that this was an adequate representative sample to cater for the essential generalizations with regard to the sample population as it was possible. It was empirical that validity and reliability was achieved by employing generalization on the total population that were to be drawn from that sample, hence it was vital that the sample be a sufficient representative of the following demographics; gender, age groups, race, and other sexual, occupation, grading or professional affiliation, as well as other necessary biographical information.

The researcher will formulate material supporting the market environment and drawing on the major concepts applied.

A content analysis was an appropriate support for a phenomenological study as a content analysis is not a stand-alone research design, (Leedy and Ormrod, 2010). Corroboration was then sought through the interviews and observations to develop themes that built the basis of the argument. In some instances, the interviewer has to cross-examine other persons who are supposedly knowledgeable about the subject being investigated and subsequently have the information obtained recorded, this can be achieved through indirect oral examination (Lambat, 2012).

Kothari (2004) indicated that structured interviews are the structured method which is usually carried out by collecting information through personal interviews. The recordings of some highly standardised techniques were used in the interviews by using a set of questions which were predetermined, in such a way that, the researcher would pose questions in a prescribed form and order because a structured interview follows a firm predetermined process.

Mazibuko (2011:78) argued that in a case a researcher does the study for the purpose of improving the existing conditions and also if the research has the prospect of either directly or indirectly helping the society, then it would be appropriate to question respondents in an investigation, with a condition that the participants gave permission to be questioned. Coldwell and Herbst (2004) pointed out that when the participant has granted consent to take part in the research, it is the researcher's prerogative to safeguard the participant's awareness of issues applicable and those that require attention in the research. It is the researcher's responsibility to supply the participant with the information on the purpose, the nature, and the proceedings of the whole research process, in order to realize full trust between the researcher and the participant.

3.4.2 Questionnaire details and sequence

Data was collected through a Self-Completed Questionnaire. The questionnaire was both an electronic and a printed questionnaire which was utilized as a research instrument to collect data. With the use of a quantitative approach, the distribution of the questionnaire for this research was to the people in the Rustenburg industries, mining and engineering companies, conducting the one-on-one interviews and also through e-mailed questionnaires.

It is stated that participants can respond to questions with a declaration that they can remain anonymous, since the questionnaire would not require for them to indicate their personal information. Thus, it would be easier for them to be more truthful than they would have been in a personal interview; this is particularly when it is sensitive or controversial issues being addressed, as quoted in (Mazibuko, 2011:78). Before the survey questionnaire could be dispatched to participants in the mining, engineering, construction and industrial teams, they were notified accordingly about this study and they were requested to participate and co-operate in completing the questionnaire.

Essentially, the collection of quantitative data had to be by means of a structured interview consequent to the guidelines, as it has been mentioned above. The decision taken was to use the survey questionnaire as an instrument to provide answers to the research objectives. For the first phase, collection of data will be done through e-mailing the questionnaire out to the participants who have access to e-mails within the Rustenburg industries, mining and engineering companies, and the second phase entailed the face-to-face hand out distribution of the questionnaire to relevant participants from the different organisations.

3.4.2.1 Selection of instruments

The validity of the study can be profoundly compromised if the selection of instruments could be found to be incorrect and subsequently presenting invalid inferences about the topic being investigated. To avoid that, correct selection of instruments were employed and they had a major contribution to the collection of data and in the attaining of results which, in turn, are reliable and valid. Herewith are several types of interviews available for the purposes of this research. Having the nature of this research being quantitative, a scale of Likert type comprising of 5 options ranging from Strongly disagree (1), Disagree (2), Agree (3), Strongly agree (4), and No opinion (5) were used; upon which the respondents will only be required to rate their responses to different variables, according to any of the numbers relating to the chosen option.

3.4.2.2 Reliability

Following approved processes is the best option to establish the validity and reliability of the research as well as utilizing reputable tools as they were designed, in order to achieve results which truly support the research objectives. As an example, if the opinions of an expert panel will be used to develop the requirements for the product where the design and development of the research are to be used, it is advisable to use the Nominal Group Technique for a mutually accepted consensus-building process and the Delphi Process can be alternatively used in determining such opinions. In an event where pilot studies could be considered in the testing and evaluation of the product that could warrant utilization of a form regarding accepted usability testing (Mazibuko, 2011: 67).

All possible forms of pressure to the participants like being compelled to adopt the views of the researcher or that of any other person were circumvented by the researcher in order to avoid partiality. To a certain extent, the researcher emphasizes that the outcomes acquired through this research are valid and consistent. When the research instrument was drafted, it was crucial for the researcher to ensure validity and reliability of the study; hence the researcher utilized some of the questions which were derived from theories already established as reflected in chapters above (Mazibuko, 2011: 67).

Lee Cronbach developed a tool named Cronbach's alpha in 1951 which was expressed as a number between 0 and 1 used to test reliability and for the provision of a calculation of the internal uniformity of a test or scale. It uses internal consistency explaining the degree to which the same theory or construct is used to measure all the items in a test which explains the link to the inter-relatedness of the test items. Before a test can be employed for research or examination purposes, an internal consistency should first be determined in order to ensure validity (Tavakol, Dennick 2011).

In relation to this research, Cronbach's alpha factor analysis had to be used to find the dimensions of a test which are for comparing methods for assessing the dimensionality and underlying structure of a test. Furthermore, for reliability estimates and to show the amount of measurement error in a test; Cronbach's alpha factor analysis was utilized.

3.4.2.3 Validity

Validity, when explained; is the degree to which an assessment is precisely measuring what it is anticipated to measure. It is a crucial component in the development of measurement tools and high quality assessment. There are various types of validity which exist, each one concerned with a measurement tool that has certain aspects which are different therefore it is imperative to comprehend that being a wide concept, validity incorporates many aspects of assessment. When it comes to the development of measurement tools such as self-report assessments, surveys and intelligence tests; validity is crucial.

A range of validity types exist, each with a special design to measure what they were envisioned to measure and ensuring accurate and specific usage of measurement tools such that in the real-world settings, the results can be effectively applied. The following are the different types of validity approaches; the first being construct validity which is a measure of how good can a tool or test measure the construct for which it was designed to measure: this refers to the extent to which operationalization of a construct measure a construct as defined by a theory e.g., practical tests developed from a theory. Construct validity includes all other types of validity; as an example, the extent to which a test measures aptitude is a question of construct validity (Validity statistics, 2016).

The other validity approach that is being discussed is the content validity. This particular validity forms a critical research methodology term referring to the behavioural patterns of a test measure in measuring what it is intended. Content validity is mostly known to rely on the knowledge of people who are acquainted with the construct being measured. The measurement tool is made available to the subject-matter experts where they are then requested to give feedback based on the results of how each question managed to measure the construct being measured. From the feedback provided, analysis is then made, in order to make informed decisions regarding the effectiveness of each question (Validity statistics, 2016).

Content validity, although subjective to some extent, it is a crucial element of developing a high quality tool of assessment.

Content validity is a kind of validity that places emphasis on how good individual questions could have an influence onto the exact construct being investigated. On completion, feedback from subject-matter experts will be utilized after they have provided and rated each question on how well it addressed the construct (Clause, 2012).

Surface validity or appearance validity are alternative names for face validity due to its superficial nature, and its subjective assessment when assessing whether the process of measurement employed in a study is indeed a valid measure of a variable or construct being investigated e.g. running speed racial prejudice, anxiety balance, or emotional. Face validity can be described as the degree to which an assessment or a test used to measure a variable, or construct is subjected to its appearance, which it is expected to measure (Clause, 2012). The research questionnaire for this study has face validity as the appropriate validity tool because it appears to accurately measure what it is intended for. Therefore; face validity has been regarded to be the most suitable validity method to be applied for this research.

3.4.2.4 Ethical Considerations

Assurance was provided to participants that their response to the questions will be kept confidential. Those who received the questionnaires electronically were sent reminders towards the deadline for their responses. This was done via e-mails, telephonically or by SMS's. The researcher has ensured that ethical practices are upheld, plagiarism will be avoided at all times, and the confidentiality clause would not be compromised and where conflict of interest would arise, measures would be taken to refrain from the possibility of taking advantage of the respondents.

Confidentiality and anonymity were maintained at all times. In addition to intellectualizing the writing process for a research, investigators need to anticipate and mitigate ethical issues that arise during their investigations considering that research comprises collecting information from people, about people. Being savvy about issues that affect people and indicating these anticipated ethical matters is requisite in strengthening an argument for a research as well as showing the importance of the subject in the format of proposals.

Researchers need to protect their respondents by utilizing a number of techniques like promoting ethical questions that are apparent in today's terms, like in issues such as personal disclosure, in developing trust with them, in being authentic, and the presentation of a research report that is credible. The researcher should also convince the participants of their role in cross-cultural contexts and issues of privacy through forms of data collected through the internet.

Nowadays, there is attention towards ethical issues in the way the research is being commanded, hence the ethical concerns that need to be anticipated are far-reaching and they are echoed through a research process. These issues are applicable to almost all research methodologies, be it qualitative, quantitative or mixed research methods and notwithstanding the level or stage at which the research is. It is advisable that all ethical issues be addressed as they are applicable to different phases of the inquiry (Creswell, 2009: 92).

3.4.2.5 Research limitations

Just like in instances where assumptions are concerned, the limitations of the study are often linked with the research methods used in a research. Although one cannot avoid limitations, establishment of the reliability and validity required careful attention to the employed methods within the study, as this was an essential process to be followed. The study did not include the whole engineering, mining and industrial sector; it only focused on the Rustenburg city.

It became imperative that the exercise could not be pursued without utilization of other guidelines from the entire industry, and the study could not cater for any impacts of women working outside the Northwest province or even South Africa, in its entirety. For the reduction of the likelihood to have results reflecting findings that may not be factual, irrespective of the kind of study being undertaken, there were always fundamental aspects that had to be recognized (Leedy and Ormrod, 2005). Underneath all research efforts, there lay assumptions, or concepts that the researcher regard as real without having tangible proof.

It was therefore vital for the researcher to prominently present those 'fundamentals' either as limitations of the study or as part of their argument. Any undertaken study cannot fully provide answers which are unarguably "true"; hence the possible reason for the researcher could be as a result of limitations or other factors, warranting a need for the study to identify improper deductions in an unequivocal manner. The limitations were identifiable; however the necessities to encourage the reliability and validity of the results of the study had to be thorough (Mazibuko, 2011:82). Finally, no study provides answers that are universally applicable; therefore it was deemed imperative for the researcher to state the delimitations or intentional constrictions found in the study which served as its restrictions.

3.5 Conclusion

In this chapter the fundamental purpose was achieved in that the research methodology was investigated and extrapolated in depth. Quantitative research methodology was adopted for acquiring data from the fields of engineering, mining and industrial. A real discussion on the research information gathering process was investigated as intended and was used as survey tools which are found in a research questionnaire and graphic analysis. The chapter to follow will mainly embark on collection of data, the analysis thereof and provision of a synopsis of the research project results, analysis and interpretation.

CHAPTER 4

DATA COLLECTION AND ANALYSIS

4.1 Introduction

This chapter has presented the results and embarked on the discussion of the findings attained from the information gathered from the responses in the study. The questionnaires served as the primary tool utilized to collect data and they were distributed to individuals employed in physically demanding jobs within Rustenburg industries, mining and engineering companies. The collected data received from the responses was analysed with SPSS version 24.0. Presented below are the descriptive statistics results represented as graphs, cross tabulations as well as quantitative data figures from data collected. For the data interpretation using the p-values; the use of inferential techniques has to include the use of correlations and chi square test values.

4.1.1 Reliability Statistics

The two most important aspects of precision are reliability and validity. While reliability is computed by means of taking a number of measurements on the same subjects; for a newly developed construct a reliability coefficient of 0.600 or higher will be considered as "acceptable". Note Cronbach's alpha score in the table below reflecting all the various items that were used to constitute the questionnaire. The main aim of this was to attain as far as possible the true reflection on the respondent's feedback towards the objectives of this study.

4.1.2 Reliability Statistics Table

		Number of Items	Cronbach's Alpha
C3	PERCEPTION OF WOMEN IN MINING	5 of 5	0.728
D4	CHANGES MADE TO ACCOMMODATE WOMEN	4 of 4	0.479
E5	CAREER ADVANCEMENT	6 of 6	0.708

Table 4.1 Reliability Statistics

In the two sections, the reliability scores have exceeded the recommended Cronbach's alpha value of 0.600. Therefore, that is an indication of an acceptable degree, and consistent scoring for these sections of the research. Section D has a value lower than the norm. This is primarily due to the manner of interpretation amongst the respondents. This section also had the fewest number of variables in its constitution.

4.2 The importance of factor analysis

A statistical technique mainly used for data reduction, is known as factor analysis. Survey researches are mostly using factor analysis, whereby the intention of the researcher would be to use a fewer number of hypothetical factors in order to signify a definite amount of questions. When using a hypothesis on certain political opinions while conducting a national survey; it may be required for respondents to answer 3 different questions about a certain environmental policy. That would be taking into account 3 spheres of government at the local, provincial and national levels. Here, each question alone, would be regarded as an insufficient measure of attitude towards environmental policy in question, however if combined they may reflect an enhanced measure of the participants' attitudes.

The usage of factor analysis includes among other things; establishing whether the three measures do indeed, measure similar things. So that if it is in accordance; the measures may as well be joined together to construct one common variable, resulting in a factor score variable which incorporates scores of each respondent on the factor. Different factor techniques can be applied onto a variety of circumstances. A researcher may want to know if correlation exists among different variables, and if so; for the factor analysis to be performed. The researcher does not have to actually believe in the existence of those variables. Although it is imperative for them to comprehend that in practice, names are usually given to factors, interpreted, and referred to as if they were real.

