An investigation into the attraction, engagement and retention of women employed in technical mining positions, South Africa

N Mashaba

orcid.org/0000-0001-6629-5786

Dissertation accepted in fulfillment of the requirements for the degree *Master of Arts in Industrial Sociology* at the North-West University

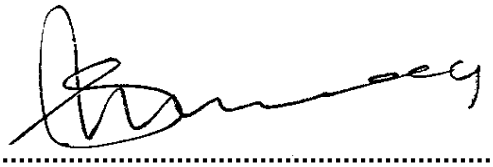
Supervisor: Prof. D Botha

Graduation: May 2022

Student number: 32869010

DECLARATION

By submitting this dissertation electronically, I solemnly declare that I authored the work contained within. The dissertation is submitted in fulfilment of the requirements for the degree Master's of Arts in Industrial Sociology at the Potchefstroom Campus of the North-West University.



.....

ACKNOWLEDGEMENTS

I would like to express my heartfelt gratitude to the following individuals and organisations for making this dissertation possible:

- First and foremost, honour and glory to my Father, the Lord Almighty, and the Highest. Thank you, Father, for your guidance and giving me the confidence to complete this journey. You have always been faithful to me, and I will always worship and praise your name.
- The Mashaba family. Paulina Thembi Mashaba, my queen mother, for instilling in me a passion for education, constantly encouraging me, and assisting me in reaching my full potential. I appreciate all the meals and snacks you prepared and purchased because you knew how much food stimulates my brain. I am indebted to you for being present not just when I needed you, but also all the time. My sister, Lee-ann Mashaba, for being my study companion and pushing those late nights together. I cannot think of another person who believed in me as much as you did. Knowing that you believed in me aided in calming and easing my journey. My brother, Siyabonga Mashaba, for bringing your sense of humour, which is necessary on such a stressful journey as this one. I appreciated your encouragement, even if you were too young to comprehend what a dissertation is.
- My second mother, Dr Michelle Boehme, for encouraging me to study further. The Zoom tips you gave me while you were on the other side of the world were beneficial.
- My granny and niece, Landi and Tshedza Maqalepo, for always being a ray of sunshine in the midst of my darkest days and inspiring me to pursue my dreams.
- My uncle, Solomon Kganyago, for seeing potential in me at a young age and nurturing it into adulthood so that I could believe it.
- My sisters, KhaPaTuNe (Khanyisile, Palesa and Itumeleng) and Thato, for tolerating my distancing and detachment from the sisterhood. I appreciate your assistance in reviewing and editing my chapters, and as your willingness to listen to me when I discovered interesting information about my research topic. I understand that they were not always interesting to you, but you listened because you understood how vital they were to me.
- My supervisor, Dr Doret Botha. Your commitment, passion and hard work are immeasurable. It has been a blessing to work with you. Thank you for believing in me from our first meeting and for not getting tired throughout the process. I think you must be some sort of superhero for putting up with me. Most importantly, I want to express my gratitude for not allowing me to fail. I cannot express how appreciative I am for the guidance, support and knowledge you have imparted to me.
- Professor Suria Ellis of the Statistic Consultation Service of North-West University for holding my hand and assisting me in developing, scripting and monitoring my questionnaire

throughout the data collection phase. In addition, I am grateful for your assistance with statistical analyses and interpretation.

- My professional editor, Laetitia Bedeker, for walking this journey with me from the proposal stage through the editing of my quantitative and qualitative instruments to the completion of my dissertation. Professionalism is a precise reflection of who you are.
- My intellectual sparring partner, Joseph Komane, for constantly pushing me to do better and push the boundaries of my capabilities. I would like to express my gratitude for reviewing all of my chapters before submitting them to my supervisor. That enhanced my appearance of intelligence. I could not have accomplished this without your zealous commitment to my work.
- My friends, Unathi and Ntando Ndamoyi, Nonhlanhla Ntaka, Nolitha Madai, Nikita Moyo, Gosiame Noge, Boitshoko Shoke, Khensani Khumalo and Sizwe Dlamini, for always calling to check on my well-being and for your motivational words. That boosted my spirits.
- My employer, the Mining Qualifications Authority, for funding a portion of my studies at a time when I most needed it, and my colleagues for their invaluable assistance in distributing my questionnaire via links of mines.
- Personnel at various mines who distributed my questionnaire to their employees: Elsabe, Given, Cyril, Felicia, Asanda and Thovhedzo.
- Sara Turnbull for connecting me with Women in Mining South Africa, Mustak Ally with the Minerals Council South Africa and Stanley Mokgothu with the National Union of Mineworkers.
- Women in Mining South Africa, the Minerals Council of South Africa and the National Union of Mineworkers for disseminating the questionnaire across multiple platforms.
- All respondents and participants in the research for volunteering their time to complete questionnaires and participate in semi-structured interviews. Without your assistance, this research would have been impossible to complete.
- North-West University and the Humanities Faculty for partially funding my studies.
- All other members of my family, friends and colleagues whom I have not specifically mentioned by name. Please know that I will be eternally appreciative of your support.

ABSTRACT

South Africa's democratic transition resulted in the adoption of liberal laws and policies to redress historical injustices and increase women's participation in the mining industry. However, the mining industry continues to be dominated by men, with most women employed in administrative and support roles and only a few in technical positions. Apart from women's underrepresentation in mining, the industry faces challenges attracting, engaging and retaining women in technical mining positions. While opportunities for women to enter the mining industry exist, women are not taking advantage of them due to the industry being viewed as unattractive to women. For those already employed in the industry, challenges exist in keeping them engaged in their work. Some leave for more gender-balanced industries due to working conditions, lack of advancement opportunities, and workplace culture.

The study's main objective was to investigate the factors that influence women's attraction, engagement and retention in technical mining positions and, as a result, to determine what could be done to promote their successful participation in the South African mining industry. Women's inclusion in the mining industry is critical for the country, as it challenges gender stereotypes that portray mining as a male-dominated industry. As a result, the presence of women may contribute to the realisation of gender equality in the industry.

A literature review was conducted first to gain a conceptual and theoretical understanding of attraction, engagement and retention, and second to provide an overview of global and national trends about women employed in the mining industry. This section also comprises the factors that influence women's attraction, engagement, and retention in the mining industry. Third, the literature provided insight into the statutory and regulatory frameworks that govern women's inclusion in the South African mining industry.

An empirical investigation using a convergent parallel mix-method research design was conducted to ascertain the factors that facilitate, inhibit and influence the attraction, engagement and retention of women employed in technical mining positions in South Africa. The quantitative research utilised questionnaires administered to women employed in technical mining positions, while the qualitative research utilised semi-structured interviews with employer representatives, most of whom were human resource personnel.

The exploratory factor analysis revealed four factors of attraction (application value and development value, economic value, interest value and social value) and seven factors of retention (affective commitment, normative commitment, compensation and benefits, career development and training, job characteristics, work-life balance and intention to stay). The confirmatory factor analysis results showed that the three-factor structure (vigour, dedication and

absorption) of the Utrecht Work Engagement Scale fit the sample data reasonably well. Although there is room for improvement, respondents generally demonstrated high levels of engagement in their work. All retention factors positively influenced the respondents' intention to stay. Similarly, career development and training positively influenced all retention factors, but a negative influence on work-life balance. The researcher's self-constructed questionnaire revealed that overall, the respondents considered a conducive work environment and work benefits important factors for attracting, engaging, and retaining women in technical mining positions.

The qualitative findings indicated that the primary factors influencing women's attraction to technical mining positions are the physically demanding nature of mine work and gender stereotypes. Employee engagement is impacted by unfavourable working conditions, work-life balance and the mining industry's male-dominated work culture, whereas career growth opportunities are the primary factor that would retain women in technical mining positions.

The literature review and empirical study both indicated a relationship between attraction factors and engagement and retention. Therefore, the study concludes with practical and theoretical recommendations for addressing factors affecting women's attraction, engagement, and retention in technical mining positions.

Keywords: attraction, engagement, retention, South Africa, technical mining positions, women in mining

OPSOMMING

Suid-Afrika se demokratiese oorgang het gelei tot die aanvaarding van liberale wette en beleide gemik op die regstelling van historiese ongeregtighede en die verhoging van vroue se deelname in die mynbedryf. Die mynbedryf word egter steeds deur mans oorheers, en die meerderheid vroue werk in administratiewe en ondersteunende rolle, en slegs ’n paar in tegniese posisies. Buiten vroue se onderverteenwoordiging in mynwese kom die bedryf voor uitdagings te staan wat die aantrekking, betrekking en behoud van vroue in tegniese mynbouposisies betref. Alhoewel daar geleenthede vir vroue is om toegang tot die mynbedryf te kry, maak vroue nie daarvan gebruik nie omdat die bedryf as onaanloklik vir vroue beskou word. Vir diegene wat reeds in die bedryf werk, is daar uitdagings om hulle by hul werk betrokke te hou, en party verlaat die bedryf vir meer geslagsgelyke bedrywe weens faktore soos werkstoestande, gebrek aan bevorderingsgeleenthede en werksplekkultuur.

Die studie se vernaamste doelstelling was om faktore te ondersoek wat vroue se aantrekking, betrokkenheid en behoud in tegniese mynbouposisies beïnvloed, en om gevolglik te bepaal wat gedoen kan word om hul suksesvolle deelname aan die Suid-Afrikaanse mynbedryf te bevorder. Vroue se insluiting by die mynbedryf is uiters noodsaaklik vir die land, aangesien dit geslagstereotipes wat mynbou as ’n mansgedomineerde bedryf uitbeeld, aanveg. Die teenwoordigheid van vroue kan dus bydra tot die verwesenliking van geslagsgelykheid in die bedryf.

’n Literatuurstudie is uitgevoer om eerstens konseptuele en teoretiese begrip van aantrekking, betrokkenheid en behoud te verkry, en tweedens om ’n oorsig te verkry van internasionale en nasionale neigings rakende die indiensneming van vroue in die mynbedryf. Hierdie afdeling behels ook die faktore wat die aantrekking, betrokkenheid en behoud van vroue in die mynbedryf beïnvloed. Derdens het die literatuur insig gebied in die statutêre en regulatoriese raamwerke wat vroue se insluiting by die Suid-Afrikaanse mynbedryf rig.