Below are the results of KMO and Bartlett's Test which are reflected in a table which is summarised and immediately before the matrix tables. Factor analysis is done only for the Likert scale items on the condition that Kaiser-Meyer-Olkin Measure of Sampling Adequacy should be greater than 0.50 and Bartlett's Test of Sphericity smaller than 0.05.

Under all circumstances, the requirements were met giving way to a proper factor analysis procedure. Below is an explanation of some components which are divided into finer components, as explained below in the rotated component matrix.

4.2.1 KMO and Bartlett's Test

		Kaiser-Meyer-Olkin Measure of Sampling Adequacy	Bartlett's Test of Sphericity		
			Approx. Chi-Square	df	Sig.
C3	Perception of women in mining	0.765	202.067	10	0.000
D4	Changes made to accommodate women	0.609	50.293	6	0.000
E5	Career advancement	0.777	205.491	15	0.000

Table 4.2 KMO and Bartlett's Test

The analysis showed that all conditions for factor analysis were good. Showing that, the Kaiser-Meyer-Olkin Measure value was > than 0.500 and the Bartlett's Test of Sphericity sig. value was < than 0.05.

4.2.2 Rotated Component Matrix

Component Matrix

SECTION C - Perception of women in mining	**Component** Perceptions on women
In our organisation women development is on top of our agenda	0.731
In my organisation Senior Management encourages diversity management	0.758
Senior management reminds us about the important contribution that women make in our business	0.804
In my organisation we have a balanced number of men and women	0.627
I am comfortable working for my organisation	0.527

Table 4.3 Extraction Method: Principal Component Analysis. (1 component extracted.)

Component Matrix

SECTION D - Changes made to accommodate women	Component: Conducive environment 1
In my organisation relevant changes have been made to accommodate women	0.593
In my organisation there is a sexual and physical harassment policy that ensures the safety of women	0.607
In my organisation we have personal protective equipment that is specifically designed for women	0.550
Women that are pregnant are moved to work in non-hazardous conditions	0.772

Table 4.4 Extraction Method: Principal Component Analysis. (1 component extracted.)

Rotated Component Matrix - Rotation Method: Varimax with Kaiser Normalization

SECTION E - Career advancement	Component: Felt Leadership	Career Advancement
My Manager supports women in our department	0.670	0.201
In my organisation there are programmes that addresses the skills gap between women and men	0.616	0.330
In my organisation leadership supports the acquisition of new skills irrespective of gender	0.795	-0.023
In my organisation leadership involves women employees in decision making	0.755	0.169
My managers and leadership keep track of women's career progression	0.093	0.809
In my organisation the managers takes into account of women's specific challenges in allocating work (e.g. during periods or post pregnancy)	0.207	0.784

Table 4.5 Rotation Method: Varimax with Kaiser Normalization. (1 component extracted.)

4.2.3 Factor analysis with Variables

A statistical technique named factor analysis can be regarded as tool to assist with the reduction of data. A classical use of factor analysis is in the survey research, whereby a small number of hypothetical factors are represented by a certain number of questions as preferred by a researcher, with reference to the table above. The component analysis principle was used for the method of extraction, and the method of rotation was Varimax with Kaiser Normalization. This method is known as an orthogonal rotation method, having high loadings on each factor minimizing the number of variables and simplifying factor interpretation. Inter-correlations between variables and loading depict the factor-analysis.

There is an implication of measurement along a similar factor when similarly loading the items of questions, allowing an examination of the content of items loading at or above 0.5, (and using the higher or highest loading in instances where items cross-loaded at greater than this value) effectively measured along the various components. It was noted that the variables that constituted Sections C and D were perfectly loaded along a single component, meaning that the statements that constituted these sections perfectly measured what was set out to be measured. Section E loaded along 2 components: sub-themes namely; Leadership commitment and Employee Development, thus implying that respondents have acknowledged different tendencies within the section, where the section is split and the splits are indicated in the following: Career advancement, felt leadership, and a conducive environment.

4.3 Data Representation in Sections A and B

This section will summarize the biographical features of the participants. In this section the biological and work history of the respondents were taken into account under the following: The Respondent's age, gender, designation in Patterson Grading, their education levels, the roles the respondents currently occupy, their level of experience in the mining / engineering industry, the manner in which respondents acquired their mining / engineering skills, and lastly whether respondents were affiliated to a union.

4.3.1 Age of respondents

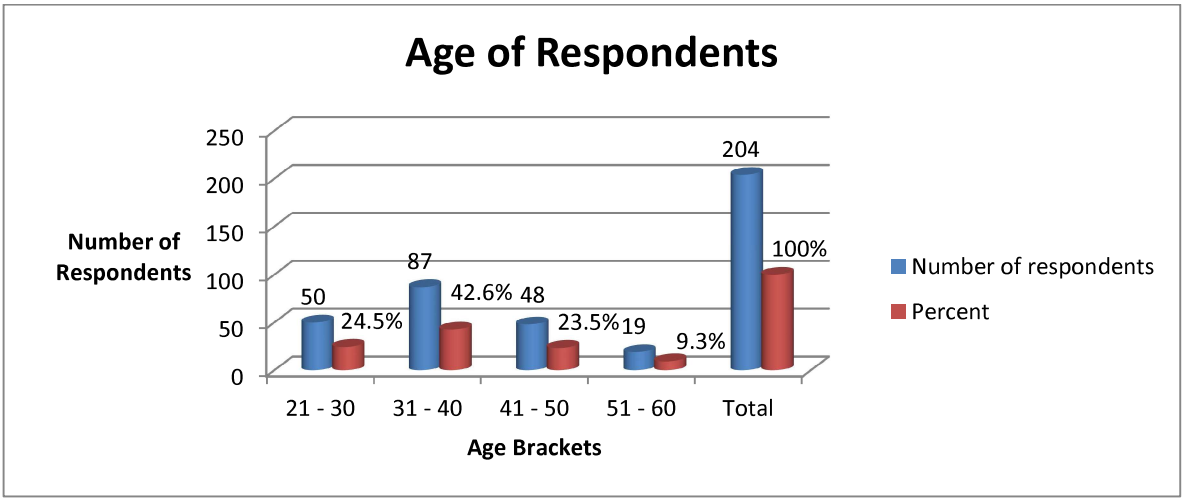


Figure 4.1 Graphical representations of Respondents by Age Group

In the age bracket of 51 to 60 years, it is found that 74% of the respondents are male, which leaves only 26% of the female respondents. This finding clearly depicts that within the Rustenburg industries, mining and engineering companies where jobs are physically demanding; the women employed are proportionally very low when compared to their male counterparts. This also demonstrates that a lot has to be done in order to get a balance within this industry.

4.3.2 Respondents' gender

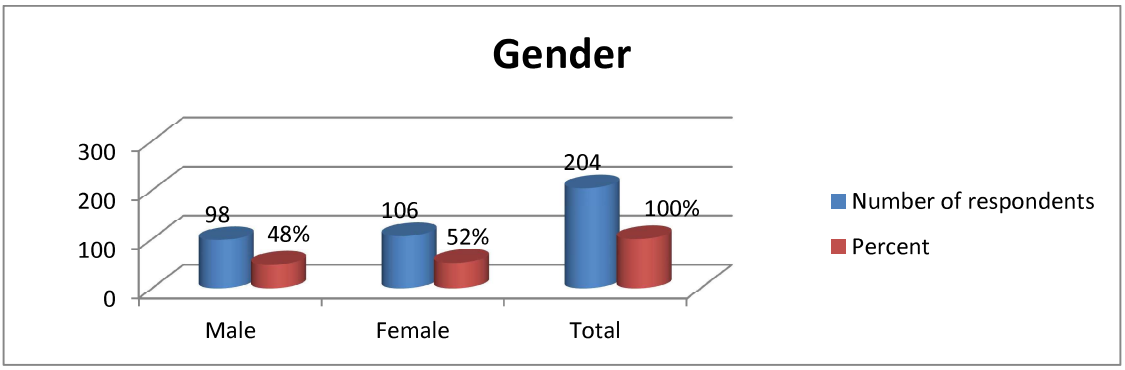


Figure 4.2 Graphical representations of Respondents' Gender

It is evident from the numbers that participation was generally balanced from both the male and female respondents. We had 52% of females and 48% of males who showed interest in sharing their views regarding the status of the issues around the effects of challenges faced by women working in physically demanding jobs.

4.3.3 Gender distribution by age			Gender		Total
			Male	Female	
Age (years)	21 - 30	Count	18	32	50
		% within Age	36.00%	64.00%	100.00%
		% within Gender	18.40%	30.20%	24.50%
		% of Total	8.80%	15.70%	24.50%
	31 - 40	Count	34	53	87
		% within Age	39.10%	60.90%	100.00%
		% within Gender	34.70%	50.00%	42.60%
		% of Total	16.70%	26.00%	42.60%
	41 - 50	Count	32	16	48
		% within Age	66.70%	33.30%	100.00%
		% within Gender	32.70%	15.10%	23.50%
		% of Total	15.70%	7.80%	23.50%
	51 - 60	Count	14	5	19
		% within Age	73.70%	26.30%	100.00%
		% within Gender	14.30%	4.70%	9.30%
		% of Total	6.90%	2.50%	9.30%
Total		Count	98	106	204
		% within Age	48.00%	52.00%	100.00%
		% within Gender	100.00%	100.00%	100.00%
		% of Total	48.00%	52.00%	100.00%

Table 4.6 Overall gender distribution by age of the respondents

It was very interesting to discover that in the overall; the ratio of females to males is approximately 3:2 (39.0%: 61.0%). Within the age category of 31 to 40 years, 39.1% were male. Within the category of males, 34.7% were between the ages of 31 to 40 years. This category of males between the ages of 31 to 40 years formed 16.7% of the total sample.

4.3.4 Designation in Patterson Grading

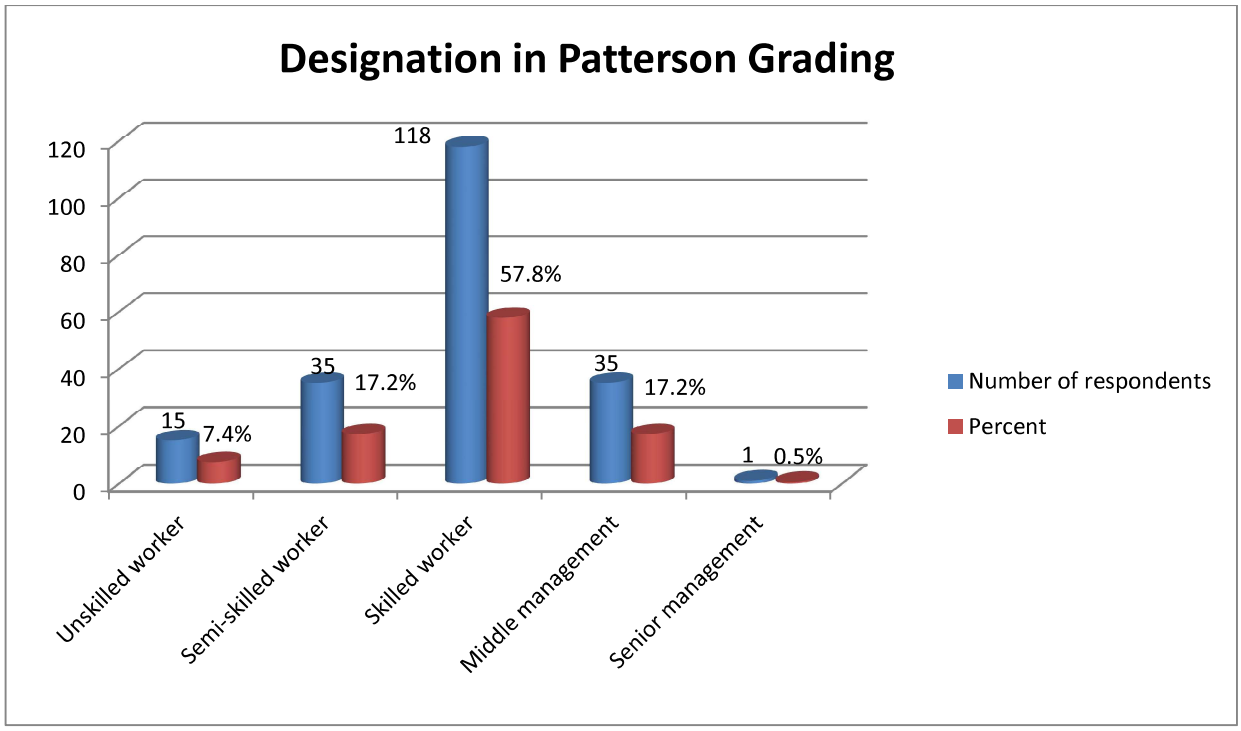


Figure 4.3 Graphical representations of Respondents' Designations

From the survey nearly 60% of the respondents are skilled workers, and it was also observed that there were similar numbers of respondents in middle management as it was in the semi-skilled workers category of 17.2%. From senior management there was only 1 respondent, whilst there were only 7.4% of the unskilled workers who participated.

4.3.5 Education Levels

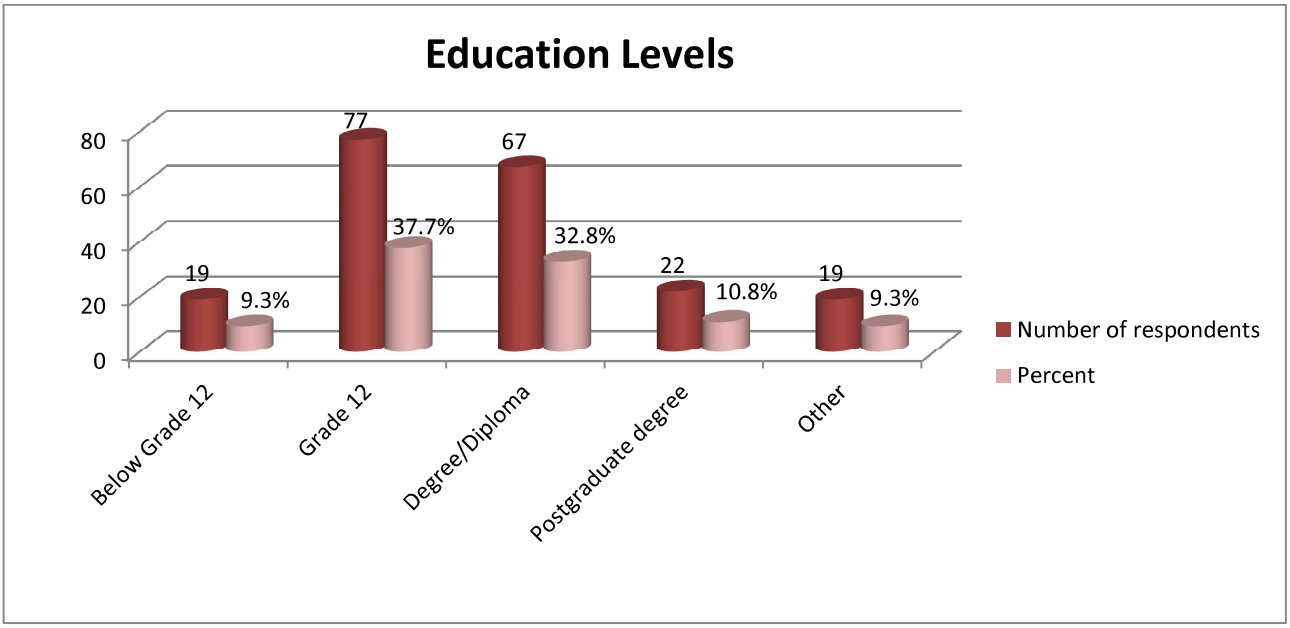


Figure 4.4 Graphical representations of Respondents' Education levels

The majority of respondents making 55.0% had a post school qualification. A tenth of the respondents 10.8% had a post graduate degree. This statistic designates that a fair fraction of the respondents have a higher qualification and this demonstrates that the responses gathered would have been from an informed position and from a learned source.

4.3.6 Other Qualifications	Frequency	Percent	Valid Percent	Cumulative Percent
	185	90.7	90.7	90.7
Artisan	1	0.5	0.5	91.2
certificate	1	0.5	0.5	91.7
N3	2	1	1	92.6
N3	1	0.5	0.5	93.1
N3	1	0.5	0.5	93.6
N3	1	0.5	0.5	94.1
N4	1	0.5	0.5	94.6
N4 +	1	0.5	0.5	95.1
n4	1	0.5	0.5	95.6
N4	1	0.5	0.5	96.1
N4 with	1	0.5	0.5	96.6
N5	1	0.5	0.5	97.1
N5	1	0.5	0.5	97.5
N6	2	1	1	98.5
N6	1	0.5	0.5	99
N6	1	0.5	0.5	99.5
Project	1	0.5	0.5	100
Total	204	100	100	

Table 4.7 Participants' other qualifications

Within the category of education levels, provision was made for respondent's to indicate their other qualifications, and as in the graph above; the qualifications found in the other roles concur with the findings that the respondent's level of education are high, whereby most of them have N3 qualifications or above. This could mean that indeed the responses may have been from an informed position.

4.3.7 Occupational Roles

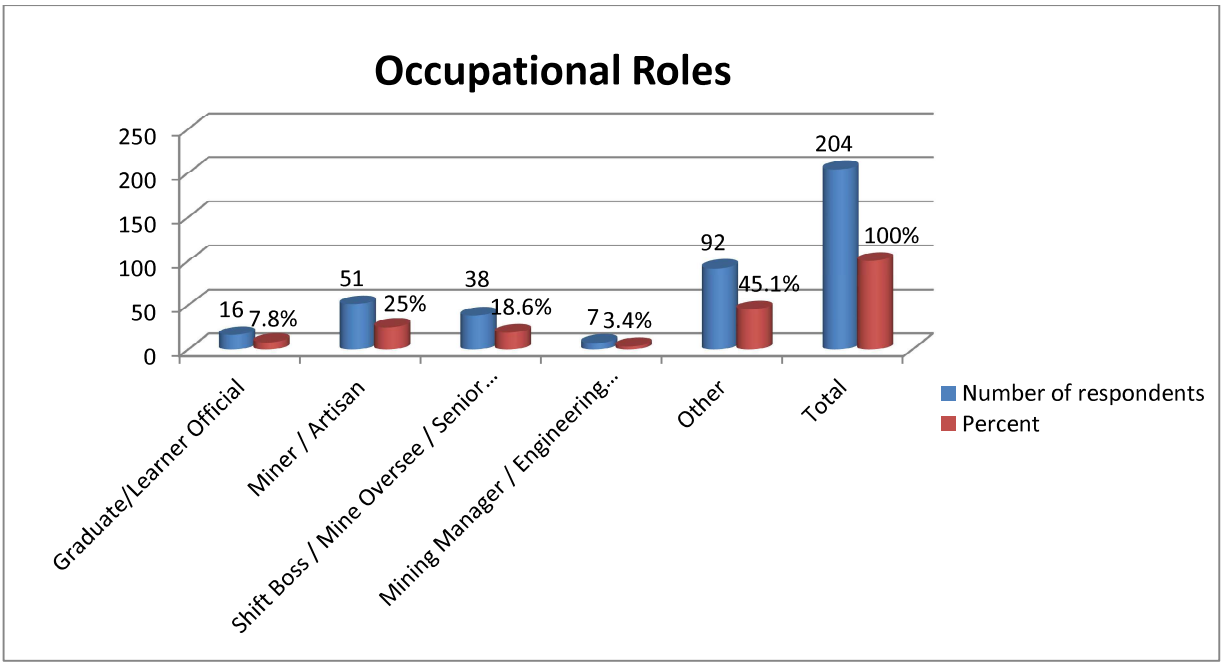


Figure 4.5 Graphical representations of respondents' roles in their organization

Roles currently occupied by respondents clearly depict and represent a good representation of employees which are currently performing physically demanding jobs. This is substantiated by the large numbers of respondents within the actual roles giving a satisfactory sense of empathy and would reflect in the manner in which the questionnaire was answered. However, "Miner / artisan" and the "Shift Boss / Mine Oversee / Senior Supervisor" categories are fairly equal to the "other roles".

4.3.8 Respondents' other roles

	Frequency	Percent	Valid	Cumulative
Valid	112	54.9	54.9	54.9
Admin	1	0.5	0.5	55.4
ADMIN	1	0.5	0.5	55.9
Admin clerk	1	0.5	0.5	56.4
Admin Supervisor	1	0.5	0.5	56.9
advisor	1	0.5	0.5	57.4
Apprentice	1	0.5	0.5	57.8
assistant	1	0.5	0.5	58.3
Assistant	8	3.9	3.9	62.3
Assistant miner	1	0.5	0.5	62.7
Break floor operator	1	0.5	0.5	63.2
Break-floor operator	1	0.5	0.5	63.7
Customer service agent	1	0.5	0.5	64.2
Diesel mech assistant	1	0.5	0.5	64.7
Engineering designer	2	1	1	65.7
Labourer	1	0.5	0.5	66.2
learner	1	0.5	0.5	66.7
Machine operator	1	0.5	0.5	67.2
Manager	1	0.5	0.5	67.6
Metallurgist	2	1	1	68.6
Middle Manager BIPM	1	0.5	0.5	69.1
Miner assistant	1	0.5	0.5	69.6
Miner Assistant	3	1.5	1.5	71.1
Mining assistant	1	0.5	0.5	71.6
Office admin	1	0.5	0.5	72.1
Official	1	0.5	0.5	72.5
Operator	4	2	2	74.5
P.T.O	1	0.5	0.5	75
Portfolio Manager	1	0.5	0.5	75.5
Processor	3	1.5	1.5	77
Project Co-ordinator	1	0.5	0.5	77.5
Project engineer	1	0.5	0.5	77.9
Protective services	2	1	1	78.9
Rigger	1	0.5	0.5	79.4
S.T.O	2	1	1	80.4
Senior Chemist	2	1	1	81.4
Senior Engineer Assistant	1	0.5	0.5	81.9
Senior store person	1	0.5	0.5	82.4
Senior Store person	1	0.5	0.5	82.8
senior tech	1	0.5	0.5	83.3
Senior Technician	2	1	1	84.3
Senior Technician in Netw	1	0.5	0.5	84.8
Snr Supervisor	1	0.5	0.5	85.3
SNR Technician	1	0.5	0.5	85.8
Specialist	2	1	1	86.8
Still busy with my N cours	1	0.5	0.5	87.3
STO	3	1.5	1.5	88.7
Store lady	1	0.5	0.5	89.2
stores	1	0.5	0.5	89.7
Survey assistant	1	0.5	0.5	90.2
t.o	1	0.5	0.5	90.7
T.O	3	1.5	1.5	92.2
T06	1	0.5	0.5	92.6
t11 worker	1	0.5	0.5	93.1
Technical Official	1	0.5	0.5	93.6
technician	3	1.5	1.5	95.1
Technician	3	1.5	1.5	96.6
Technician Electrical	2	1	1	97.5
TO	1	0.5	0.5	98
TO6	2	1	1	99
Works co-ordinator	1	0.5	0.5	99.5
works coordinator	1	0.5	0.5	100
Total	204	100	100	

Table 4.8 Respondents' other roles

When taking a closer look at the respondents' "other roles"; it is clear that the large composition thereof is by the actual employees who are actually operational and are performing the tasks which may in one way or another, require physical strength to carry out. Among others there were apprentices, break-floor operators, diesel mechanic assistants, labourers, machine operators, minor assistants, operators, riggers, senior technicians, survey assistants, technical officials and electrical technicians. This finding blends well with the one above where it is plausible for the respondents to provide a true reflection of their experiences within the premise of the physically demanding jobs.

4.3.9 Related experience in the mining and engineering industry

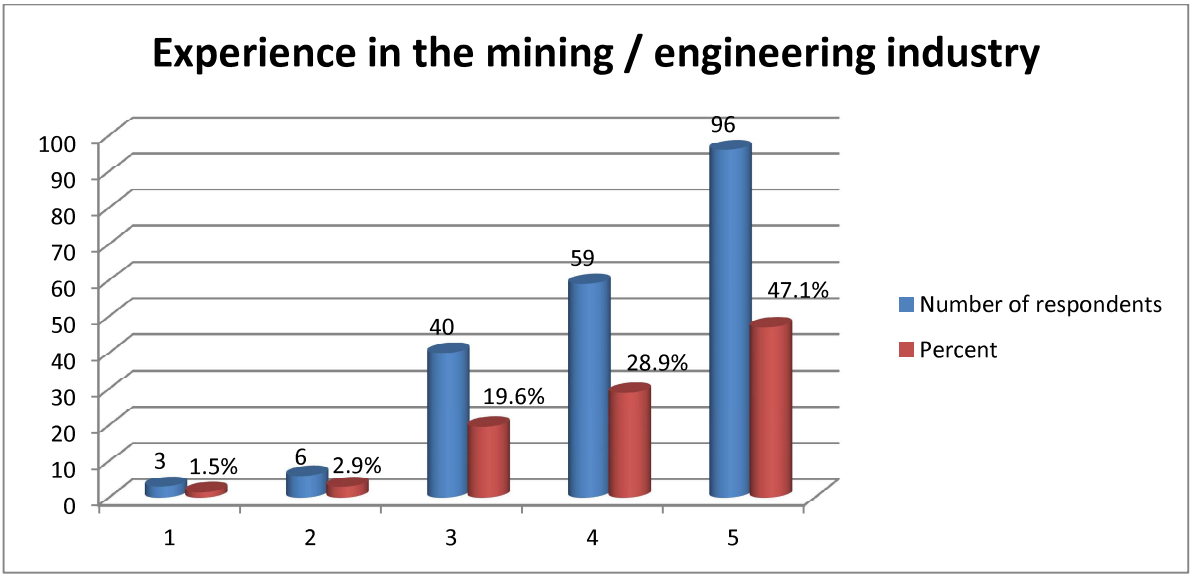


Figure 4.6 Graphical representations of respondents' related experience

Three-quarters of the respondents which is 76.0% of the whole, had been employed for more than 5 years. This implies that respondents had been employed for a while and this is also a useful fact as it indicates more dependable responses from experienced workers. Only a few respondents were 3 years and less in the industry, thus amplifying the authenticity of the responses.

4.3.10 Acquisition of respondents' mining and engineering skills

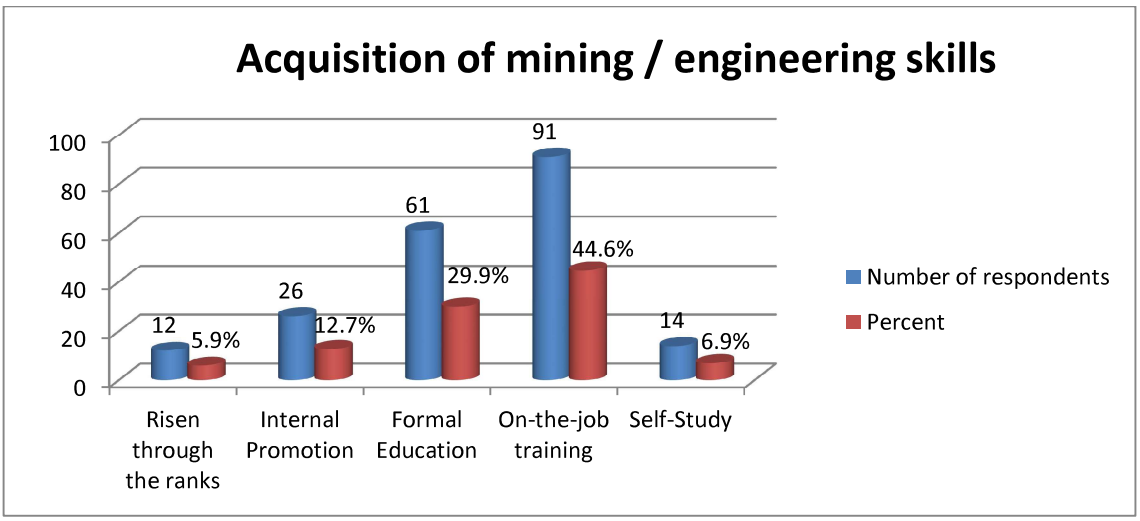


Figure 4.7 Graphical representations of respondents' skill acquisition

It was interesting to see that 45% of the respondents acquired their mining and engineering skills through the "On-the-job training", while the formal education was constituted by 30% of the respondents. The "internal promotions" though not much also showed some contribution by the employer in enhancing and advancing its employees within their organizations. Only a few of the respondents have acquired their skills by self-study and rising through the ranks.