’n Empiriese ondersoek met behulp van ’n konvergerende parallelle gemengdemetode-navorsingsontwerp is uitgevoer om die faktore te bepaal wat die aantrekking, betrokkenheid en behoud van vroue in tegniese mynbouposisies in die hand werk, verhinder en beïnvloed. Vir die kwantitatiewe navorsing is vraelyste deur vroue wat in tegniese mynbouposisies werk, ingevul, terwyl semigestruktureerde onderhoude met werkgewerverteenwoordigers, waarvan die meerderheid menslikehulpbron-personeel was, vir die kwalitatiewe navorsing gevoer is.

Die verkennende faktoranalise het vier faktore van aantrekking (toepassingswaarde en ontwikkelingswaarde, ekonomiese waarde, belangwaarde en sosiale waarde) en sewe faktore van behoud (affektiewe verbintenis, normatiewe verbintenis, vergoeding en voordele,

loopbaanontwikkeling en opleiding, poskenmerke, werk-lewe-balans en voorneme om in die organisasie te bly) aan die lig gebring. Die bevestigende faktoranalise het getoon dat die driefaktor-struktuur (energie, toewyding en absorpsie) van die Utrecht-werkbetrokkenheidskaal redelik goed in die steekproefdata gepas het. Alhoewel daar ruimte vir verbetering is, het die respondente in die algemeen hoë vlakke betrokkenheid by hul werk getoon. Alle behoudfaktore het 'n positiewe invloed gehad op die respondente se voorneme om in die organisasie te bly. Eweneens het loopbaanontwikkeling en opleiding 'n positiewe invloed op alle behoudfaktore gehad, maar 'n negatiewe invloed op werk-lewe-balans. Die navorsingsresultate van die navorser se saamgestelde vraelys het getoon dat die respondente in die algemeen 'n bevorderlike werksomgewing en werksvoordele as belangrike faktore vir die aantrekking, betrokkenheid en behoud van vroue in tegniese mynbouposisies beskou.

Die kwalitatiewe bevindinge het getoon dat die primêre faktore wat vroue se aantrekking tot tegniese mynbouposisies beïnvloed die fisies veeleisende aard van mynwerk en geslagstereotipes is. Werknemerbetrokkenheid is deur ongunstige werkstoestande, werk-lewe-balans en die mynbedryf se mansgedomineerde werkskultuur beïnvloed, terwyl loopbaanontwikkelingsgeleenthede die primêre faktor was wat vroue in tegniese mynbouposisies sou behou.

Die literatuuroorsig en empiriese studie het albei aangetoon dat daar 'n verhouding is tussen aantrekkingsfaktore en betrokkenheid en behoud. Die studie sluit af met aanbevelings wat sowel praktiese as teoretiese komponente insluit vir die hantering van faktore wat die aantrekking, betrokkenheid en behoud van vroue in tegniese mynbouposisies beïnvloed.

Sleutelwoorde: aantrekking, betrokkenheid, behoud, Suid-Afrika, tegniese mynbouposisies, vroue in die mynwese

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF ACRONYMS AND ABBREVIATIONS

ANOVA	Analysis of variance
BCEA	Basic Conditions of Employment Act
CFA	Confirmatory factor analysis
CFI	Comparative Fit Index
CMIN/DF	Chi-square statistic divided by degrees of freedom
EEA	Employment Equity Act
EFA	Exploratory factor analysis
EmpAt	Employer Attractiveness scale
EVP	Employee value proposition
GDP	Gross domestic product
GFI	Goodness-of-model-fit indices
HDSAs	Historically disadvantaged South Africans
ILO	International Labour Organization
IWRAW	International Women's Rights Action Watch
JD-R	Job demands-resources
KMO	Kaiser-Meyer-Olkin
LRA	Labour Relations Act
MBI	Maslach Burnout Inventory
MHSA	Mine Health and Safety Act
MiHR	Mining Industry Human Resources Council
MPRDA	Mineral and Petroleum Resources Development Act
MQA	Mining Qualifications Authority
NCGE	National Committee on Gender Equality
PCA	Principal component analysis
PGM	Platinum group metals
PEPUDA	Promotion of Equality and Prevention of Unfair Discrimination Act
PPE	Personal protective equipment
QWL	Quality of work-life
RFS	Retention Factor Scale
RMSEA	Root mean square error of approximation

SDA	Skills Development Act
SPSS	Statistical Package for the Social Sciences
UWES	Utrecht Work Engagement Scale
WIMM	Women in Mining Mongolia
WiMSA	Women in Mining South Africa

CHAPTER 1

INTRODUCTION, PROBLEM STATEMENT AND RESEARCH METHODOLOGY

1.1 INTRODUCTION, ORIENTATION AND BACKGROUND

This study investigated the attraction, engagement and retention of women employed in technical mining positions in South Africa.

The long-term sustainability and success of any organisation are dependent on the retention of key employees (Bidisha & Mukulesh, 2013:8; Deshwal, 2015:344; Ibidunni *et al*., 2016:1). However, relevant employees must first be attracted to a particular occupation or industry to be retained. Employers have long recognised that employee attraction is a critical component of talent management, and employee retention (NHS Leadership Academy, 2015:3). Therefore, there is a need to respond to the rapidly changing global environment, which has resulted in reliance on attracting and retaining high-quality individuals who can respond effectively to changing employment environment needs (Newell, 2005).

Retention also incorporates the element of employee engagement, as it encompasses strategies used by organisations to promote an environment conducive to long-term employee engagement (Onah & Anikwe, 2016:11). Employee engagement plays a pertinent role in envisaging an employee's intention to remain within an organisation or to leave (Kundu & Kusum, 2017:718). It is worth noting, however, that employee retention commences during the recruitment and attraction stage, as this phase establishes the type of employees that organisations seek and desire to retain (Rossi, 2018:33). Therefore, there is a link between attracting employees to an organisation, keeping them engaged and ultimately retaining them in the long term (Hutchings *et al*., 2011:7; Padayachee, 2017:77; Rossi, 2018:33).

In the mining industry, organisations face challenges in attracting, engaging and retaining women in technical mining positions (AHRC, 2013:3; Botha, 2013:200; Campbell, 2007:8; Ledwaba, 2017:17; Masvaure *et al*., 2014:488). Technical mining positions are positions held by employees who possess a tertiary qualification in the frontline tasks of exploration, quantification, development, extraction and processing of mineral resources (Terrill, 2016:16). For example, these positions involve technical skills within the mining value chain such as geology, mining engineering, metallurgical engineering, chemical engineering, electrical engineering, analytical chemistry, mine surveying as well as jewellery design and manufacturing (Musingwini *et al*., 2013:235). A mineral resource is a universal term used to identify a concentration or occurrence

of solid material of economic interest in or on the earth's crust in such form, grade (or quality) and quantity that has prospects for economic extraction (Britt *et al*., 2017:2, CRIRSCO, 2013:10, Implats, 2019:25, SAMREC, 2016:18). The MQA's (Mining Qualification Authority) 2021 Sector Skills Plan report (MQA, 2021:18) revealed that there are 17% of women employed in the mining and minerals industry in South Africa, with the majority (67%) employed in clerical or support positions.

One of the most significant challenges in the mining industry is introducing and ensuring full incorporation and inclusion of women in the traditionally male-dominated industry (Zungu, 2011:4). A male-dominated industry is defined as having 25% or fewer women participating in it (Catalyst, 2013). The establishment of gender equality in the male-dominated mining industry is reported as one of the major equity challenges in South Africa (Botha & Cronjé, 2014:1915). The challenges experienced concerning the integration of women into male-dominated occupations in South Africa can be attributed to the historical exclusion of women in the mining industry, structural changes in occupations and legislative restrictions (Bradley, 1989:109; Heine, 2008:13; Mashiane, 2009:2–3). As a result, there is a need to direct women towards more technical mining positions (De Klerk, 2012:9).

Prior to 1994, South Africa's legislation prohibited the entry of women into underground mining professions (Commission for Gender Equality, 2017). Historically, women were considered unfit for the physical labour associated with mine work. Therefore, most of their occupations involved support functions such as administration and menial lower-ranking tasks such as cleaning and office assistance (Heine, 2008:14). Calitz (2004:30) describes that the mining industry's association with male physical strength is due to the industry's hard labour, the location of mining companies, hot temperatures, and handling of heavy machinery. As a result, the industry embodied a masculine rather than a feminine mode of endeavour (Calitz, 2004:1; McCulloch, 2003:413). This perception was exacerbated by the socialisation of gender roles, which emphasised distinct roles for men and women, resulting in gender occupational discrimination, impeding women's participation in the industry and contributing to the mining industry's reputation as a relatively hostile environment for women (Heine, 2008:13; Mashiane, 2009:24; Mxhakaza, 2010:1; Nndanduleni, 2016:28).

This trend was not unique to South Africa, but was also observed globally. In Australia, for example, women were banned from pursuing qualifications in mining until the 1970s, when the legislation that prohibited women from working underground was repealed (Bailey, 1988; Layman, 2014). Women working in mine tunnels were deemed ominous in Chinese culture. The foot-binding custom (the Chinese custom of binding young girls' feet) restricted their mobility; preventing them from performing labour-intensive tasks (Lahiri-Dutt & Macintyre, 2006:238–239).

However, with the formation of the People's Republic of China political party in 1949, women began to participate in underground mining until the promulgation of the Provision for Protection of Working Women law in 1992 (Lahiri-Dutt & Macintyre, 2006:238–239).

Since the inception of democracy in South Africa, policy and legislative changes have been modified to redress past injustices. The most substantial shift was the repeal of the law prohibiting women from working underground by the Mine Health and Safety Act (MHSA). The MHSA (No. 29 of 1996), the Mining Charter and the Mineral and Petroleum Resources Development Act (MPRDA) (No. 28 of 2002) (RSA, 2002) are some of the legislations that promoted a change in mining companies' demographic profile (Ranchod, 2001:22). In addition, Women in Mining South Africa (WiMSA) was established in 2003 to mobilise and promote women's participation in mining (De Klerk, 2012:11). The Association's mission is to mobilise women to become active participants in the mining industry by addressing their needs through initiatives that recognise them and provide them with training to improve their skills (DMR, 2011:4).