4.3.11 Affiliation to Unions

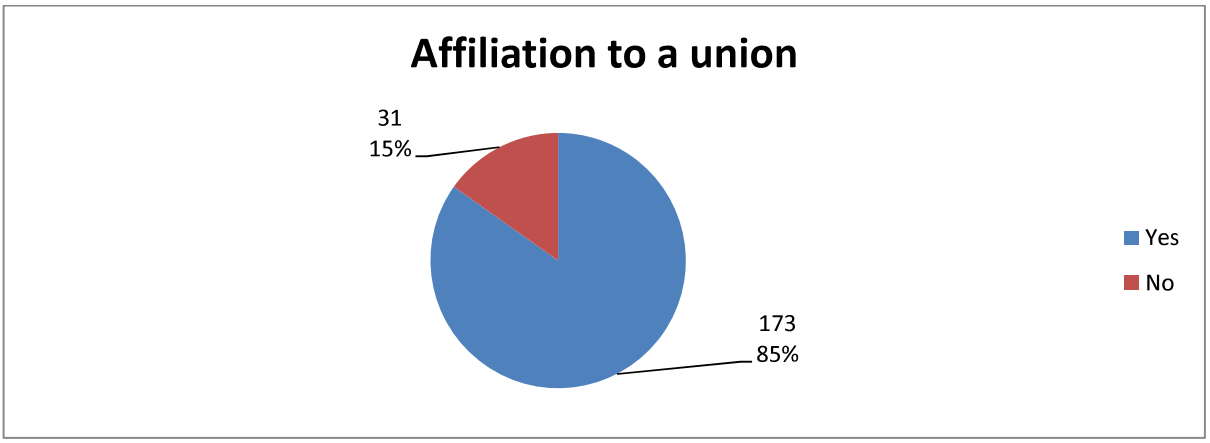


Figure 4.8 Graphical representations of respondents' affiliation to a union

The table below indicates whether respondents were affiliated to a union.

	Respondents	Percentage
Yes	173	84.8
No	31	15.2
Total	204	100
Table 4.9		

84.8% were members of a union, which constitutes the majority of respondents. This statistic clearly illustrates the steadfast movement of the labour unions within the engineering and mining environment within the Rustenburg area. Thus providing comfort regarding employees in the bargaining units; who may be fairly represented for negotiations in the labour market.

4.4 SECTION C - Analysis Section

The following section will analyse the participant's scoring patterns according to each variable on each section. In order to indicate a single category of "Disagree"; where applicable levels of disagreement or negative statements were collapsed. The same process to record the levels of agreement on positive statements was carried out. The results were summarised percentages, which were used for the variables that constitute each presented section, and then further analysis was performed on the results to be in line with the significance of the statements.

4.4.1 Employee Satisfaction

Figure 4.9 Graphical representations of Employee satisfaction

The above graph is a representation of the two questions asked, namely: "Q3.1 - Women development is on top of our agenda", and "Q3.5 - I'm comfortable working for my organisation". For the Employee satisfaction, it is observed that on average, over 65% of the respondents are generally satisfied to work for their specific organisation.

4.4.2 Diversity management

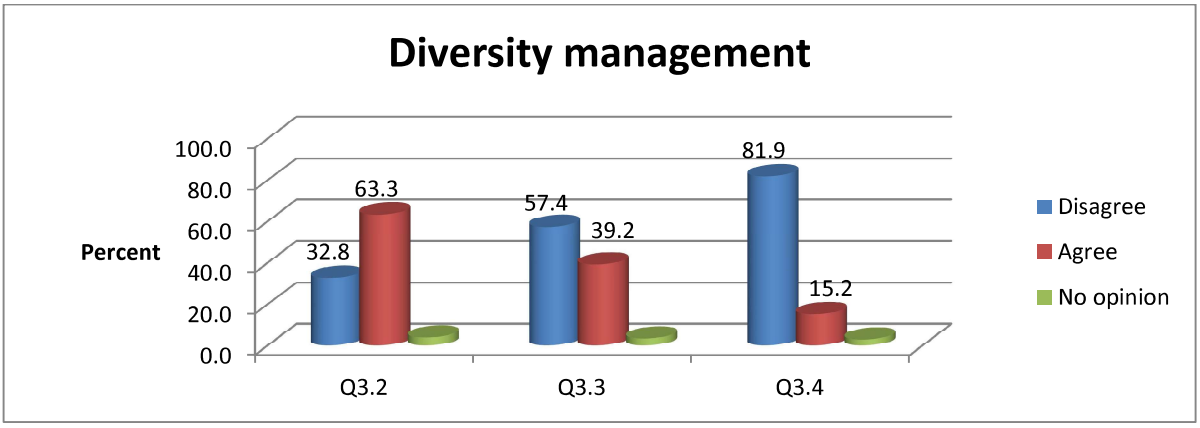


Figure 4.10 Graphical representations on Diversity management

The responses as seen on the Diversity management category: "Q3.2 - Senior management encourages diversity management", here 63% of the respondents claim that management does encourage diversity, yet over 57% percent disagree about being reminded of the importance of women in their business as asked in "Q3.3 - Senior management reminds us about the important contribution that women make in our business".

Over 80% of the respondents disagree on the notion of having a balanced figure regarding gender number as enquired in "Q3.4 - In my organisation we have a balanced number of men and women". Hence the matter of diversity management or lack thereof; depicts incongruity within most organizations.

The patterns from above are observed as follows:

i) Two statements garnered considerably higher levels of agreement, whilst the other levels of agreement were lower and there still were some levels of disagreement observed.

ii) Three statements showed higher levels of disagreement

iii) As shown in the results below; the test for significance of the differences was then undertaken.

For determining whether each statement's scoring patterns differed significantly per option; a chi square test had to be done, in which the null hypothesis suggests that, for one statement at a time, the number of participants that gave a score across each option for each statement are the same. It is stated in the alternate that there is a significant difference between the levels of agreement and disagreement, as shown in the results within the table below. The sig. values (p-values) highlighted have a level of significance less than 0.05, meaning that the distributions were not the same. That is, the variances between the way respondents scored "Agree" and "Disagree"; were significant. Although these statements were quite clear as observed in the scoring patterns, it was imperative that it be shown statistically as seen below.

4.4.3 Employee satisfaction and Diversity management

		Disagree		Agree		No opinion		Chi Square
		Count	Row N %	Count	Row N %	Count	Row N %	p-value
In our organisation women development is on top of our agenda	Q3.1	100	49.00%	92	45.10%	12	5.90%	0.564
In my organisation Senior Management encourages diversity management	Q3.2	67	32.80%	129	63.20%	8	3.90%	0.000
Senior management reminds us about the important contribution that women make in our business	Q3.3	117	57.40%	80	39.20%	7	3.40%	0.008
In my organisation we have a balanced number of men and women	Q3.4	167	81.90%	31	15.20%	6	2.90%	0.000
I am comfortable working for my organisation	Q3.5	24	11.80%	176	86.30%	4	2.00%	0.000

Table 4.10 Employee satisfaction and Diversity management

The outcomes above indicate that although most employees are comfortable working for their organizations and do believe that senior management encourages diversity; the reality is that there are still great disparities when it comes to men and women, regarding their numbers and the recognition thereof.

4.5 Section D - Policies and procedures

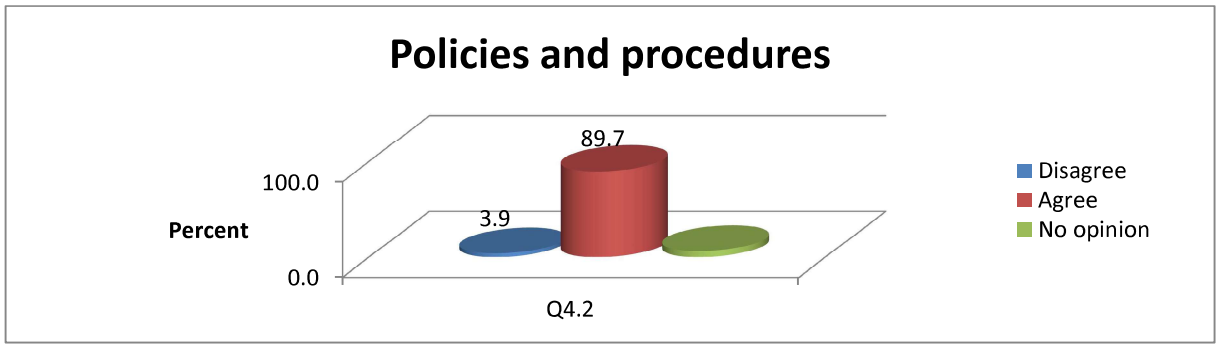


Figure 4.11 Graphical representations on Policies and procedures

The graph above depicts clearly that almost 90% of the respondents agree that their organizations do have policies and procedures in place. The application and understanding thereof is yet to be discovered in the findings of this study. The statements that are yet to be discussed, should clearly stipulate whether the policies and procedures are effective.

4.5.1 Working conditions

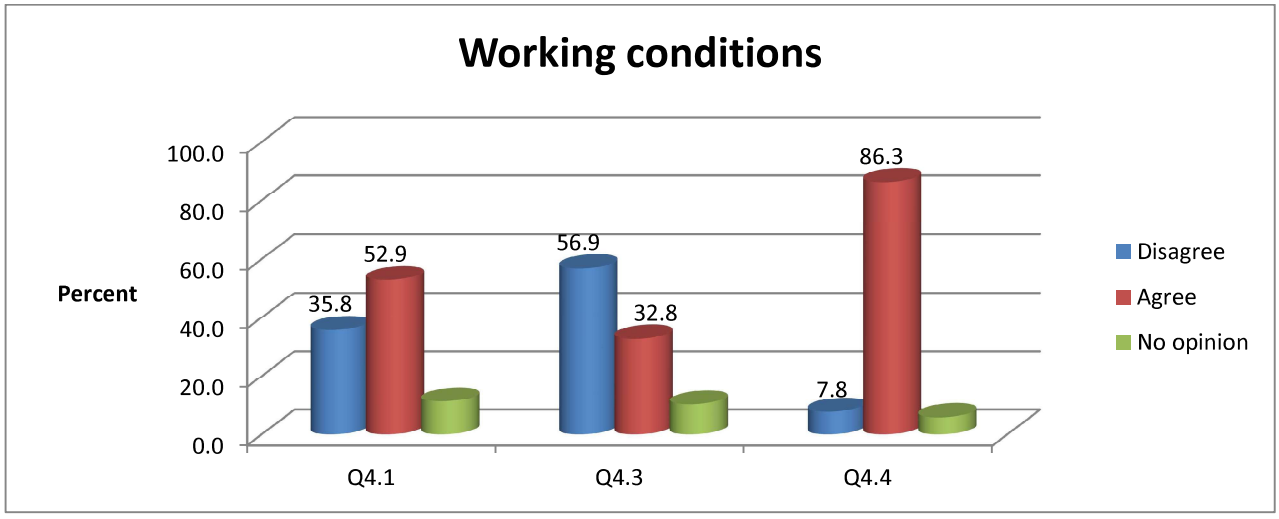


Figure 4.12 Graphical representations on working conditions

The illustrations above graphically represent that 53% of the respondents agree that relevant changes have been made to accommodate women, as asked in Q4.1, and in Q4.14 - 86% of respondents fully agree that women that are pregnant are moved to work in non-hazardous conditions. Contrary to the former; - in Q4.3 – 57% of the respondents' dispute that provision for personal protective equipment that is specifically designed for women, is in place.

4.5.2 Policies, procedures and working conditions

		Disagree		Agree		No opinion		Chi Square
		Count	Row N %	Count	Row N %	Count	Row N %	p-value
In my organisation relevant changes have been made to accommodate women	Q4.1	73	35.80%	108	52.90%	23	11.30%	0.009
In my organisation there is a sexual and physical harassment policy that ensures the safety of women	Q4.2	8	3.90%	183	89.70%	13	6.40%	0.000
In my organisation we have personal protective equipment that is specifically designed for women	Q4.3	116	56.90%	67	32.80%	21	10.30%	0.000
Women that are pregnant are moved to work in non-hazardous conditions	Q4.4	16	7.80%	176	86.30%	12	5.90%	0.000

Table 4.11 Policies, procedures and working conditions

The statements above may need depth in the explanation of how the policies and procedures are applied in terms of personal protection towards women in general. As it is evident that although some measures are put in place to ensure safety of women, this may not be executed entirely as the respondents clearly disagree that protective clothing and equipment is designed specifically for women's needs.

Taking into account the statements above, which show disarray in what the requirements are and what the actual state is in the workplace, insinuates a certain discord around the effectiveness of policies and procedures in enhancing the working conditions, especially of women in physically demanding jobs.

4.6 Section E - Leadership commitment in employee wellbeing

4.6.1 Leadership commitment in employee safety

Figure 4.13 Graphical representations on Leadership commitment

The questionnaire prompted the respondents to give their take on leadership commitment; and on Q5.1 "My Manager supports women in our department", 59% of the respondents agree that indeed management supports women. Also in Q5.6 "In my organisation the managers take into account women's specific challenges in allocating work (e.g. during periods or post pregnancy)", there are 73% of respondents who agree that efforts are taken by management to accommodate women with special needs.

It was however observed that in Q5.3 "In my organisation leadership supports the acquisition of new skills irrespective of gender.", there is not much commitment by management to be gender sensitive when acquiring new skills. 57% of the respondents seem not to be convinced about leadership's commitment in this regard.

4.6.2 Development

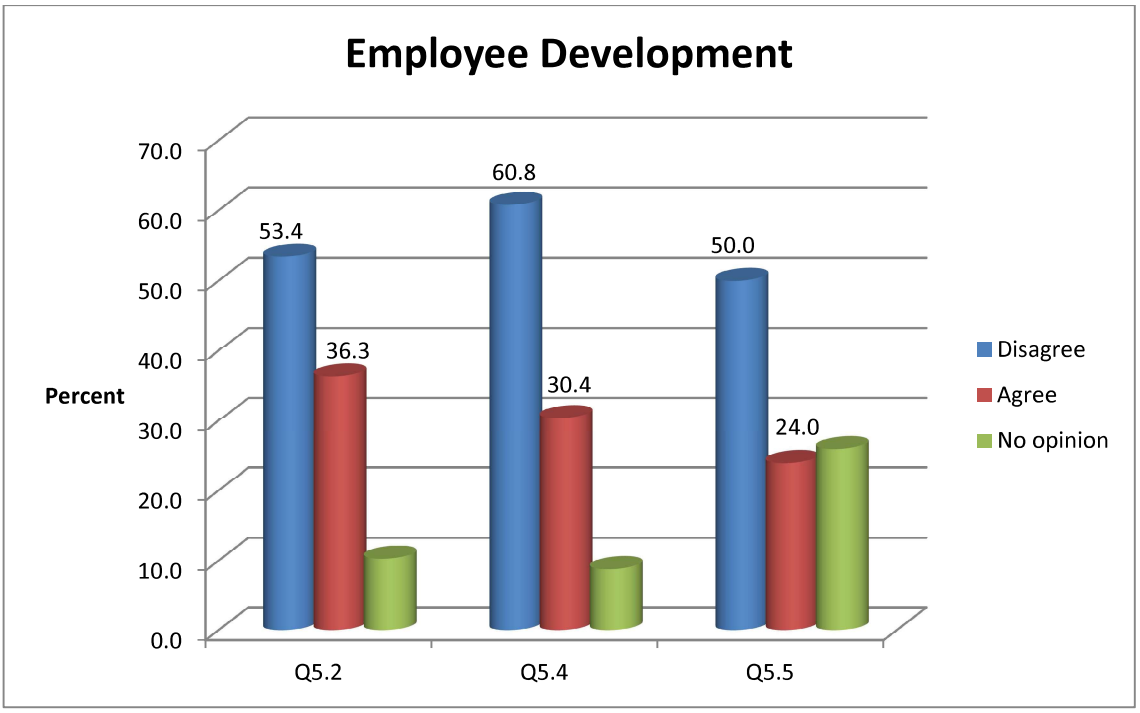


Figure 4.14 Graphical representations on Employee Development

When it comes to the development of women in physically demanding jobs Q5.2 – "In my organisation there are programmes that addresses the skills gap between women and men", results showed that 53% of the respondents disagree with the question of there being enough programmes to get women on par with their male counterparts when it comes to skills development.

A huge number of respondents disagree with Q5.4 that leadership involves women employees in decision making processes, this may concur the preceding finding of lack when addressing skill development. In the same breath, 50% of respondents in Q5.5 disagree on the matter of leadership keeping track of women's career progression; all these findings demonstrate a certain trend on the development of women in organizations.

4.6.3 Leadership commitment on safety and employee development

		Disagree		Agree		No opinion		Chi Square
		Count	Row N %	Count	Row N %	Count	Row N %	p-value
My Manager supports women in our department	Q5.1	68	33.30%	121	59.30%	15	7.40%	0.000
In my organisation there are programmes that addresses the skills gap between women and men	Q5.2	109	53.40%	74	36.30%	21	10.30%	0.010
In my organisation leadership supports the acquisition of new skills irrespective of gender	Q5.3	117	57.40%	77	37.70%	10	4.90%	0.004
In my organisation leadership involves women employees in decision making	Q5.4	124	60.80%	62	30.40%	18	8.80%	0.000
My managers and leadership keep track of women's career progression	Q5.5	102	50.00%	49	24.00%	53	26.00%	0.000
In my organisation the managers takes into account of women's specific challenges in allocating work (e.g. during periods or post pregnancy)	Q5.6	39	19.10%	148	72.50%	17	8.30%	0.000

Table 4.12 Leadership commitment on safety and employee development

On leadership commitment towards safety of employees it is witnessed that just enough is done to ensure bare minimum adherence and compliance, where leadership is seen to provide just sufficient protective equipment to get by. However, there is more that can be done in improving the safety aspects for women in physically demanding jobs. For the development of women in the acquisition of skills, they may need to, among others be empowered to become decision makers. The surveys were clear that there is way too much that leadership may still have to do in improving women's development. The relationship between leadership commitment on safety and employee development is quite significant in attaining highly productive women in physically demanding jobs.

4.7 Conclusion

In this chapter; reliability statistics and factor analysis was discussed, together with the importance of factor analysis, methods assisted with data interpretation as presented in sections A and B which has depicted trends on respondents behavioural patterns based on the biographical data, age of respondent's, respondent's gender, their designations, education levels, their union affiliations as well as their related working experience in the mining and engineering industry. Whilst analysing employee satisfaction and diversity management in section D; working conditions, policies and procedures, leadership commitment in employee wellbeing, safety, and development were thoroughly investigated.

CHAPTER 5

INTERPRETATION AND DISCUSSION OF THE PRIMARY DATA

5.1 Introduction

The previous chapter focused on plotting out the data collected whereby the respondent's patterns of answers were plotted either in tabular or graphical format. The exercise led to the data grouping according to questionnaire sections which led to certain configurations whereby data could be interpreted in certain groupings. The following were discussed: Employee Satisfaction, Diversity management, Policies and procedures, Working conditions, Leadership commitment towards safety and Employee development.

In this chapter, the hypothesis testing, the chi-square tests, and correlations will be explored in order to discover the relationship amongst the statements asked and the relationship amongst the responses given which we will affirm or disapprove. The research objectives will go through analysis in order to determine the effect and patterns as they are interpreted according to the findings revealed by the research.

5.2 Chi square test results

In determining whether a statistically significant relationship between the variables existed, a second Chi square test had to be performed. In this survey results, even though there is an indication of an association by alternate hypothesis, the null hypothesis states otherwise, claiming no association between the two. In the tables, is a summary of the results from the second chi square tests, whereby, there was no significant relationship on all values with p-values of more than 0.05. The differences in the number of responses between agreement and disagreement are significant for all statements.

The p-value between "Gender" and "In our organisation women development is on top of our agenda" is 0.010. This depicts a significant relationship realised between the variables as it is observed on those which have p-values less than 0.05, meaning that gender predisposition of the participant has indeed played a quite an important role in determining how participants viewed the organisation's approach towards women development.

From a Gender perspective: the manager's show support of women in the organisations by making relevant organisational changes to accommodate women; with pregnant women being accommodated by being moved to work in non-hazardous conditions. The p-values of 0.0038 and less are observed, thus citing quite a substantial association among the issues as is specifically viewed from gender's perspective, which in this case is from women and is somewhat negative.

With regard to the need for senior management's need to emphasise the importance of women; the connection between employee's designations in Patterson grading and the presence of the sexual and physical harassment policy in ensuring the safety of women, had a lot do with the respondents' position in the business. With the p-values ranging between 0.00 and 0.004 it was evident that the higher the rank the respondent occupied, the more comfortable they were with how important they felt about management's commitment in showing the importance of women.

Dezso, Ross and Uribe (2013; 5) agree that from an econometric perspective, an imperative but inconspicuous change in the culture of the company and their policies as tabled by the human resources, carried weight by having even just a single woman as part of the top management team. This could be associated with efforts to make the environment more favourable to women, as this woman representative can advocate for women's needs, like how to be treated during their periods, unlike how it would be if there were no women representatives at all in the top management team. This means that some sort of reverse causality could be experienced with the presence of a woman as part of the top management, who tend to serve as a proxy in favour of women employees.

Current roles occupied by respondents depicted a great interrelation amongst the following questions: leadership support for the acquisition of new skills irrespective of gender, leadership involvement for promoting women employees in decision making, and senior management's compulsion in encouraging diversity management. The relationship is steadily in the bandwidth of p-values between 0.008 and 0.026. It is appreciated that various employees will show their preferences variably, however bias was observed in that; the higher the ranking of women, the more they felt less involved in women employees making decisions, in acquisition of new skills as women, and in management encouraging diversity. Research thus reflected a decreased level of satisfaction among female employees occupying higher positions.

P-values of 0.007 and less were observed between the respondent's highest educational qualifications and whether the organisations have a balanced number of men and women, on the question of how respondents acquired their mining or engineering skills and on employees being comfortable working for their organisations. Being affiliated to a union relative to the organisational aptitude in implementing programmes that addresses the skills gap between women and men, together with the manager's pledge in accommodating women's specific needs at work at p-values less than 0.002; was quite aligned in that most respondents who are affiliated in the union seem to be in disagreement that there is any quantifiable progress made regarding skills gap and accommodating women's specific needs.

5.3 Correlations

As demonstrated, the correlation value between "In our organisation women development is on top of our agenda" and "In my organisation we have personal protective equipment that is specifically designed for women" is 0.320. This result showed proportionality which is directly related. Participants have indicated that the more emphasis on women development, the more the organisation would develop personal protective equipment for women, and vice versa. The same applies to all other statements in the table.

Martin and Barnard (2013:4) stated that biased infrastructure, inadequate resources and unfavourable policies were some of the exclusive challenges that women dealt with, in male-dominated occupations. Their research findings showed that none of the participants were cognisant of any practices or policies relevant or intended at improving women's accommodation and incorporation in the workplace.

The women believed instead that most of the existing resources, infrastructures and policies were only beneficial to the male employees. Participants from the mining industry indicated how they experienced a great deal of embarrassment and personal discomfort, especially due to their noted battle with acquiring the appropriate basic facilities and resources, together with personal protective equipment which is suitable for women from the employers.

Bivariate correlation was also implemented on the collected (ordinal) data. Patterns were indicated from the results which were found in the appendix as depicted below. Negative values indicate inverse relationship whilst positive values are an indication of a relationship which is directly proportional between the variables. All significant relationships are indicated below. The results show patterns; an inverse relationship is indicated by a negative value and positive values indicate a directly proportional relationship between the variables. The significant relationships are discussed in the table below.

5.3.1 Correlation table

	Primary statement	Relative Statement	Correlation values
1	In our organisation women development is on top of our agenda	In my organisation we have personal protective equipment that is specifically designed for women	0.32
2	In my organisation Senior Management encourages diversity management	In my organisation leadership supports the acquisition of new skills irrespective of gender	0.321
3	Senior management reminds us about the important contribution that women make in our business	My Manager supports women in our department	0.393
4	In my organisation we have a balanced number of men and women	In my organisation leadership involves women employees in decision making	0.34
5	I am comfortable working for my organisation	Women that are pregnant are moved to work in non-hazardous conditions	0.33
6	In my organisation relevant changes have been made to accommodate women	In my organisation there are programmes that addresses the skills gap between women and men	0.248
7	In my organisation there is a sexual and physical harassment policy that ensures the safety of women	Women that are pregnant are moved to work in non-hazardous conditions	0.308
8	In my organisation we have personal protective equipment that is specifically designed for women	In my organisation the managers takes into account of women's specific challenges in allocating work (e.g. during periods or post pregnancy)	0.212
9	Women that are pregnant are moved to work in non-hazardous conditions	In my organisation the managers takes into account of women's specific challenges in allocating work (e.g. during periods or post pregnancy)	0.229
10	My Manager supports women in our department	In my organisation the managers takes into account of women's specific challenges in allocating work (e.g. during periods or post pregnancy)	0.254
11	In my organisation there are programmes that addresses the skills gap between women and men	My managers and leadership keep track of women's career progression	0.26
12	In my organisation leadership supports the acquisition of new skills irrespective of gender	My managers and leadership keep track of women's career progression	0.189
13	In my organisation leadership involves women employees in decision making	My managers and leadership keep track of women's career progression	0.301
14	My managers and leadership keep track of women's career progression	My managers and leadership keep track of women's career progression	0.347

Table 5.1 Correlation table

5.4 Hypothesis Testing

The traditional approach to reporting a result requires a statement of statistical significance. A p-value is generated from a test statistic. A significant result is indicated with a p-value of less than 0.05. All values with p-values of more than 0.05 therefore do not have a significant relationship for the two statements they may be matched with. This substantially means that those results were not utilised for hypothesis testing in this study.

The tables below show the results as given by respondents on the question of gender in relation to other questions. Highlighted are the percentages of the respondents according to their gender who either agree or disagree with the statements below to which they have responded.

1. **Table 5.2 In our organization women development is on top of our agenda * Gender Cross tabulation**

			Gender		Total
			Male	Female	
	Disagree	Count	37	48	100
		%	37.8%	45.3%	49.0%
	Agree	Count	35	31	92
		%	35.7%	29.2%	45.1%
	No opinion	Count	6	6	12
		%	6.1%	5.7%	5.9%
Total		Count	98	106	204
		%	100.0%	100.0%	100.0%

49% of the respondents disagreed on the issue of women development being on top of the organisational agenda, the following statement corresponds with the respondents view: "A quasi experimental study was conducted to investigate hiring decisions of equally competent men and women aspiring to an executive management position. Findings in this study had male and female participants. Perceived experienced male applicants were more favoured to being promoted to the executive management position than experienced female applicants. The findings suggested that on a conscious level there was an attempt to be objective in the assessment of women but in hiring decisions an unconscious bias was reflected.