Considering that the current South African legislation on mining promotes transformation through the inclusion of women, the expectation is that there would be more women pursuing careers in technical mining positions. Apart from the view that women entering the mining industry are a novel phenomenon, it also brings unique challenges not encountered by women in more gender-balanced occupations and industries (Martin, 2013:1–12). The existing barriers inhibiting women's attraction in mining include stereotypes and bias towards women pursuing non-conventional gendered occupations, myths about women in the workplace, workplace culture, and structural issues (Abrahamson *et al.*, 2014:24; AHRC, 2013:5; Khoza, 2015:71; Kljajevic, 2015:90). All of these factors are explored further in the literature review. According to research conducted by the Mining Industry Human Resources Council (MiHR) (2016:26), among job-seekers, women, compared to men, were less likely to view the mining industry as a viable or attractive career choice. Women are said to possess little knowledge about mining occupations and view the industry as providing interesting and varied occupations, particularly for men (MiHR, 2016:26). Consequently, women job-seekers tend to have fewer positive perceptions of mining being an environment inclusive of women (MiHR, 2016:26).

For the mining industry to become a driver of inclusive economic growth, gender considerations and women's empowerment should be prioritised (BSR, 2017:3). Gender equality is both a human rights issue and a precondition for, and indicator of, sustainable development (Alvarez, 2013:13). The United Nations' Sustainable Development Goal number five emphasises the importance of achieving gender equality and empowering all women and girls (Rickard *et al*., 2017:13). Considering that women account for the majority of the world's poor population, prioritising their inclusion into the workplace, especially where they are less represented, will liberate them from

a life of poverty and could contribute to countries' economic growth. Women should be empowered and equally accorded an opportunity to contribute to and benefit from all aspects of development in society to generate sustainability (Bayeh, 2016:39). In addition, it is also imperative for the mining industry to implement relevant measures to ensure that current employees are retained, engaged and developed to their fullest potential (Hughes, 2012:39).

According to Botha (2013:200), mining organisations experience challenges in retaining their female employees, including those occupying technical and production positions such as geologists, mining engineers and general mine workers. A study conducted by the MiHR (2016:12) revealed that the likelihood of women leaving the industry within five years of employment is greater than for men. There are societal and organisational barriers hindering women's retention in the industry. At an organisational level, women choose to leave the industry when they experience limited opportunities for advancement in their professions (Hewlett *et al*., 2005:44; Hewlett *et al*., 2008:23; Letlape, 2014:104, MiHR, 2016:34, WIMC, 2010:20). Societal barriers to women's retention include negative, unsympathetic behaviour from colleagues in mines, including women, who doubt women's leadership capabilities to perform at high-level demanding work assignments. Women's work-life balance and perceived personal characteristics such as confidence, assertiveness and low self-esteem also affect retention (Botha & Cronjé, 2014:1915, Hewlett *et al*., 2005:44; Hewlett *et al*., 2008:23; Letlape, 2014:26; WIMC, 2010:20). These challenges are observed globally and in South Africa. Women also often find themselves confronted with a glass ceiling, i.e. a failure of women and other minority (or vulnerable) groups to climb the corporate ladder, irrespective of possessing the capabilities to fill the respective occupations and not reaching them due to discriminatory barriers (Mathur-Helm, 2006:311). Those who break the glass ceiling attribute their success to their efforts rather than collective support (Letlape, 2014:26).

The industry also battles with keeping up with competition emerging from gender-diverse industries, i.e. industries with an equal representation of men and women (Hughes, 2012:36–46). For example, according to Campbell (2007), university graduates are reported to be headhunted by companies outside the mining industry that offer them less physical, more comfortable jobs with higher salaries and higher social status, which are more family-friendly. Thus, the mining industry should pay attention to perspectives about the workplace and career opportunities if it seeks to attract and retain female talent. Furthermore, to attract talent, it will be beneficial to have current employees who will be passionate enough to attract those who are still not absorbed into the labour market (MiHR, 2016:3).

Over and above attracting recruits and satisfying existing employees' needs so that they will remain within the industry, employees need to be engaged. The availability of engaged

employees is critical for organisations. It leads to lower turnover, paves an opportunity to attract new talent, enhances employees' knowledge base and results in a competitive advantage over companies that have disengaged employees (Albrecht *et al*., 2015:7). Employee engagement has the potential to enable employees to be emotionally attached to their organisation and to be passionate about their work, and could possibly result in improved employee retention (Balakrishnan *et al*., 2013:10). Therefore, employee engagement is significant for the viability and success of an organisation because of its potential to positively influence the productivity, loyalty, and retention of employees (Muthuveloo *et al*., 2013:1546).

It was deduced from the above background that the absorption of women into the mining industry is imperative, as it challenges gender stereotypes that portray mining as a male-dominated industry. Therefore, women's presence will contribute to strides being made to ensure gender equality in the industry (IOA, 2011). From this context, it is clear that employee attraction, engagement and retention are interrelated and critical for the inclusion of women in technical mining positions, which could lead to the success and sustainability of organisations as a whole (AHRC, 2013:35; Kapoor & Meacham, 2012:18). In light of this background, the study sought to investigate the attraction, engagement, and retention of women in technical mining positions.

1.2 PROBLEM STATEMENT

Since 1994, South Africa has promulgated and implemented progressive policies aimed at rectifying past injustices and achieving social cohesion (Commission for Gender Equality, 2017:18). Twenty-seven years into democracy, the mining industry still faces challenges in attracting and retaining women. The mining industry is a foundational industry that supports a very large number of people, companies and industries (Vegter, 2019:4). For every direct mining job, a further two indirect jobs are developed in downstream and support industries (FSE, 2018). Equal participation of men and women is critical for a country's economic growth to be effective and sustainable (Bayeh, 2016:39). Therefore, the mining industry can play a prominent role in fostering gender equality in the labour market.

Organisations previously asserted that skills shortages, competition for talent and the continuing lack of qualified and experienced applicants, particularly in specialised technical positions, were some of the reasons for the low attraction rate of women in mining (Hutchings *et al.*, 2011:15; Moraka & Jansen van Rensburg, 2015:671; Schultz & Grimm, 2008:54). This is despite the industry's high salaries, particularly in mines that are located in remote areas (Hutchings *et al.*, 2011:15; Moraka & Jansen van Rensburg, 2015:671; Schultz & Grimm, 2008:54). In addition, retaining talent as a result of competition from other industries was a major concern for mining organisations, as the industry found itself competing with more gender-balanced industries that could provide even better financial resources, accompanied by flexible working conditions and

other support, which the mining industry finds challenging to offer to women employees (Heine, 2008:25; Hutchings *et al.*, 2011:15). The mining industry competes with industries such as the infrastructure and manufacturing industries, which women who leave the mining industry find attractive (Hutchings *et al*., 2011:15; Landelahni, 2013).

Attracting and retaining women are key to addressing the skills shortage in the labour market. This is particularly true in industries that have traditionally and historically relied on men to fill roles, including the mining, construction and utility industries (AHRC, 2013:4). Attracting, retaining, and engaging women in the mining industry are important to address skills shortages and contribute to gender diversity (AHRC, 2013:35). This therefore creates a positive image of the industry and makes it attractive to potential women seeking careers in mining. In addition, retaining engaged and motivated employees is crucial to an organisation's sustainability and results in improved organisational performance and increased productivity (AHRC, 2013:35).

There is a gap in the literature of studies that have conducted research on the attraction, engagement and retention of women in technical mining jobs. Previous research (Lord & Eastham, 2011; MCA, 2005; MCSA, 2019) primarily focused on attracting and retaining women in the mining industry in general, but did not consider the importance of engagement as a factor that could influence women's retention. These studies were also conducted in Australia and not in the South African context. Other studies (AWRA, 2014; Bailey-Kruger, 2012; Botha, 2013; Hutchings *et al*., 2011; Khoza, 2015; Ledwaba, 2017; Nyabeze *et al*., 2010; Ozkan & Beckton, 2012; Van der Walt, 2008) addressed some aspects of attraction, engagement and retention of women in mining, but their primary focus was not on these topics. The studies mainly concentrated on women in mining, in general; women in all occupational categories, rather than only those in technical positions. Diverting attention to women employed in technical mining positions is imperative given their underrepresentation in the industry. As a result, this research sought to fill the gap in existing knowledge in the area under investigation.

The study's problem statement can be outlined as follows: Firstly, because of women's perceptions of the mining industry as a less attractive employment industry, it is experiencing challenges in redressing past inequities in terms of gender representation. Due to ongoing technical skills shortages in mining (e.g. geology, mining engineering, mine surveying), there are currently opportunities for women who are skilled, i.e. those involved in core/technical mining activities and who possess a post-basic school qualification and training to join the industry (MQA, 2018:13). However, there are not many women capitalising on these opportunities. Secondly, even though women are absorbed into the industry, some of them end up leaving the industry due to the workplace culture, extreme working conditions and the lack of career advancement (Hewlett *et al*., 2008:23). Thirdly, the lack of employee engagement, that is, their own perceived

contribution to organisational success and attachment to the organisation, is an additional challenge leading to the lack of retention of women in mining and is said to lack attention in the industry (Ledwaba, 2017:17; Masvaure *et al*., 2014:488). If employee retention is to be enhanced, employees' knowledge, skills, and experience should be engaged and retained to a greater extent (Allen, 2008:26). Allen (2008:26) argues that if this is not applied, valuable talent could be lost, which could have negative effects on the sustainability of the industry and will also affect transformation and diversity in the industry. Chovwen (2007:76) asserts that unless an organisation's social and cultural structures are transformed, particularly through the incorporation of gender issues, it may become increasingly difficult to retain incumbents and attract new entrants. This study aimed to contribute to the body of knowledge on factors influencing the attraction, engagement and retention of women in technical mining positions to promote women's successful participation in the South African mining industry.

1.3 RESEARCH QUESTIONS

Given the problem statement, the general and specific research questions are provided below.

1.3.1 General research question

The general research question for this study was: Which factors influence the attraction, engagement and retention of women in technical mining positions and what can be done to promote women's successful participation in the mining industry in South Africa?

1.3.2 Specific research questions

The specific research questions arising from the general research question were as follows:

- What are the existing approaches, perspectives and theories on employee attraction, engagement and retention and how can they contribute to ensuring a better understanding of the factors that may influence the successful participation of women in the mining industry?
- What are the global and national trends and perspectives regarding the attraction, engagement and retention of women in the mining industry?
- What are the statutory and regulatory frameworks guiding the inclusion of women in the South African mining industry?
- What factors facilitate, inhibit and influence the attraction, engagement and retention of women employed in technical mining positions in South Africa?
- What conclusions and recommendations can be drawn from the literature review and empirical findings to assist organisations to successfully attract, engage and retain women in technical mining positions in South Africa?

1.4 RESEARCH OBJECTIVES

The general and specific research objectives are provided below.