Consequently, the behaviour that is not gender appropriate, in line with traditional gender roles is especially problematic for women relative to men even when the assessor is a woman. Women who lack communality and behave in a manner that does not conform to culturally prescribed gender roles are likely to face discrimination during recruitment. The subtle manifestation of prejudicial bias was observed which discouraged highly skilled women from actualizing their potential by ceasing to strive to more challenging positions in the workplace" (Akingbade, 2010:3265).

2.

Table 5.3 In my organization Senior Management encourages diversity management * Gender Cross tabulation

			Gender		Total
			Male	Female	
	Disagree	Count	21	39	67
		%	21.4%	36.8%	32.8%
	Agree	Count	64	53	129
		%	65.3%	50.0%	63.3%
	No opinion	Count	5	3	8
		%	5.1%	2.8%	3.9%
Total		Count	98	106	204
		%	100.0%	100.0%	100.0%

"Having a woman on the top management team may serve as a catalyst for change that increases the possibility of additional women joining her on the top management team, and women who rise together would be expected to enhance each other's chances of success within the organization. Moreover, as the number of women in senior positions rises, there could well be greater internal pressure to accommodate maternity leave, flexible work schedules, and alternative career paths, which are differentially important to women" (Dezso, Ross, and Uribe 2013:6). The statement as quoted above, harmonizes with the 63% of participants who believes that in their organization Senior Management encourages diversity.

Management from as low as supervisory level, make it difficult for women to display their important contribution within the business, thus 57% of respondents disagree. Several researchers; De Pater, Van Vianen, and Bechtoldt (2010; 433), have submitted that female employees are given a small amount of challenging duties as compared to their male counter parts. Female workers in their jobs were seen to be having lesser challenging encounters when compared to their male counterparts; as it is according to the investigation's results.

In addition, the trigger behind the gender based differences in the task allocation emanated from the discrepancy in the task assignment whereby more challenging tasks were assigned to the male than to female subordinates. This suggests that the decisions for the task allocation by the supervisors were not gender-blind and could easily result in women having fewer challenging job experiences than men. Such behaviour could subsequently, leave women feeling less important.

3.

Table 5.4 Senior management reminds us about the important contribution that women make in our business * Gender Cross tabulation

			Gender		Total
			Male	Female	
	Disagree	Count	41	55	117
		%	41.8%	51.9%	57.4%
	Agree	Count	37	28	80
		%	37.8%	26.4%	39.2%
	No opinion	Count	5	2	7
		%	5.1%	1.9%	3.4%
Total		Count	98	106	204
		%	100.0%	100.0%	100.0%

4.

Table 5.5 I am comfortable working for my organization * Gender Cross tabulation

			Gender		Total
			Male	Female	
	Disagree	Count	5	12	24
		%	5.1%	11.3%	11.8%
	Agree	Count	52	62	176
		%	53.1%	58.5%	86.2%
	No opinion	Count	1	3	4
		%	1.0%	2.8%	2.0%
Total		Count	98	106	204
		%	100.0%	100.0%	100.0%

Some substantial differences due to gender in the workplace exist on a number of issues. Naturally, more than men, women possess resilient positive feelings with regard to their levels of job satisfaction. Women felt that their career anticipations were achieved, and when asked they indicated that they would opt to follow the same career path again, and would definitely endorse the career to others. (Bowen, Cattell and Distiller, 2008:20). The former statement thus concurs with the findings herein that 86% women are comfortable working for their organization.

5.

Table 5.6 In my organization relevant changes have been made to accommodate women * Gender Cross tabulation

			Gender		Total
			Male	Female	
	Disagree	Count	27	42	73
		%	27.6%	39.6%	35.8%
	Agree	Count	44	43	108
		%	44.9%	40.6%	52.9%
	No opinion	Count	9	14	23
		%	9.2%	13.2%	11.3%
Total		Count	98	106	204
		%	100.0%	100.0%	100.0%

53 % of respondents agreed that relevant changes have been put in place in order to accommodate women in physically demanding jobs.

Dezso, Ross, and Uribe (2013:6), indicated that potential barriers to the managerial advancement by women could be mitigated by effecting some changes. Increased positive attitude toward the competency of women in general can be attained if women holding top management positions showcase their proficient leadership, thus giving confidence that women are capable. If leadership is carried out well; discrimination against women regarding uncertainty about their skills would see reduced statistics, thus dropping the existing hurdles towards women advancement imposed by other women within the same organization, be it on the same level or below.

6.

Table 5.7 In my organization we have personal protective equipment that is specifically designed for women * Gender Cross tabulation

			Gender		Total
			Male	Female	
	Disagree	Count	46	51	116
		%	46.9%	48.1%	56.9%
	Agree	Count	25	25	67
		%	25.5%	23.6%	32.8%
	No opinion	Count	12	9	21
		%	12.2%	8.5%	10.3%
Total		Count	98	106	204
		%	100.0%	100.0%	100.0%

Martin et al (2013:4) further revealed in their grounded theory analysis that there were irrelevant policies, biased infrastructure, and inadequate resources in the work place. The study also revealed that there were stereotypes that existed regarding gender roles and expectations that relate to women, and lack of real transformation was evident due to prejudices and resistance from male employees.

The proposed coping strategies were among others: appreciation of feminine advantage, adopting male characteristics, mentorship, taking care of woman's unique physical needs, and encouraging work-life balance. These were advisable in order to improve the current working conditions of the women working in physically demanding jobs. The statements corroborate with the respondents feedback, whereby 57% of them disagreed with having personal protective equipment that is specifically designed for women.

7.

Table 5.8 In my organization there are programmes that addresses the skills gap between women and men * Gender Cross tabulation

			Gender		Total
			Male	Female	
	Disagree	Count	48	46	109
		%	49.0%	43.4%	53.4%
	Agree	Count	29	34	74
		%	29.6%	32.1%	36.3%
	No opinion	Count	12	9	21
		%	12.2%	8.5%	10.3%
Total		Count	98	106	204
		%	100.0%	100.0%	100.0%

Bobbitt-Zeher (2011:786) quantified that in the analysis of real work settings, mere observations across diversity clearly demonstrates the structural contexts and cultural groundwork within which discrimination occurred. The analysis has shown predictable ways in which gender stereotyping has been associated with workplaces gender configuration in relation to the policies of the organization, mostly due to collaborative dynamics of liberal policy application, which subsequently lead to discrimination. Thus the findings portray the importance of structural, cultural, and shared influences regarding gender discrimination.

An increasingly common trend of working long hours i.e. being overworked; propagates gender discrimination in the work place. While overwork is an anticipated norm in most male predominant work environments, for female employees specifically those who have children, they find themselves being on the disadvantaged side because they are less able to meet this expectation due to family demands to which their time is subject, than it is for men.

These factors in turn, increase the rate at which mothers are departing from work environments which are mostly male predominant, thereby emphasizing the current segregation in occupations, and thus not addressing the skills gap, instead causing the gap to become wider and concurring with respondents' feedback where 53% of respondents disagreed on the point where it is said: "there are not sufficient programmes that addresses the skills gap between women and men" (Cha, 2013).

8.

Table 5.9 In my organization leadership involves women employees in decision making * Gender Cross tabulation

			Gender		Total
			Male	Female	
	Disagree	Count	49	61	124
		%	50.0%	57.5%	60.8%
	Agree	Count	24	23	62
		%	24.5%	21.7%	30.4%
	No opinion	Count	9	9	18
		%	9.2%	8.5%	8.8%
Total		Count	98	106	204
		%	100.0%	100.0%	100.0%

60% of the respondents disagree with the statement: "In my organization, leadership involves women employees in decision making". Bowen et al (2008: 21) sense that: "Highly significant differences on the basis of race arise over issues of : being subjected to greater supervision because of race, not being allowed to contribute meaningfully to the decision-making process, viewing PDI status as a valid basis for promotion, seeing race representation in the profession as important in combating discrimination at work. The results provide valuable indicators for how the quantity surveying firms can create a more conducive work environment for professional staff, particularly females."

9.

Table 5.10 My managers and leadership keep track of women's career progression * Gender Cross tabulation

			Gender		Total
			Male	Female	
	Disagree	Count	35	54	102
		%	35.7%	50.9%	50.0%
	Agree	Count	20	17	49
		%	20.4%	16.0%	24.0%
	No opinion	Count	34	19	53
		%	34.7%	17.9%	26.0%
Total		Count	98	106	204
		%	100.0%	100.0%	100.0%

Chovwen (2007:70), states that personal and organizational factors possess a negative influence towards women's career growth, further pointing out that subtle segregation articulated in a form of marginalization and preconceived ideas that women are incompetent; signified lack of acceptance. Apparent lack of job gratification was inclined to low self-confidence which was due to lack of support; further evidence on findings shows that the antagonistic environment of male dominated occupations renders it difficult for women to excel and advance, negatively affecting their skill acquisition, thus stifling their growth. Thus, 50% of the respondents disagrees that leadership keeps track of women's career progression.

10.

Table 5.11 In our organization women development is on top of our agenda * Age Cross tabulation

			Age				Total
			21 - 30	31 - 40	41 - 50	51 - 60	
	Disagree	Count	25	34	19	7	100
		%	50.0%	39.1%	39.6%	36.8%	49.0%
	Agree	Count	16	28	17	5	92
		%	32.0%	32.2%	35.4%	26.3%	45.1%
	No opinion	Count	2	5	4	1	12
		%	4.0%	5.7%	8.3%	5.3%	5.9%
Total		Count	50	87	48	19	204
		%	100.0%	100.0%	100.0%	100.0%	100.0%

Women development in companies is seen to be a daunting exercise hence 49% of respondents do not believe that the leadership seem not to give priority to this petition. Chovwen (2007:71) in his research has examined the influence of mentoring on the growth of women in the professional fields. The results specified that although protégé / mentoring rapport was not officially constituted in most organizations, participants with mentors were perceived to have greater opportunities to higher growth than those without mentors and that factor had a significant impact to a protégé's future growth. Clearly, organizations have not formalized plans on how to develop women for them to advance to higher levels.

5.5 Conclusion

In conclusion; above is the portrayal of how the respondents indicated their take on issues that personally affect them in the work environment. The tables from 5.1 to 5.9 represent the views from the gender perspective while table 5.10 represents the views from the age perspective. There is a lot observed above, the frequencies within the tables are of great interest in the enhancement of my arguments to follow.

CHAPTER 6

CONCLUSIONS AND RECOMMENDATIONS

6.1 Introduction

This chapter succeeds the one where thorough analysis on the received data was performed, many prominent tools were utilised to get the best interpretation thereof. The exercise assisted a great deal in coming to conclusions based solely on the data analysed. It is therefore in this chapter that the findings from the previous ones will guide the discussions towards conclusions and recommendations of this study.

The research topic "Encounters of women in physically demanding jobs within Rustenburg" is a multi-pronged subject matter; whereby the study entailed a number of facets which will weigh in on the conclusions and recommendations. The hypothesis results as expressed in the chapter above are given below with the inclination in which each response was given.

6.1.1) "In our organisation women development is on top of our agenda" - **49% Disagree.**
6.1.2) "In my organisation Senior Management encourages diversity management" - **63,3 % Agree.**
6.1.3) "Senior management reminds us about the important contribution that women make in our business" - **57,4% Disagree.**
6.1.4) "I am comfortable working for my organisation" - **86,2% Agree.**
6.1.5) "In my organisation relevant changes have been made to accommodate women" - **52,9% Agree.**
6.1.6) "In my organisation we have personal protective equipment that is specifically designed for women" - **56,9% Disagree.**
6.1.7) "In my organisation there are programmes that addresses the skills gap between women and men" - **53,4% Disagree.**
6.1.8) "In my organisation leadership involves women employees in decision making" - **60,8% Disagree.**

6.1.9) "My managers and leadership keep track of women's career progression" - **50% Disagree.**

6.1.10) Across the entire age groups - "In our organisation women development is on top of our agenda" - **49% Disagree.**

The above statistics provide a synopsis of how the tendencies prevalent in the environment of the physically demanding jobs. On average, a percentage above 50 % disagree on a number of factors; i.e.

i) women development
ii) important contribution women make within the business
iii) women specific personal protective equipment
iv) programmes addressing the skills gap between men and women
v) women involvement in decision making
vi) leadership's care for women's career progression.

These figures are despite the fact that on a few factors; responses were positive towards the following:

i) Senior leadership encouraging diversity management,
ii) Employees across all genders being comfortable working for their organisation,
iii) Relevant changes being made to accommodate women.

Having observed the above; it is established in the study that little or no effort is taken by leadership to develop women; fellow colleagues and leadership disregard the contribution women make in the organisations. Nor is there much effort to create programmes addressing the skills gap between men and women, resulting in the absenteeism of leadership in women's career progression. It is also witnessed that women- specific, personal protective equipment is not provided despite the need thereof and it is also evident that women's inputs towards decision making are disregarded.

6.2 Research Objectives

The study is informed by the research objectives within which the purpose of the research is reliant. The premise of the objectives is to solely investigate the views and perception of the respondents so that, in the end, a well-researched topic may provide answers, responses, conclusions and recommendations as well as providing a lead into the future researches that may be undertaken by others.

The objectives are as follows:

I) To establish if the current networking arrangements and reward systems which are sex-specific perpetuated the lower positions women occupy in their professional careers.

II) To establish how competences which are regarded as key technical and were formerly constructed to accommodate males, can include females by using emerging technological innovation.

III) To establish if the effect of prejudice, bias and discrimination hinders the career growth of women in the workplace in question.

IV) To establish if the women in male dominated industries feel threatened by negative stereotypes alleging their intellectual and physical inferiority.

V) To establish if the organisation's leadership embraces diversity in order to improve talents.

6.2.1 Classification of objectives

In light of the above findings, it was found that most of the respondents are not in agreement with the key dialogue that invigorates the very discussions for the topic regarding the effect of encounters experienced by women employed in physically demanding jobs within Rustenburg industries, mining and engineering companies. The following are sub-topics which funnelled the objectives such that the six paramount ideals which were explored are expressed.

6.2.1.1) Policies and procedures: to establish if the effect of prejudice, bias and discrimination hinders the career growth of women in their workplace.

6.2.1.2) Diversity management: to establish if the women in male dominated industries feel threatened by negative stereotypes alleging their intellectual and physical inferiority.

6.2.1.3) Working conditions : to establish how competences which are regarded as key technical and formerly constructed to accommodate males can include females by using emerging technological innovation.

6.2.1.4) Leadership commitment: to establish if the organisation's leadership embrace diversity in order to improve talents.

6.2.1.5) Development: to establish if the current networking arrangements and reward systems which are sex-specific perpetuated the lower positions that women occupy in their professional careers.

6.2.1.6) Employee recognition: to determine the general impression of employees regarding the value of their contribution in the work environment.

The table below depicts clearly the questions relating to the objectives and how the respondents gave feedback on each one of them. They are therefore used as the point of reference with regard to the general perception on the challenges faced by women employed in physically demanding jobs within Rustenburg industries, mining and engineering companies. The discussions on the topic gave an insight into how employers and other employees view women in their companies. This also directed dialogue towards the possible solutions on some of the challenges which are attitude based, hence reliant on individuals to work on their own personal attributes in achieving the best outcomes in building good relationships in the work place, thus improving production and employee satisfaction.

6.3 Results on the Research objectives

		Research objective - Results												
		Strongly disagree		Disagree		Agree		Strongly Agree		No opinion		Total		
		Count	%	Count	%	Count	%	Count	%	Count	%	Count	%	
A Policies and procedures	In my organisation there is a sexual and physical harassment policy that ensures the safety of women	6	2.9%	2	1.0%	110	53.9%	73	35.8%	13	6.4%	204	100.0%	90% Agree
B Diversity management	In my organisation Senior Management encourages diversity management	7	3.4%	60	32.8%	117	57.4%	12	5.9%	8	3.9%	204	100.0%	63,3% Agree
C Working conditions	In my organisation relevant changes have been made to accommodate women	4	2.0%	69	33.8%	87	42.6%	21	10.3%	23	11.3%	204	100.0%	53% Agree
D Leadership commitment to foster balance	In my organisation we have a balanced number of men and women	69	33.8%	98	48.0%	26	12.7%	5	2.5%	6	2.9%	204	100.0%	82% Disagree
E Development	In my organisation leadership supports the acquisition of new skills irrespective of gender	12	5.9%	105	51.5%	62	30.4%	15	7.4%	10	4.9%	204	100.0%	57% Disagree
F Employee recogntion	In my organisation leadership involves women employees in decision making	14	6.9%	110	53.9%	47	23.0%	15	7.4%	18	8.8%	204	100.0%	60,8 % Disagree

Table 6.1 Research objective result table

According to the dipstick results in the table above, it becomes clear that not everything is based on pessimism and despondency; there are indeed some good strides that were made in an endeavour by management to accommodate women and some of their needs in the work place. These results though will act as a guideline in addressing both the good and the unappealing facts linked to the study in order to arrive at desired solutions. Consequent to the above, the conclusions of the research are succeeded by the recommendations.

6.4 Research Discussions

To enter the mining and engineering job market for a woman has proven to remain difficult as it still requires physically strong, mentally prepared and willing personalities.

This is because a woman not possessing any of those qualities has a slim chance of pulling through the medical and physical assessments, which threatens their chances of entering the work place. These challenges are therefore reducing the already insignificant number of women in these fields who, once entrenched in these working environments, struggle to progress and cultivate in their careers.

Although most respondents acknowledged the availability of policies and procedures; the statement above is a direct result of impotent policies and procedures as implemented in organizations in the alleviation of prejudice, bias and discrimination that hinder the career growth of women in the workplace. It sufficed to say; even with good policies and procedures, lack of consistent implementation or wrong application of the policies still bear no fruit in achieving its desired intentions, especially in the betterment of women in the physically demanding jobs.

Regarding diversity management, there seemed to be quite a significant positivity by the respondents on that point, it however conflicted with other related objectives. It is a known fact that gender diversification and transformation initiatives go together, according to the government requirements, although this was proven otherwise, based on the research. It is therefore imperative that if an organization's diversity policies are effective, transformation initiatives and active involvement of leadership in women's career growth becomes evident, failure which; the status quo will remain whereby negative stereotypes will continue to plague organizations alleging women's intellectual and physical inferiority.

Even though most respondents agreed on being satisfied about their working conditions; this was mainly due to the relevant changes being made to accommodate women. These responses depicted the lack of commitment for organizations to invest in the ergonomic requirements of their female workers, instead they wait until a need arises and reacts to it. An example is women who are pregnant being moved to non-hazardous environments which are not at all in line with what they are employed for: this shows that not much is being done to adopt technological innovation; in order to ensure that key technical competences previously constructed as masculine can accommodate women's physique and their physiological needs.

This study showed that 57% of the respondents disagree with the statement regarding the leadership's commitment towards the development of women in the physically demanding jobs. These findings concede with the study which was funded by the National Union of Mineworkers (NUM) and the Mineworkers Investment Trust who found that the majority of women in these industries are "general workers" as opposed to holding managerial and professional positions. It described general workers as assistant back washers, cashiers, car washers, and belt cleaners who held no influence in the sectors (Faku, 2016:6).

Leadership commitment to foster balance was found wanting as 86% of the respondents dismally objected that management had little or no intention to employ a greater number of women as stipulated by the South African government. Concurring with these facts; and declared by Faku (2016:6), a Johannesburg research into employment trends in the mining, construction and energy sectors found that women still occupied low-level jobs despite the standards that the industries had set up for women empowerment; it will still be a long way for leadership to embrace diversity in order to improve talents.

The NUM report said the main contributor to the low job levels was that many of these women only had a matric qualification, but argued that while education levels could partly explain the low levels of jobs held, there was no correlation between positions held and the level of education. The report further continued to highlight that the main challenge faced by women across these sectors, was lack of career advancement. As emphatically quoted in Faku (2016:6); these findings concur with those found in this study alluding to the fact that despite the qualification a woman possessed, development was just ineffective and thus further oppressing and failing to address the salary discrepancies between men and women, since the structures and sex-specific reward systems are non-existent.

Recognition of employees plays a significant role in maintaining a healthy, productive and motivated workforce. It is however observed that a colossal figure of over 60% of the participants believe that leadership can still do more in terms of involving women in decision making, in acknowledging and rewarding women's contribution in the organizations to disprove the alleged women's intellectual and physical inferiority. It is appreciated that various employees will show their preferences variably, however bias was observed in that; the higher the ranking of women, the more they felt less involved in decision making as women employees.

The respondents also showed that the acquisition of new skills as women and the urge for management to encourage diversity could be daunting and very difficult; thus, reflecting a decreased level of satisfaction among female employees occupying various positions. This is substantiated by Faku (2016:6) indicating challenges resulting in the lack of career progress, as being discrimination in decision making and remuneration.

This lack of empathy and recognition is further perpetuated by women's immediate supervisors and company policies, as it is evident that policies and procedures may be in place but as to whether they address the current challenges is yet to be discovered. Accessibility and understanding of policies could be another bottle neck in the progress anticipated for women in the physically demanding jobs.

6.5 Effects of encounters experienced by women employed in physically demanding jobs within Rustenburg industries, mining and engineering companies

The following are the perpetual effects of encounters experienced by women in physically demanding jobs within Rustenburg industries, mining and engineering companies. The situation and circumstances where one or few women are identified for development create a few high flyers, whilst it stifles and depresses other women who may be in the same work place. Such an environment leads to favouritism and this approach only advances a few. For women who feel side lined and are watching other women colleagues progress; this brings greater levels of low self-esteem, emanating from little or no recognition causing them to not believe in their own potential, consequently making them to believe compliance is just enough and thinking it is acceptable not to be a high flyer.

A drift is imminent amongst women who are treated differently, due to a number of different reasons: a "Queen- Bee" syndrome is recognized, whereby women who may be in power tend to be inclined to pursuing their own career progression, finding it difficult to bring other women along. This could be due to other patriarchal practises and cultures which are dominant in the work place.

This system further alienates women from being in touch with their femininity, whereby they tend to behave in a more masculine manner in order to adapt to the intricacies and challenges of the physically demanding, patriarchal and male dominant workplace. Women tend to therefore disregard their other social and domestic obligations in trying to prove a point at work, leading to overworking themselves and either burning out or ostracizing themselves from their society and families.

Often it is seen that when holding high positions, women tend not to stay for too long, leaving the high profiled positions without having managed to make a sustainable contribution for their successors. Many would just be in the position; do their best and just leave for a position lesser challenging or to be with their families. This behaviour perpetuates an impression that women cannot handle the pressure too well, therefore misconstrued to be giving permission for the other sex to take advantage and doubt their capabilities.

Due to different cultural beliefs; there are women who, at the workplace, allow some form of abuse like sexual harassment which goes unreported as seen in chapter 3 above. This is mainly because of some societal beliefs due to stereotypes theories that a woman be subservient; thus leading to women being scared to express themselves even in times of real need, even when they are desperate and need a bathroom, thus leading to health problems later on in life and tending to accept inferiority for the sake of societal acceptance.

6.6 Recommendations

This research has shown the intricacies that are attributed to physically demanding jobs in terms of relations, development, policies and procedures, working conditions, diversity management and employee satisfaction. It is clear that despite the positive progress that has been witnessed; much should still be done in improving the working conditions, especially for women in the physically demanding jobs.

It is imperative to take a good look at the pre-job environment for young girls which are preparatory to the working world.

Girls in high schools should be provided with essentials that assist them with the knowledge of the workplaces they might encounter when choosing careers for their future. This could be achieved by setting up elementary structures which simulate the workplace environment, especially for the physically demanding jobs.

Technical, Vocational and Educational Training institutions (TVETs) previously known as technical colleges, Universities of technologies, Universities, and other tertiary learning academies can have programmes which will assist students to emulate and acclimatize with the working environment for which they may be studying. Courses including engineering, mining, construction, survey and all other faculties that may require greater physiological and physical strength when being executed, are to be enacted as part of the introduction to the course specifications.

Successful women with great profiles and achievements in these industries can be formally utilized as a compass to prepare women aspiring to become successful in the physically demanding jobs, and also use that to determine a clear path of finding solutions for the real world. As predecessors, their experience can be used as a basis or a point of departure in determining the aspired outcomes of how women could be handled in achieving great results for all stakeholders.

On entry to the workplace; women's induction and orientation should be compulsory in order to clearly demonstrate the policy and procedures, expectations, job profiles, performance measurements and the systems of implementation and application of the policies. The contents of this orientation should include a clear career growth map for each individual, highlighting key performance indicators with targets, including milestones and salary and reward system. Compulsory mentorship programme for all entrants by appointing mentors at entry level, should be guaranteed.

As suggested in an article by Faku (2016:6) research revealed that despite the advances, women faced hurdles in entering the job market and getting higher ranking jobs. This puts limits to their progress, weighs negatively on their social standing and eventually restricts their personal development.

It is therefore crucial that the organizations inform all employees about their career plans, record them and always make it accessible to the employees to avoid misperceptions and this will be to encourage self-growth for all.

For the existing employees, encourage innovation and reward it accordingly, publicize it and give it enough recognition so that more women can embrace it and join in on growing their organizations. Human resources department are to robustly conduct personal engagements with employees regarding matters of remuneration and a growth path instead of making it in a blanket approach. Performance appraisal discussions must be done quarterly with the employees and expectations must be

S - Specific

M - Measurable

A - Accessible

R - Realistic and

T - Time-based

Organizations can hold conferences in semesters to enlighten women about the organizational values, culture and creeds, allowing engagements, thus in the process instilling the organisation's doctrines unambiguously to its employees. In safeguarding continued growth and development, organisations could create a pool of mentors from which they can draw in order to validate and maintain consistency in the reliable, measurable development of their female employees.

Managing stereotypes: special efforts need to be taken in harnessing the work force; i.e. men and women in the workplace environment. Programmes could be adopted in teaching about policies, about respect for one another, showing everyone the benefits of co-existence, allowing both parties to verbalise concerns and share suggestions on harmonizing the working relationships. By doing this, it will inculcate a culture of co-existence and dependability on strength, capabilities and competencies for the progress of the organization, thus yielding increased job satisfaction for all.

The consequences of managing stereotypes against women in the workplace serves an even a greater purpose of upholding the constitution of South Africa no. 108 of 1996 listed in the Bill of Rights; section 9 of "The right to equality" which states that: "Everyone is equal before the law and has the right to equal protection and benefit of the law". Abiding by these requirements can satisfy the interest of everyone, ensuring the protection of the women (South African constitution, 1996).

The first right listed in the Bill of Rights is the equality right, it is aimed at prohibiting discrimination by both the government and by private persons; however it gives way to affirmative action to be implemented in order to redress past unfair discriminations. Therefore, equality includes the full and equal enjoyment of all rights and freedoms. For the promotion of equality achievement; legislature and other measures were designed in order to protect or advance persons, disadvantaged by unfair discrimination (South African constitution, 1996: section 9.2).