1.4.1 General research objective

The general objective of this study was to explore the factors that influence the attraction, retention and engagement of women in technical mining positions and to, consequently, determine what can be done to promote women's successful participation in the mining industry in South Africa.

1.4.2 Specific research objectives

The specific research objectives emanating from the general objective were as follows:

- To analyse the existing approaches, perspectives and theories on employee attraction, engagement and retention to obtain a better understanding of the factors that may influence the successful participation of women in the mining industry
- To review the literature on global and national trends and perspectives regarding the attraction, engagement and retention of women in the mining industry
- To analyse the statutory and regulatory frameworks guiding the inclusion of women in the South African mining industry
- To ascertain factors that facilitate, inhibit and influence the attraction, engagement and retention of women employed in technical mining positions in South Africa
- To draw up conclusions and recommendations emanating from the literature review and empirical findings that could assist organisations to successfully attract, engage and retain women in technical mining positions in South Africa.

1.5 CENTRAL THEORETICAL STATEMENTS

The preceding sections indicated that the mining industry faces challenges in attracting women. At university level, few women are reported to choose degrees that would link them to a career in the mining industry, and very few school-age girls on a secondary school level identify mining as a preferred career path (Lord & Eastham, 2011:1; Moraka & Jansen van Rensburg, 2015:674; PWC, 2013:20; Schultz & Grimm, 2008:54). In addition, the perception of the mining industry as a male-dominated industry further reduces its desirability to potential female employees (Lord & Eastham, 2011:1; Moraka & Jansen van Rensburg, 2015:674; PWC, 2013:20; Schultz & Grimm, 2008:54). Retaining women who enter the mining industry is an additional challenge. This is partly due to experiences of gender discrimination, minimal career progression opportunities, work-life balance and strong masculine workplace culture (Hewlett *et al*., 2005:44; Hewlett *et al*., 2008:23; Hughes, 2012:36–46; Letlape, 2014:26; Mathur-Helm, 2006:311; MCA, 2005; PWC, 2013:24; WIMC, 2010:20).

Furthermore, low retention rates are attributed to the lack of engagement within organisations. Research suggests that disengaged employees have contributed to the 28.5% reduction in the mining industry's contribution to South Africa's gross domestic product (GDP) (Marais, 2017:11). The general business problem is that disengaged employees lead to low productivity and hinder organisations' performance in the South African mining industry (Marais, 2017:11). Drivers of employee engagement are also the main factors that influence employee retention (Ahmad & Azumah, 2012:20). Therefore, both concepts of retention and engagement are critical to ensure a highly productive workforce, which could lead to the attraction of those who are not yet employed in the industry. To retain women in the mining industry, effective retention and engagement strategies are required (Ramlall, 2004:52).

Previous research has demonstrated that perceptions of the work environment are pertinent to predicting work engagement (Alarcon *et al.*, 2010; Saks, 2006). Engaged employees invest themselves fully in their jobs, which in turn leads to the enactment of active in-role performance (Rothbard, 2001). Organisations with disengaged employees experience high turnover, while employees who are engaged remain in their organisations, are loyal, work harder and are often willing to go the extra mile in fulfilling occupational agreements (Gair, 2018:2). Employee engagement and retention are the end result of consistent and positive employee experiences, which may be a positive attribute to attract potential employees (Meyer *et al.*, 2002).

Employees are reported to stay within organisations if they receive motivating incentives (Aguenza & Som, 2012:89). Motivation incentives are a significant employment retention strategy to preserve existing employees (Govindaraju, 2018:95). According to Aguenza and Som (2012:89), there are two interrelated strategies in understanding employee retention, namely focusing on establishing reasons related to employee turnover and explaining reasons why some stay and why others choose to engage or not in their jobs and organisations. Turnover intentions induce employees to make comparisons between their present and future employment (Govindaraju, 2018:96). These reasons can essentially be interlinked to the attraction of new entrants to the industry.

Employer attractiveness theory developed by Berthon *et al*. (2005) was used to understand the factors influencing attraction. Berthon *et al*. (2005) assert that to comprehend attraction, one must first understand the factors that contribute to an employer's attractiveness. Berthon *et al.* (2005:152) state that the objective is to create an organisation that prospective employees regard as an 'employer of choice'. When seeking an employer of choice, prospective employees typically consider factors such as interest, economic, social, development and application values. These five dimensions correspond with the anticipated benefits that prospective employees seek in a company (Meehan, 2019:6). In addition, the three-factor engagement model developed by

Schaufeli *et al*. (2002) explored factors influencing engagement. Previously, it was asserted that engagement is the inverse of burnout (Maslach & Leiter, 1997). However, Schaufeli *et al.* (2002:74) argued that these phenomena must be viewed separately. As a result, Schaufeli *et al.* (2002:74) view engagement as a positive, fulfilling, work-related state of mind characterised by vigour, dedication and absorption. Factors influencing retention, on the other hand, were explored using Herzberg's two-factor theory. Employee retention, according to Herzberg (1987:9), can be influenced by two factors: motivators and hygiene factors. Motivators are job-related factors that are associated with the content of an employee's work and encourage performance while also providing the employee with satisfaction (Almaaitah *et al*., 2017:21, Berry & Morris, 2008:3). Hygiene factors, on the other hand, are non-job-related factors that are external to the job and can lead to dissatisfying experiences (Almaaitah *et al*., 2017:21). Improving hygiene factors will not make employees satisfied, but will keep them from becoming dissatisfied (French *et al*., 2011:169.). However, motivators can contribute to employee satisfaction, influencing their intention to stay within their organisations (Henha, 2019:36).

These theories were chosen because they are the most widely used in research on attraction, engagement and retention. Numerous studies have applied employer attractiveness theory in various countries and in various cultural and demographic contexts (Aboul-Ela, 2016; Mohanty, 2019; Noutel *et al*., 2021; O'Driscoll, 2017; Pingle & Kaur, 2019; Priyadarshini *et al*., 2016; Rozsa *et al*., 2019; Sivertzen *et al*., 2013; Tamoniene, 2015; Vokić & Mostarac, 2019). By the same token, numerous studies have demonstrated support for the three-factor employee engagement dimensions (Brand-Labuschagne *et al*., 2012; Coetzee & De Villiers, 2010; Drake, 2012; González-Romá *et al*., 2006; Jordaan, 2005; Mäkikangas *et al*., 2014; Moshoeu, 2017). Likewise, Herzberg's two-factor theory has been extensively studied to understand the role of motivation in retention (Almaaitah *et al*., 2017; Berry & Morris, 2008; Owler & Morrison, 2015). These theories and their dimensions are discussed in detail in Chapter 2.

Along with the theories mentioned above, the pertinent literature on women in mining revealed several central issues that affect the attraction, engagement and retention of women in the mining industry. These include compensation and benefits, career development opportunities, remote work locations, work-life balance, gender stereotypes and workplace culture, and hazardous working conditions, safety risks and sexual harassment (AWRA, 2014; Bailey-Kruger, 2012; Botha, 2013; Hutchings *et al*., 2011; Khoza, 2015; Kilu *et al*., 2017; Ledwaba, 2017; Mangaroo-Pillay & Botha, 2020; MiHR, 2016; Nyabeze *et al*., 2010; Ozkan & Beckton, 2012; Sohn & Lee, 2008; Van der Walt, 2008). These findings also served as the framework for the study's empirical investigation, particularly the deductive inquiry.

1.6 RESEARCH METHODOLOGY

Research methodology is defined as the researcher's general approach to carrying out research, with a specific focus on the research process and the type of tools and procedures used to conduct the research (Babbie & Mouton, 2008:74; Mouton, 2001:56). The research entailed a literature review and empirical research guided by a research paradigm that informed the research design. These are explained in detail in the sections below.

1.6.1 Literature review

A literature review aims to illuminate insights and understanding of existing research and debates relevant to a particular topic or area of study and present that knowledge in a written format (Western Sydney University Library, 2017:2). It also aims to determine existing knowledge on the topic, how well the knowledge is established and where future research could be directed (University of Melbourne, 2013). Moreover, the literature review can provide guidance for the study's design, establish an appropriate sampling technique and sample size, and identify applicable data collection practices or instruments that can be used in the study (Mertens, 2015:91). Acquaintance with literature is valuable for research, irrespective of the research paradigm (Mertens, 2015:91).

In this study, the literature review was used in conjunction with the empirical data to address the research questions and objectives. A conceptual and theoretical framework regarding perspectives that motivate employees to be attracted to and engaged and retained in specific occupations was developed through a literature review. Literature also provided a general overview of women employed in the mining industry and factors affecting their attraction, engagement and retention. Finally, as tools for promoting gender equality in South Africa, the researcher also analysed statutory and regulatory frameworks that govern women's inclusion in the mining industry.

The data sources that were used included the internet, relevant books, e-publications, journal articles as well as theses and dissertations in the field. The next section discusses the research paradigm alongside the research design.

1.6.2 Research paradigm/worldview

The selection of an appropriate research methodology commences with choosing a research paradigm that informs the study and is guided by philosophical beliefs about the nature of reality (ontology), knowledge (epistemology) and values (axiology) that enlighten the comprehension, interpretation and research practices of the study (Chilisa & Kawulich, 2012:3).

Kuhn (1962) coined the term 'paradigm', referring to it as a philosophical way of thinking. Creswell (2014:35), on the other hand, prefers the term 'worldview', which he defines as "a general philosophical orientation regarding the world and the nature of research that a researcher brings to a study". Therefore, worldview is synonymous with paradigm (Kaushik & Walsh, 2019:1). Therefore, paradigms or worldviews are vital, as they direct what should be studied, how it should be studied and how the findings of the study should be interpreted (Kivunja & Kuyini, 2017:26). The major research paradigms are positivism/post-positivism, constructivism, the transformative paradigm and pragmatism (Creswell, 2014:36; Masenya, 2018:42; Mertens, 2015:8).

The positivist paradigm is based on the philosophical notions of August Comte and is founded on the premise that the world is real and those realities can be studied (Antwi & Hamza, 2015:218; Bhattacherjee, 2012:18; Walliman, 2010:21). Comte believed that observation and reason represent an optimal way to comprehend human behaviour, and that true knowledge is based on the experience of sense and can be acquired by observation and experiment (Antwi & Hamza, 2015:218). With that accounted for, positivists tend to rely solely on theories that can be directly tested (Bhattacherjee, 2012:18). However, there was criticism of the empirical nature of positivism, with concerns that it could not be entirely applied to humans and that the social world could not be studied similarly as the natural world, that the world is not value-free and that it is unfeasible to provide explanations of a causal nature (Antwi & Hamza, 2015:218; Bhattacherjee, 2012:18). Post-positivism arose as a result of these critiques.