Managing ergonomics – it is a requirement for every employer to comply with the OHS Act requirements: General duties of employers to employees Section 8 of the Occupational Health and Safety Act (85 of 1993) stating that: an employer must provide and maintain (as far as is reasonably feasible), a working environment that is safe and without risk to the health of employees i.e. Provide and maintain safe systems of work, plant & machinery, take precautionary measures to eliminate or mitigate any potential hazard, before resorting to Personal Protective Equipment (PPE), (South Africa, OHS Act:1993).

It is therefore an obligatory responsibility for the employer to ensure adherence to all the OHS Act requirements and further acclimatize the workplace in maintaining and enhancing safety and compliance. The employer can introduce techniques which are female-friendly by upgrading work place technology in order to make the working environment as conducive as possible, for example: install mobile toilets/sanitation and privacy rooms for field workers working far in sites, invest in safety gear or work suits especially designed for women, invest in the technology of drilling machines appropriate for women in mining and construction.

Should a woman be moved due to other reasons; provision should be made for relevant continuation. For example; instead of just manning the reception, such a woman can be sent to job specific workshops of a lighter nature or be allowed to pursue a course which will later be applicable to the actual position they are appointed for. It will also be important for organisations to synergize with other leading organisations who have advanced in providing such facilities which are beneficial to the women's needs like children's kindergartens (day care centres at work), breast-feeding facilities for breastfeeding women as this may improve the performance and well-being of female employees in the physically demanding jobs.

Diversity management begins with leadership's willingness to adapt, display and enforce specific creeds that will define an organizational culture. The leadership is responsible for creating a dependable climate that is appealing to the new entrants, the previously disadvantaged and the vulnerable. It is advisable for organizations to consider hosting periodic workshops based on the topic of diversity. This cause should be pursued for both men and women to invigorate discussions and start dialogues in a safe space; i.e. external facilitators may be employed for this undertaking.

If successful, this endeavour will foster a culture of free-will talks and suggestions may easily come forward without employees feeling prejudice from above or from one another. Another approach is to institute anonymous suggestion websites in the workplace, whereby employees can confidently share their ideas without fear or favour. Most importantly, immediate supervisors and line managers are the first to be empowered in touching base with their softer side and honing their soft skills in order to manage this transition well and create a new culture of equal opportunities and respect for all.

Managing performance and retention, according to one report by "WimSA" as quoted in Faku (2016:6); an organization which aims to provide women with support and guidance for personal growth in mining; said that 65 % of respondents were not taking advantage of the opportunities that were provided by companies as required by the Mining Charter and that was because some of the respondents also felt that they do not want to take advantage of the system, just because they were women. However in another report, Women In Mining (WimSA) believed that women in mining were not taking their future into their own hands.

The solution to the above findings is for the recognition and award system to be effected, it should be especially created for the category of women high flyers; this event can be done every semester. The events can be conducted intra-department, to prepare them for inter-department, then later to the round of the divisional annual awards. Management is to quarterly share a clear plan with everyone on how and when to balance representation of both sexes in the work force, from the company's groups, divisionally, and funnel it down to departments where each individual is located. This will stimulate co-ordinated planning from leadership and commitment towards managing retention of their female employees.

The question can be asked whether women are aware of the opportunities available to them, whether they know how to take advantage of the opportunities and whether they want to. The truth is, programmes need to be intensified and be driven by senior leadership to first empower their management teams with toolkits to spearhead these processes of retaining and sustaining the women in the physically demanding jobs. It would be achievable by leadership partnering with the work force on formulating principles; from understanding of policies to application and implementation thereof. When the process is known to all, and management is acquainted with the process of how to support their women and men subordinates when situations arise; the desire to achieve a workplace that is accommodating and conducive and productive to all is possible.

6.7 Further Research

For organizations to realize the benefits of investing in the empowerment and retention of women in jobs that require physical strength and that were previously male dominant; a radical approach has got to be employed. This means that emancipation and transformation of women will have to take priority in the business sector, coercing them to leave routines comfortable to them and expend money in finding sustainable solutions to correct these social inequalities. Further research can be explored in the education space, whereby industrial sectors can partner with institutions of higher learning in pursuing actual programmes that can be adapted in acquiring full time mentors in the system to construct a curriculum that brings solutions to the current challenges faced by women in physically demanding jobs.

6.8 Conclusions

In this chapter, conclusions and recommendations of the study were explained. Research objectives, primary findings, and the secondary finding were discussed. The results of the research sufficed to conclude that women form the most essential component of the work force in our country, South Africa. For the best results regarding the success and sustainability of the economy, the society, and the industries at large; commitment by all stakeholders on the development and nurturing of women in the jobs that require physical strength and resilient physiological attributes, is imperative.

The country's and business leadership need to, as a collective, create a dependable climate that is appealing to the female workers. Supervisors and line managers require empowerment first in acquiring interpersonal skills. Enlightening women about their work environment can be acquired by emulating their successful predecessors who were instrumental in becoming achievers even in the worst of their working conditions. A mentorship programme for all women at entry level can be piloted as a project in industry sector, when successful, it can be made compulsory. It can be followed by the adoption of robust and SMART programmes in educating all stakeholders about policies; this would be achievable by having leadership partnering with the work force on formulating principles for the understanding of policies and application thereof.

The benefits of co-existence must be enforced to inculcate respect for one another, consider having anonymous and protected idea websites to report and alleviate stereotype mentalities. Organizations can synergize with other leading organizations in providing facilities which are valuable to women's needs like children's day care centres close to their workplaces. To enhance business sustainability, reliable recognition and award systems have to be effected. These measures will bolster succession planning and retention of women in physically demanding jobs, like in the mining and engineering sectors.

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LIST OF APPENDICES

APPENDIX I

LETTER OF INFORMATION

Title of the Research Study: Encounters of Women in physically demanding jobs within Rustenburg.

Principal Investigator/s/researcher: Mrs. Nthabeleng Tlome, B-Tech degree in Management

Co-Investigator/s/supervisor/s: Prof. Bonke Dumisa, supervisor - Advocate of the High Courts of South Africa and Lesotho

Brief Introduction and Purpose of the Study: The purpose of the research will be to examine the experiences, the challenges and fears which the women in the physically challenging occupations as well as in the male dominated industries, such as in mining, industrial and engineering sectors in Rustenburg encounter on a daily basis. With intention to provide amicable solutions, to benefit all stakeholders involved.

Outline of the Procedures: Responsibilities of the participant,

Consultation/interview/survey details; to answer the questionnaire via electronic media, or hard copies, as honestly as possible, and respond back to the researcher on or before the deadline.

Venue details; electronic media, e.g: e-mail and or cell phones and at their work stations.

Explanation of tools and measurement outcomes, conduct interviews via a written questionnaire, which will be distributed electronically, through print and e-mails. On completion, all data will be quantified and classified accordingly. Conclusion will be based on the bias of the most given answers towards the proposed solution.

Any follow-ups; No follow ups may be required.

Any placebo or no treatment: None required.

How much time required of participant, 15 minutes maximum.

What is expected of participants: to answer the questionnaire as honestly as possible.

Randomization/ group allocation: N/A.

Risks or Discomforts to the Participant: None.

Benefits: To the participant; to eventually discover the discomforts of the nature of their job and propose permanent solutions in the industry and to the researcher; to provide a solution to the current challenges in the industry and through publications share light on the latest findings of this research area.

Reason/s why the Participant May Be Withdrawn from the Study: None.

There will be no adverse consequences for the participant should they choose to withdraw.

Remuneration: None.

Costs of the Study: None.

Confidentiality: The participant reserves the right to remain anonymous.

Research-related Injury: No injuries can be sustained from this interview

Persons to Contact in the Event of Any Problems or Queries:

Supervisor and details – Prof Bonke Dumisa

Please contact the researcher Nthabeleng Tlome – 082 922 8962

My supervisor e-mail: bonke@dumisainvest.co.za or

The Institutional Research Ethics administrator on 031 373 2900.

Complaints reported to the DVC: TIP, Prof F. Otieno on 031 373 2382 or dvctip@dut.ac.za.

General:

Potential participants must be assured that participation is voluntary and the approximate number of participants to be included should be disclosed. A copy of the information letter should be issued to participants. The information letter and consent form must be translated and provided in the primary spoken language of the research population e.g. isiZulu.

APPENDIX II

Faculty of Management Sciences

Department of Entrepreneurial Studies and Management

Date: 30 March 2016

Dear Participant

You are hereby requested to participate in this interview relating to a research to be pursed on the below topic;

Encounters of Women in physically demanding jobs within Rustenburg.

You will only be requested to answer the question as illustrated on the attached questionnaire.
Kindly provide your answers on a rated scale of 1 to 5, 1 (less likely) and 5 (most likely).

Confidentiality is assured, and the details of this interview will be used solely for the purpose of this research which is a property of the institution.

Thanking you for your co-operation
Regards,

Nthabeleng Tlome – cell: 082 922 8962 e-mail: tlomen@eskom.co.za

Student Contact Details

Prof. Bonke Dumisa – e-mail: bonke@dumisainvest.co.za

Supervisor Contact Details

_____
Co-Supervisor/Co-Promoter
Contact Details

APPENDIX III

CONSENT

Statement of Agreement to Participate in the Research Study:

- I hereby confirm that I have been informed by the researcher, _Nthabeleng Tlome, about the nature, conduct, benefits and risks of this study - Research Ethics Clearance Number: _____,
- I have also received, read and understood the above written information (Participant Letter of Information) regarding the study.
- I am aware that the results of the study, including personal details regarding my sex, age, date of birth, initials and diagnosis will be anonymously processed into a study report.
- In view of the requirements of research, I agree that the data collected during this study can be processed in a computerised system by the researcher.
- I may, at any stage, without prejudice, withdraw my consent and participation in the study.
- I have had sufficient opportunity to ask questions and (of my own free will) declare myself prepared to participate in the study.
- I understand that significant new findings developed during the course of this research which may relate to my participation will be made available to me.

_____	_____	_____	_____
Full Name of Participant	**Date**	**Time**	**Signature / Right Thumbprint**

I, Nthabeleng Tlome_____ herewith confirm that the above participant has been fully informed about the nature, conduct and risks of the above study.

Nthabeleng Tlome_____	_____	_____
Full Name of Researcher	**Date**	**Signature**
_____	_____	_____
Full Name of Witness (If applicable)	**Date**	**Signature**
_____	_____	_____
Full Name of Legal Guardian (If applicable)	**Date**	**Signature**

APPENDIX IV

Encounters of Women in physically demanding jobs within Rustenburg.

QUESTIONNAIRE

SECTION A: BIOGRAPHICAL DATA

1.1 Please indicate your Age				
< 20 yrs	21-30 yrs	31-40 yrs	41-50 yrs	51- 60 yrs
1.2 Please indicate your Gender				
Male		Female		
1.3 Kindly indicate your designation in Patterson Grading				
A	B	C	D	E
Unskilled worker	Semi-skilled worker	Skilled worker	Middle management	Senior management

SECTION B: QUALIFICATIONS AND JOB EXPERIENCE

2.1 Please indicate your highest educational qualification				
Below Grade 12	Grade 12	Degree/Diploma	Postgraduate degree	Other (Please specify)
2.2 Please indicate your current role				
Graduate/Learner Official	Miner / Artisan	Shift Boss / Mine Oversee / Senior Supervisor	Mining Manager / Engineering Manager	Other (Please specify)
2.3 Please indicate your experience in the mining / engineering industry				
< 1 year	1-2 years	3-5 years	6-10 years	>10 years
2.4 How did you acquire your mining / engineering skills				
Risen through the ranks	Internal Promotion	Formal Education	On-the-job training	Self-Study	Aptitude and Ability
2.5 Do you affiliate to a union				
Yes		No		

SECTION C: 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 women development is on top of our agenda				
Strongly disagree	Disagree	Agree	Strongly agree	No opinion
1	2	3	4	5
3.2 In my organisation Senior Management encourages diversity management				
Strongly disagree	Disagree	Agree	Strongly agree	No opinion
1	2	3	4	5
3.3 Senior management 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 a balanced number of men and women				
Strongly disagree	Disagree	Agree	Strongly agree	No opinion
1	2	3	4	5
3.5 I am comfortable working for my organisation				
Strongly disagree	Disagree	Agree	Strongly agree	No opinion
1	2	3	4	5

SECTION D: CHANGES IMPLEMENTED 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 relevant changes have been made to accommodate women				
Strongly disagree	Disagree	Agree	Strongly agree	No opinion
1	2	3	4	5
4.2 In my organisation there is a sexual and physical harassment policy that ensures the safety of women				
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 are moved to work in non-hazardous conditions				
Strongly disagree	Disagree	Agree	Strongly agree	No opinion
1	2	3	4	5

SECTION E: 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
5.6 In my organisation the managers takes into account of women's specific challenges in allocating work (e.g. during periods or post pregnancy)				
Strongly disagree	Disagree	Agree	Strongly agree	No opinion
1	2	3	4	5

APPENDIX V:

DECLARATION BY LANGUAGE EDITOR

USHA NAIDU BPaed (Arts) Eng 3 Afrik 3

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Translator
Journalist
Editing and Proofreading Services
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14 December 2017

Mrs Nthabeleng Tlome

Student Number 21032762

Master's Thesis

EDITOR'S REPORT

This letter confirms that the Master's Thesis written by Nthabeleng Tlome was professionally edited and proofread, before changes to the text were effected.

Errors in grammar were corrected, more especially those dealing with the use of hyphens, commas, semi colons and colons as well as the correct use of quotation marks. Long winded sentences were deconstructed and made more readable, but especially, more understandable while not losing the essence of meaning.

The student was encouraged to write in a less formal and more business-like manner, by replacing all contractions used in her thesis. (they're to they are). Synonyms were found to replace words that were deemed incorrectly or colloquially used eg. Employees are allowed to *ventilate* their concerns.

The student was also encouraged to include an Abbreviations page with her thesis. The student will undertake to ensure that page numbering, alignment and spacing is correct before handing in her thesis.

Sincerely

USHA NAIDU