Post-positivists recognise that reality is imperfect and the truth is not definitive, but likely to be true (Kivunja & Kuyini, 2017:32). It permits observations without using experiments or the formulation of hypotheses to be tested, thereby holding a deterministic philosophy where causes probably determine effects or outcomes. Quantitative research is associated with post-positivism (Creswell, 2014:36).

Constructivism, also known as social or real constructivism (often combined with interpretivism), is a philosophy based primarily on the work of Vygotsky (Liu & Matthews, 2005:338). The constructivist paradigm emerged from hermeneutics, which studies interpretive understanding or meaning (Mertens, 2015:16). The researcher intends to interpret the meanings people have about the world; rather than beginning with a theory, as in post-positivism, the researcher develops a theory or pattern of meaning inductively (Creswell, 2014:37).

The constructivist paradigm is based on the fundamental assumption that knowledge is socially constructed (Schwandt, 2000:197). Individuals are thought to seek understanding of the world in which they live and work. Constructivism suggests that individuals do not find or discover knowledge, but construct or create it (Schwandt, 2000:197). In that, they create subjective meanings of experiences – meanings directed to particular objects or things – and their perceptions of reality may change throughout the course of the study (Creswell, 2014:37; Mertens, 2015:18). Constructivists reject the notion of an objective reality that can be known, and therefore, the researcher aims to understand the multiple social constructions of meaning and knowledge (Mertens, 2015:18). Because of this, researchers should attempt to understand the complex world of life experiences from the viewpoint of individuals who live it (Schwandt, 2000:197). Typically, these experiences are gathered through qualitative methods. Researchers rely on research participants' views to develop the subjective meaning of the research under investigation (Kaushik & Walsh, 2019:2).

The third worldview is the transformative paradigm that emerged in the 1980s and 1990s from researchers who critiqued post-positivists for imposing structural laws and theories that did not cater for marginalised individuals in society or issues of power and social justice discrimination and oppression (Creswell, 2014:38). Therefore, a transformative framework seeks to advance the needs of the underrepresented or marginalised populations (Creswell & Plano Clark, 2011:96). Transformative research is action-oriented, with researchers consciously and explicitly positioning themselves to advocate for the less powerful in a collaborative effort to address everyday social issues, such as those of empowerment, inequality, oppression, domination, suppression and alienation (Creswell, 2014:38; Mertens, 2015:21). This is done to effect social transformation in society (Mertens, 2015:21). Critical theorists, participatory action researchers, Marxists, feminists, racial and ethnic minorities and people living with disabilities are among the group of researchers involved in transformative research (Mertens, 2015:21).

In transformative research, participants are provided with a platform to assist in designing research questions, collecting and analysing data, and benefiting from the rewards of the study. The research offers a voice for participants, raising their consciousness or advancing an agenda to improve their lives (Creswell, 2014:38). The transformative paradigm recognises multiple versions of what is perceived to be real, similarly to constructivism. The paradigm emphasises the ontological belief that what appears real could be ratified structures that are assumed to be real due to historical circumstances (Mertens, 2015:32). As a result, the idea of what is considered real should be studied in light of its ideological role in perpetuating oppressive social structures and policies (Mertens, 2015:32). Transformative researchers are pluralistic, depending on the type of research being conducted. Transformative empiricists typically employ quantitative methods, with an emphasis on avoiding sexist, racist or biased findings. The majority use

qualitative research, while others use mixed methods (Creswell & Plano Clark, 2011:98; Mertens, 2015:33). The inclusion of diverse voices from the marginalised is a recurring theme in the methodology of transformative researchers (Mertens, 2015:33).

Pragmatism emerges from actions, situations and consequences instead of antecedent conditions, as post-positivism suggests (Creswell, 2014:10). The paradigm rejects the idea of a mono-paradigmatic orientation and argues that it is neither possible to acquire the truth about the real world solely by virtue of a single scientific method, as advocated by the positivist paradigm, nor is it possible to determine social reality as constructed under the interpretivism paradigm (Kivunja & Kuyini, 2017:35).

Pragmatism is not committed to a single system of philosophy and reality. Pragmatists do not perceive the world as an absolute unity (Creswell, 2014:11). However, the pragmatic approach recognises the importance of epistemology and the centrality of one's worldviews for research and focuses on elements that will make a difference and connect abstract issues on the epistemological and the methodological level (Morgan, 2007). Pragmatists advocate for practical research and employ pluralistic approaches, enabling the blending of multiple research methods to explain participants' behaviour, their beliefs regarding those behaviours and consequences that are likely to result from different behaviours (Kivunja & Kuyini, 2017:35). Emphasis is therefore placed on the research problem and the usage of manifold (mixed-methods) approaches to understanding the problem, instead of subscribing to a single method of collecting and analysing data (Creswell, 2014:11).

In studying the connections between theory and data, pragmatism uses abductive reasoning, drawing distinctions between induction and deduction – first converting observations into theories and then assessing those theories through action (Morgan, 2007:71). As deduction proves that something must be, induction demonstrates that something is operative, while abduction suggests that something might be (Fischer, 2001:7). Essentially, abduction is a form of inference that starts from observed consequences and tries to establish its relevant explanation (Jiang, 2001:14).

This study was conducted within a pragmatic research paradigm. In light of the above, the research was conducted from the standpoint of a relational epistemology position, i.e. the premise that relationships in research are best established by what the researcher considers appropriate to the study, a non-singular reality ontology (the assumption that there is no single reality and that each individual has their own and unique interpretations of reality), a mixed-methods research design (integrating quantitative and qualitative research methods) and value-laden axiology (conducting research that benefits people) (Kivunja & Kuyini, 2017:35). The benefit will be in assisting mining organisations and the industry to determine factors that influence the attraction,

engagement and retention of women in technical mining positions and identify measures that could be implemented for their successful participation in the mining industry in South Africa.

1.6.3 Empirical investigation

Empirical research or investigation derives knowledge from real lived experiences rather than a theory based on observed and measured phenomena (Pennsylvania State University, 2018). The research setting, research design, sampling method, data collection, instrumentation, data analysis and approaches for ensuring reliability and validity are discussed in the subsections below.

1.6.4 Research setting

The research setting was limited to South African mining companies employing women in technical mining positions. Except for the Eastern Cape, these companies were spread across all South African provinces. The mines that participated in the research were not selected on the basis of their mineral deposits, but on the availability of women in technical mining positions. Permission letters were sent to mines to obtain authorisation to conduct research at the respective mines.

The subsections below provide details on the research design, sampling, data collection, research instruments and data analysis techniques used in the study.

1.6.5 Research design

Research design is the overall disposition for linking conceptual research problems to the execution of relevant empirical research. It identifies the type of data required to conduct the research, the methods used to collect and analyse the data, and how these elements answer the research question (Van Wyk, 2012). Different design logics are used for different types of studies (Van Wyk, 2012). A mixed-methods research design, using quantitative and qualitative methodologies, was adopted to achieve the research objectives and to address the problems identified.

A mixed-methods research design is derived from the pragmatist paradigm that combines multiple research approaches within different phases of the research process (Teddlie & Tashakkori, 2009:22). As a research design, it involves philosophical assumptions that guide the direction of the collection and analysis of data to combine qualitative and quantitative research into a single study or series of studies (Creswell & Plano Clark, 2007:5). It stems from the notion that the usage of both quantitative and qualitative approaches offers a heightened understanding of research problems than either approach can address solely (Creswell & Plano Clark, 2007:5).

The mixed-methods research design has been criticised for being time-consuming, as it necessitates the collection of both quantitative and qualitative data and requires more resources to collect both types of data than using a single-approach research design (Regnault *et al.*, 2018:3). Although these limitations are acknowledged, the rationale for adopting a mixed-methods research approach was due to its benefits to the study. Using qualitative or quantitative research approaches individually might not wholly address the research problem and questions, while a combination of methods does so holistically (Creswell & Plano Clark, 2011).

Furthermore, the usage of mixed methods has benefits in terms of increasing the validity of the research findings, informing the collection of the secondary data sources, confirming or filling gaps of data collected and creating knowledge (McKim, 2017; Regnaul*t et al*., 2018:1; Rossman & Wilson, 1991; Zohrabi, 2013:254). Additional benefits include acquiring a deeper and broader understanding of the phenomenon and the compensation of weaknesses in research that only uses a single research method (McKim, 2017:203).

Specifically, a convergent parallel research design using questionnaires and semi-structured interviews was employed in this study. A convergent parallel design uses both qualitative and quantitative data simultaneously, prioritises each method equally, independently analyses each method, and then amalgamates the results during the overall interpretation (Creswell & Plano Clark, 2011:70–71). The purpose of following a convergent parallel design was to obtain different, but complementary, data on factors affecting the attraction, engagement and retention of women employed in technical mining positions (see Creswell & Plano Clark, 2011:77).

1.6.6 Sampling method

Sampling is the process of selecting a subgroup of a population of interest for research (Turner, 2019:8). A population is a complete set of cases from which a sample is selected (Taherdoost, 2016:18). In most instances, collecting data from an entire population is nearly impractical; hence, focusing on a smaller group is considered more viable (Turner, 2019:8; Taherdoost, 2016:18). The method of choosing respondents or participants to form part of a sample is crucial, as it determines the population to whom the research findings can be generalised (Elfil & Negida, 2017:1). Sampling commences with defining the target population, selecting a sampling frame, choosing a sampling technique, determining the sample size, and ultimately collecting data (Taherdoost, 2016:19). The study's sampling process is discussed below.

1.6.6.1 Target population

Women employed in technical mining positions across various mining companies in South Africa were the target population for the quantitative component of the study. On the other hand, the qualitative research focused on mining company representatives who were well versed with issues pertaining to the attraction, engagement and retention of women in technical mining positions.

1.6.6.2 Sampling frame

A sampling frame is defined as a set of sources from which a sample is drawn (Turner, 2003:3). The frame is used to select specific cohorts of a target population to be interviewed or included in a survey. In quantitative research, the sampling frame must be representative of the population (Turner, 2019:8). Mines employing women in technical positions in all South African provinces made up the sample frame for the study's quantitative and qualitative segments. These mines were from the following subsectors: cement, lime, aggregates and sand; coal mining; diamond mining; diamond processing; gold mining; jewellery manufacturing; other mining (mining of iron ore, chrome, manganese, copper, phosphates and salt) and platinum group metals (PGMs) mining. The qualitative sample frame involved human resource personnel responsible for tasks related to the attraction, engagement and retention of women in mining in South Africa.

1.6.6.3 Sampling method/technique

The sampling method used in a study determines the ability to make inferences about a population with respect to a theory (Taherdoost, 2016:20). Sampling methods are commonly categorised as probability and non-probability sampling. With probability sampling, every individual within a sampling frame has a known and equal opportunity of being selected to form part of a sample, and random selection is used to select respondents (Turner, 2019:8). In contrast, in non-probability sampling, the likelihood of individuals being chosen as part of a sample is unknown, and their chances of being selected are unequal (Turner, 2019:10). Non-probability sampling was used for both the qualitative and the quantitative research.

In this study, convenience sampling (also known as availability sampling) was used to select the respondents for the quantitative phase of the study. This sampling technique is suitable for both qualitative and quantitative research (Etikan *et al*., 2016:3). Inclusion criteria included the following: women who possessed some form of a tertiary qualification in the frontline tasks of exploration, quantification, development, extraction and processing of mineral resources. This included women employed in positions that require technical skills within the mining value chain such as in geology, mining engineering, metallurgical engineering, chemical engineering, electrical engineering, analytical chemistry, mine surveying as well as jewellery design and

manufacturing. Exclusion criteria included women who were employed in administrative and supportive positions such as clerical, secretarial, catering, and nursing and health work. As will be seen in Chapter 5, an exception was made for a few respondents who stated that they were not employed in technical positions at the time of data collection due to pregnancy, injuries or other health-related issues, but had experience in technical occupations.

Due to Covid-19 and various lockdown restrictions that were imposed in the country during the data collection phase, access to various mines was difficult, necessitating the use of multiple platforms to garner respondents. Moreover, due to the general concerns about privacy and the protection of personal information in the country, there is currently no publicly available database of women in technical mining positions, therefore substantiating why convenience sampling was chosen. Convenience sampling is a non-probability sampling technique in which respondents or participants are chosen based on their availability or accessibility (Bryman, 2012:201; Waterfield, 2018:2). When used in quantitative research, convenience samples are criticised for their lack of assured representativeness, which makes estimating population parameters difficult and makes them prone to bias (Waterfield, 2018:2). Consequently, the results of the research cannot be generalised to the general population.

While convenience sampling has methodological limitations, its use can be mitigated by the following (Waterfield, 2018:2):

- It provides a detailed description of the sample's demographics and other characteristics, and, where possible, comparison to those of the relevant population, such that readers of the study can assess the representativeness of the sample.
- It attempts to recruit all intended respondents to ensure that response bias or self-selection does not exacerbate a lack of representativeness.
- It ensures that respondents who are selected to form part of the sample are theoretically relevant to the study, avoiding selection solely based on convenience.

The above-mentioned factors were considered while conducting the research. In addition, convenience samples have been shown to be relevant for testing various theories and topics in social research (e.g. Asch, 1963; Festinger & Carlsmith, 1959; McCombs & Shaw, 1972; Milgram, 1963; Shock *et al*., 1984 all cited by Leiner, 2016:371). Even if the results cannot be generalised, it is argued that they contribute to a better understanding of their underlying processes (Etikan *et al*., 2016:3; Mook, cited by Leiner, 2016:371).

Furthermore, purposive and convenience sampling was used to select the participants for the qualitative phase of the research. Purposive sampling is adopted when the researcher targets individuals with specific traits that are of interest or relevant to the study (Turner, 2019:11).

Inclusion criteria included human resource personnel of different mines who were purposely targeted to be part of the study, as, in most cases, they are responsible for dealing with matters related to the attraction, engagement and retention of women in technical mining positions. Personnel not directly involved in or knowledgeable about the attraction, engagement, and retention of women in technical mining positions were excluded. Those who participated were readily and easily accessible. What was critical was that the research participants needed to be relevant to answer the study's research objectives.

1.6.6.4 Sample size

Given that the study used non-probability sampling, the sample size could not be determined in advance. In view of this, a total of 282 women in technical mining positions completed the structured questionnaire. The achieved sample size is comparable to previous studies conducted on women in mining (Botha, 2014 [156]; De Klerk, 2012 [100]; Mangaroo-Pillay, 2018 [165]).[1] In addition, 11 employer representatives participated in the qualitative phase of data collection in the research.

1.6.7 Data collection

Data collection is the process of carefully gathering desirable information, with the least possible misrepresentations leading to an analysis that provides credible and logical answers in terms of the research being undertaken (Sapsford & Jupp, 2006). Various methods can be implemented to collect data. For this study, quantitative data were collected utilising a structured web-based questionnaire, while qualitative data were collected through the use of semi-structured interviews. The different data collection techniques are discussed in detail in the sections below.

1.6.7.1 Quantitative phase (structured web-based questionnaires)

Quantitative data were collected utilising a web-based self-administered structured questionnaire. Questionnaires are a useful tool that allow large populations to be assessed with relative ease (Jones *et al*., 2013:5). The questionnaire was distributed through different channels. Among them was WiMSA, which distributed the questionnaire's link to women in technical mining positions in South Africa via their LinkedIn page (a social media platform for connecting business and professional networks). The questionnaire was also distributed to employees of various mines by human resource personnel, and the Minerals Council of South Africa and the National Union of Mineworkers. Throughout the data collection phase, the researcher was available to assist respondents who needed clarification or explanations for questions they were unable to understand.

[1] The square brackets indicate the sample size achieved.

1.6.7.2 Qualitative phase (semi-structured interviews)

In addition to the web-based structured questionnaires, semi-structured interviews were conducted using an interview schedule. Interviews were conducted with employer representatives (who consisted of mostly human resource personnel) knowledgeable about the attraction, engagement and retention of women in technical mining positions. This was also to determine strategies that were implemented within their organisations to attract, engage and retain women in technical mining positions. Interviews are a qualitative data collection approach applied to amass information regarding participants' experiences, opinions and notions specific to a research question or phenomenon being studied (Lambert & Loiselle, 2008). Qualitative interviews involve a process where the interviewer plans questions in advance before the interview and provides the interviewee with the platform to engage with, explain and illuminate responses employing open-ended questions (Alsaawi, 2014:151). Interviews were conducted to expand the researcher's understanding of factors affecting women's attraction, engagement and retention in technical mining positions.

The qualitative research participants were identified through the assistance of different mines, the MQA and the National Union of Mineworkers. E-mail invitations were sent to the identified participants, requesting them to participate in the study. The invitation included a brief background of the study, its purpose, ethical considerations and the researcher's contact details if the participants had any questions to ask regarding the study. Due to Covid-19, participants were encouraged to participate in the interview via video meeting platforms such as Zoom, Microsoft Teams or Skype. Participants also had the option to respond to the interview in written format. Because appointments were already established at one of the mines, some interviews were undertaken face to face. Prior to the interviews, arrangements were made to schedule dates and times convenient for the participants. Participants were required to fill in an informed consent form in all cases, indicating their agreement to voluntary participation in the research. The informed consent form provided a description of the study, the research objective, participants' rights, protection and confidentiality.

Ultimately, qualitative research entailed face-to-face and written interviews. Face-to-face semi-structured interviews were conducted in accordance with all the necessary Covid-19 protocols. Among others, the researcher attended to the following Covid-19 protocols:

- Maintained appropriate physical distancing (1.5 m) during fieldwork
- Ensured that all windows were open, where possible, when conducting interviews

- Ensured that sanitising and cleaning measures were in place on return from the fieldwork before contact was made with family/friends/colleagues sharing the home/office.

The face-to-face interviews were conducted as shown in Figure 1.1:

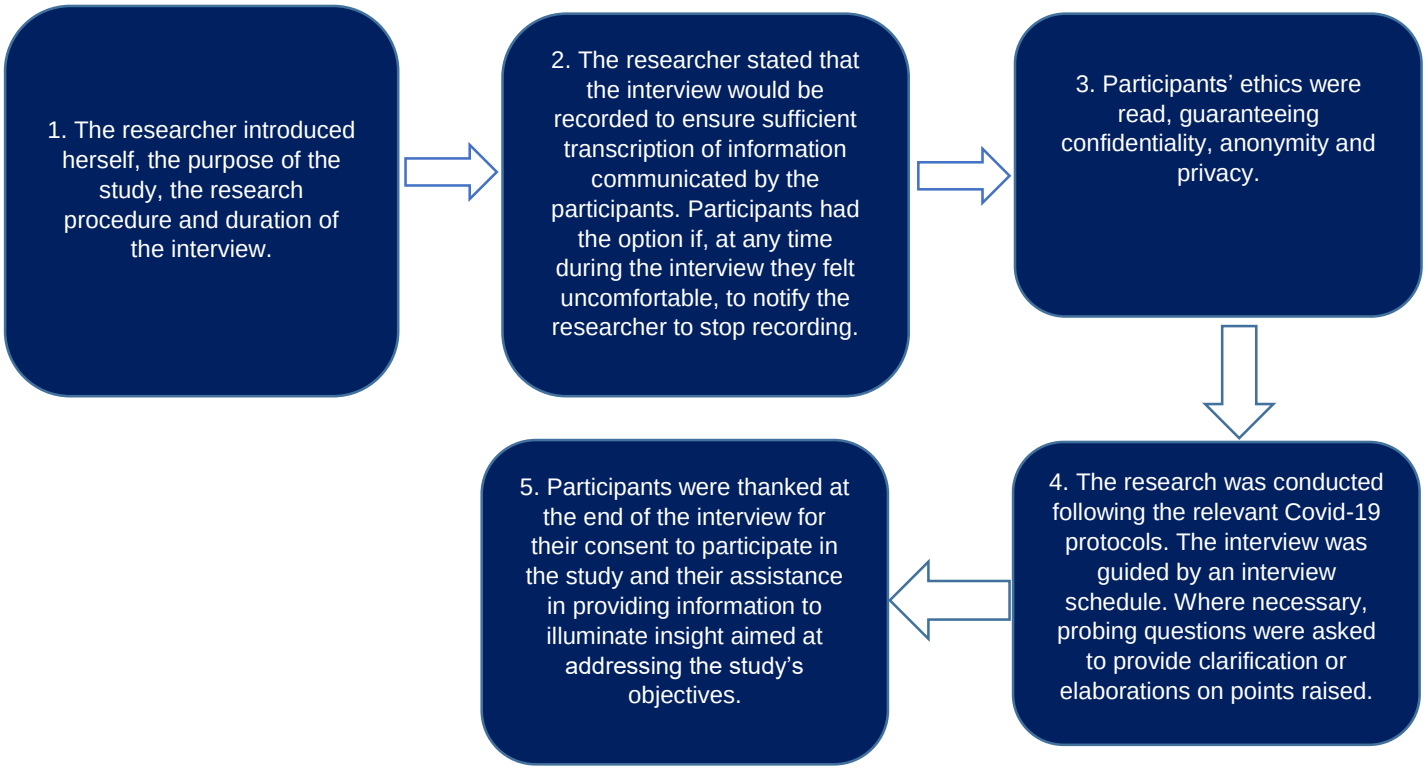


Figure 1. 1: Procedure followed during face-to-face semi-structured interviews

All interviews were held in English and lasted between 23 and 45 minutes. None of the participants experienced difficulties understanding English. Where necessary, follow-up questions were sent for clarity and elaboration to participants who opted for self-completions. The following section discusses the research instruments that were used to collect data.

1.6.8 Instrumentation

Quantitative data were collected using a structured questionnaire and qualitative data were collected through the use of an interview schedule. The following sub-sections discuss the instrumentation of both the quantitative and the qualitative phases.

1.6.8.1 Quantitative phase

Existing measurement scales were used to measure women's attraction, engagement and retention in technical mining positions for the quantitative component of the research (see Annexure A). A scale is defined as an instrument that contains two or more items developed to measure a specific construct of interest (Tharenou *et al*., 2007). The scales used had been measured, peer-reviewed and published to be valid and reliable to implement. All these scales were constructed using a Likert scale. A Likert scale uses statements instead of questions to ask respondents to select a number representing their view about the given statements and the direction of the response (Jackson, 2008:92–93).

The Employer Attractiveness (EmpAt) scale was adapted specifically to measure women's attraction to mining organisations. Berthon *et al*. (2005) grant permission for individual use of the scale in their research paper "Captivating company: dimensions of attractiveness in employer branding". The EmpAt scale is the most widely used scale for measuring employee attractiveness (Andreasen & Reinholt, 2019; Arachchige & Robertson, 2013; Eger *et al.*, 2019; Larsson & Rosell, 2014; Reis & Braga, 2016). The EmpAt scale stresses the salience for organisations to comprehend factors that attract job-seekers to an organisation that represent perceived interest, economic, social, development and application values (Berthon *et al*., 2005:159–162). These dimensions are explained in detail in Chapter 2. There are 25 items on the EmpAt scale. However, 23 of these were used in the study, with the researcher personally incorporating two additional items. The items added by the researcher fall under the statements related to interest value ("the location of the workplace) and social value ("an environment that enables me to balance my work and home life easily"). These items were informed by literature. According to Berthon *et al*. (2005:164), the EmpAt scale is considered reliable, as it has a Cronbach's alpha coefficient of 0.96.

In addition to the attraction scale, the 17-item Utrecht Work Engagement Scale (UWES) was used to measure women's level of engagement in the mining organisation. Wilmar Schaufeli provides permission on his website to use the UWES (Carnahan, 2013:43). This measurement scale is the most commonly used measure for employee engagement (Schaufeli & Bakker, 2004:5). The UWES has 17 questions in total: six that measure vigour, i.e. employees' high levels of energy, resilience and willingness to invest effort in their work; five that measure dedication; and six that

measure absorption (Carnahan, 2013:43). Since as early as 1999, studies have been performed using the UWES and have shown that the scale is a valid tool that can be used to measure employee engagement (Carnahan, 2013:43). The study made use of all the UWES items. The UWES, according to Schaufeli and Bakker (2004:14), is reliable and internally consistent, with a Cronbach's alpha coefficient of 0.93. Similarly, Cronbach's alpha values for all three UWES measures were greater than 0.9 in Roberts's (2014) study, indicating that the measuring instrument is reliable. Likewise, Vosloo's (2015:60) study revealed that collectively all three measures of the UWES indicated a Cronbach's alpha coefficient of 0.92. In addition, the reliability analysis of Bakar (2013:117) showed a Cronbach's alpha coefficient of 0.89, indicating good reliability and internal consistency.

Furthermore, the Retention Factor Scale (RFS) was adapted to measure the retention of women employed in technical mining positions. The RFS is included in Döckel's (2003) dissertation titled "The effect of retention factors on organisational commitment: an investigation of high technology employees", which is available through the University of Pretoria's Institutional Repository, which provides open access to scholarly articles and conference papers resulting from university-based research (Olivier, 2015). Döckel (2003) developed the RFS to measure respondents' satisfaction regarding retention factors. The scale was adapted to measure the retention of women in technical mining positions. The different items were used as follows:

- Organisational commitment has 18 items; 11 of those were used.
- Compensation and benefits have 13 items; six were used.
- Job characteristics, training and development opportunities, career development and supervisor support have 22 items collectively; 13 were used.
- Work/life policies have four items; all of them were used.
- Likelihood of staying or leaving the organisation has three questions, of which all were used.

Döckel (2003) confirmed the construct validity and reliability of the scales.

Finally, the researcher developed a self-constructed scale consisting of 11 items to assess the broad factors that influence the attraction, engagement and retention of women in technical mining positions. The scale's items were informed by the literature review that identified perceived factors influencing the attraction, engagement and retention of women in mining, in particular. The scale's primary objective was to ascertain what factors women in technical mining positions believe are critical for their attraction, engagement and retention. The scale's reliability was measured using Cronbach's alpha and its construct validity using an exploratory factor analysis (EFA). The results are discussed in detail in Chapter 5.

The questionnaire was scripted and converted into a web-based questionnaire through the assistance of North-West University's Statistical Consultation Services using Google Forms. Google Forms is a free Google application that enables users to rapidly develop and distribute questionnaires (ICIT Technology Training and Advancement, 2020:3; Mondal *et al*., 2018:218). Computers, laptops, tablets and smartphones are all compatible with the format of Google Forms questionnaires (Rohmah *et al*., 2018:178). In addition, Google Forms questionnaires are environmentally friendly, cost-effective, time-efficient, provide accurate recapitulation of responses, and are uncomplicated to complete (Rohmah *et al*., 2018:180).

1.6.8.2 Qualitative phase

An interview schedule developed by the researcher was used to conduct semi-structured interviews (see Annexure B). The interview schedule was sent to the participants prior to the interview to familiarise them with topics covered in the interview. The schedule included the following topics:

- Section A included an introductory section highlighting the participants' organisations, their job title and their role within the organisation.
- Section B covered factors influencing the attraction of women to technical mining positions.
- Section C probed the engagement of women employed in technical mining positions.
- Section D explored factors influencing the retention of women in technical mining positions.
- Section E entailed an open question that aimed at establishing additional commentary concerning the attraction, engagement and retention of women in technical mining conditions.

1.6.8.3 Pre-testing of the instruments

Three procedures of pre-testing were used to ensure that the questionnaire was fit for purpose. First, the statistician (Professor Suria Ellis at the Statistical Consultation Services, North-West University) reviewed the questionnaire to ensure that the questions posed were relevant to the research objectives and identified questions that would have been difficult for respondents to comprehend and could have resulted in biased responses. Secondly, the questionnaire was piloted among selected women in technical mining positions to assess their understanding and interpretation of the questions posed. The pre-test identified questions that were unclear or challenging to comprehend and detected errors or inconsistencies discovered by respondents while responding to questions. Thirdly, the questionnaire's hyperlink was tested before dissemination. The link was tested to determine whether the questionnaire was working adequately electronically. Those who tested the link identified challenges they experienced while

completing the web-based questionnaire. They provided feedback on the layout of the questionnaire, i.e. whether it was user-friendly, checked logic instructions such as skips and the ability to type open-ended questions and also provided feedback on the length of the questionnaire**.**

Furthermore, the researcher pre-tested the interview schedule with people working in the mining industry who are knowledgeable about women in mining to determine their understanding and interpretation of questions and identify questions that were challenging to understand, as well as the length of the interview.

In addition, a professional editor also double-checked the spelling, wording, sentence structure and flow of both instruments. The final instruments incorporated the feedback from the pilot tests and those of the statistician and editor.

1.6.9 Data analysis

According to Marshall and Rossman (1999:150), data analysis is the process of assembling, constructing and forming meaning in terms of data collected. This involves applying deductive and inductive logic to the research (Best & Khan, 2006:354). The data analysis techniques that were used in the study are discussed in the sub-sections below.

1.6.9.1 Quantitative phase

The Statistical Package for the Social Sciences (SPSS version 27) was used to process and analyse the data. This was accomplished with the assistance of North-West University's Statistical Consultation Services, which facilitated the selection and implementation of data analysis methods that were appropriate and effective for the type of data obtained in the study. Statistical analysis is critical in quantitative research, as it is the technique developed for analysing, interpreting and drawing conclusions from acquired data (Isotalo, 2001:2). According to Ali and Bhaskar (2016:662), statistical analysis "gives meaning to the meaningless numbers, thereby breathing life into a lifeless data". This study applied several statistical analyses to provide meaning to the collected data. These statistical analyses included descriptive statistics (frequency distributions, means and standard deviation), multivariate analysis (exploratory and confirmatory factor analysis [CFA]), comparison tests (independent t-test and ANOVA) and correlation tests (the Pearson product-moment correlation). A detailed discussion of the study's quantitative data analysis is provided in Chapter 5.

1.6.9.2 Qualitative phase

The purpose of qualitative data analysis is to make sense of texts and image data, which involves segmenting and disintegrating data as well as putting them back together (Creswell, 2014:246).

Unlike quantitative research that follows a systematic process of firstly collecting data, then analysing them and finally writing the report, qualitative data analysis can commence immediately upon the completion of little data collected (Creswell, 2014:246). In view of this, the analysis of qualitative data commenced as soon as four interviews were transcribed. Questions from the interview schedule were used to organise the analysis, i.e. synthesise interview responses to the questions. A qualitative computer data analysis program (ATLAS.ti) was used to analyse the data. The use of this software was beneficial, as it turned out to be an efficient method for storing and analysing data (see Creswell, 2014:245). After transcribing the interviews, the coded material was analysed using a thematic content analytical technique. Thematic content analysis is an analytic technique that identifies and analyses patterns or themes across data sets (Wilson & MacLean, 2011:551). Its purpose is to identify themes, i.e. patterns in the data, that are important or of interest to the study and to employ them to address the research questions (Maguire & Delahunt, 2017:3353). The themes that emerged from the analysis are discussed in Chapter 6. To ensure that adequate and thorough analysis was undertaken, Creswell's (2014:246) step-by-step data analysis process was adopted (see Figure 1.2).

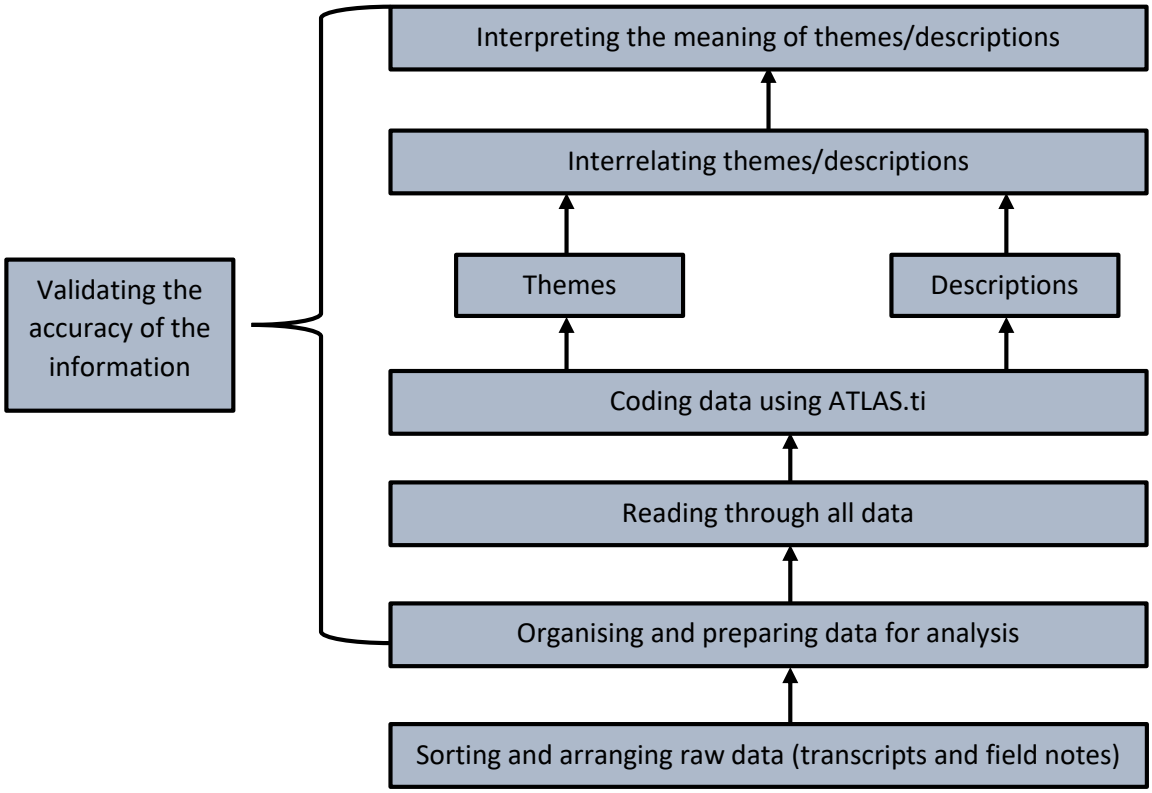


Figure 1. 2: Qualitative data analysis process followed in the study

Source: Creswell (2014:247)

1.6.10 Approaches for ensuring reliability and validity

A measuring instrument is consistent (reliable) if it produces equivalent results for repeated measurements (Eiselen *et al*., 2005:14). An internal consistency indicator of reliability is called Cronbach's alpha coefficient (Wilson & MacLean, 2011:71). Cronbach's alpha coefficients that are higher than 0.70 are considered satisfactory, those of 0.6 to below 0.7 are regarded as moderate determinants of reliability and those lower than 0.6 are considered to be poor (Peterson, 1994:381). To ensure reliability, the internal consistency of all three scales (EmpAt, UWES and RFS) was calculated. In addition, the quality of a measuring instrument is also determined by looking at its validity. Eiselen *et al*. (2005:14) define validity as the degree to which a measuring instrument accurately measures what it is supposed to measure. The construct validity of the scales was determined using factor analyses to ensure that the measurements accurately reflected the constructs as intended, as recommended by Bryman (2012:47). Factor analysis is a valuable technique for establishing validity evidence, as it provides empirical evidence for a construct's dimensionality (Wetzel, 2011:31). Chapter 5 discusses the research results of the factor analyses.

The approach used to establish validity in quantitative studies is inapplicable to establishing validity in qualitative studies (Masenya, 2018:73). In Bryman (2012:49), Lincoln and Guba (1985) proposed that alternative methods for evaluating qualitative research are required. These include establishing trustworthiness as a criterion for evaluating the quality of a qualitative study. Each dimension of trustworthiness corresponds to a quantitative research criterion. The first is credibility, which is parallel to internal validity, and relates to the degree to which the findings are credible. The second is transferability (a parallel of external validity), which seeks to determine whether findings apply to other contexts. Finally, dependability (a parallel of reliability) relates to the likelihood that findings will apply in other situations. The aspect of trustworthiness was taken into account when conducting the qualitative research.

In addition, as recommended by Creswell (2014:251), the following methods for ensuring the validity of qualitative data were also used in the study:

- *Triangulation of different data sources of information to develop a comprehensible justification for themes.* Data triangulation in the analysis process, and a literature review, provided more substantial support for the confirmation of recurring themes and confirmed the data production techniques used (see Santos *et al*., 2020:660).
- *Utilisation of detailed and thorough descriptions to communicate research findings.* The qualitative findings provided detailed descriptions of the themes, drawing the reader closer to the perspectives expressed by the research participants. According to Creswell (2014:251), this approach makes research findings more realistic and contributes to their validity.

- *Clarification of the researcher's bias in conducting the study.* The study may be biased in that as a woman who has witnessed and heard of the injustices faced by women in mining, the researcher admits that the subject is sentimental. According to Creswell (2014:251), good qualitative research entails disclosing how the interpretation of the findings is shaped by the researcher's background.
- *Presentation of negative or contradictory information that runs counter to the themes*. This research includes the presentation of findings that contradict the general perspective of the recurring themes. Creswell (2014:252) believes that by presenting this contradictory evidence, the study becomes more realistic and valid.

To ensure reliability in the qualitative research, all face-to-face interviews were audio-recorded. Consent was obtained from the participants prior to recording the interviews, and all agreed that the sessions could be recorded. The recordings were backed up with supplementary notes taken during the interviews. According to Halcomb and Davidson (2006:40), field notes are valuable, as they can encapsulate the researcher's thoughts and interpretations while listening to audio recordings. Recordings reduce the possibility of bias in data analysis, as they enable interviewers to reflect on the conversations held and ensure that the content shared by participants is fittingly represented (Halcomb & Davidson, 2006:41). Moreover, recordings are a fundamental tool for transcription. The transcription of interviews is a critical component of qualitative data preparation (Masenya, 2018:68).

According to Duranti (2006:301), transcription is the "transformation of either analogical or digital recordings of sounds or moving images into some kind of 'text' that can be later examined and/or displayed as evidence of a particular phenomenon under investigation". The transcription in the study only involved the conversion of sounds (conversation) to text. All interviews were transcribed in accordance with the interview schedule themes. The researcher personally transcribed all transcripts following the clean verbatim approach. This approach entails light editing, which eliminates parts of utterances such as false starts, stutters, external sounds, repetitions and filler speeches such as uhms and errs (Palaya *et al*., 2018:269). However, caution was taken to ensure that these edits did not deviate from the original dialogues. In qualitative research, coding occurs during the data analysis phase. In addition, a codebook containing all code descriptions was also saved and exported to a Microsoft Word document. This could be useful in the event that the data are requested for analysis in future. The next section discusses the study's ethical considerations.

1.7 ETHICAL CONSIDERATIONS

Ethics in research is a dimension that is concerned with the manner in which codes and conducts are formulated on the principles of moral behaviour (Wilson & MacLean, 2011:597). Ethical considerations ensure adherence to the general principles and codes of conduct of ethical behaviour (Wilson & MacLean, 2011:597). The Arts Research Ethics Committee of the Faculty of Humanities at North-West University granted permission to conduct the research (ethics number: NWU-01007-20-A7).

The research was guided by the principles provided by North-West University's Ethics Committee (NWU, 2010:47). The first ethical point was in the way participants were treated. The participants were treated with respect at all times and referred to as 'participants', which is considered to be a more respectful term (Wilson & MacLean, 2011:599). Confidentiality of research participants was applied. Participants were assured that the outcomes obtained from the study would remain confidential and would not be used for any purpose other than the research. In addition, ethics in eliminating physical harm was taken into account. The participants were assured that they would be protected from any undue risks associated with participating in the research (Wilson & MacLean, 2011:599). Data collected face to face were gathered in accordance with all the necessary Covid-19 protocols. The temperatures of the researcher and research participants were taken before entering the mining premises, masks were worn at all times and a one-metre social distancing guideline was followed.

Furthermore, consent was pursued before participating in the study with the research participants and mining companies where data were collected. This was done through informed consent. Every participant who provided consent to participate in the study was given an informed consent form, which they had to sign to indicate that they understood the purpose of the study and that they provide permission for their responses to be used for the research (see Gravetter & Forzano, 2009:107).

Following the completion of the study, a debriefing session will be performed with the participants who wanted feedback on the research findings. The researcher will present research findings, conclusions and recommendations.

Moreover, ethical obligations in research do not only conclude with treating participants ethically. The researcher also has an obligation to treat the study ethically and with integrity (Wilson & MacLean, 2011:611). Wilson and MacLean (2011:611) assert that dishonest research practices can erode the public's confidence in scientific findings, potentially harming the outcomes of the larger group of people being studied. An additional issue related to integrity in research is that of plagiarism. Plagiarism is the representation of someone else's work or ideas as one's own without

giving them credit (Gravetter & Forzano, 2009:122). Researchers are responsible for presenting truthful and accurate reports of findings and providing relevant credit when reports or ideas of others are used (Gravetter & Forzano, 2009:122). In this regard, the researcher took these aspects into account, and efforts were made to reduce the possibility of these errors.

1.8 LIMITATIONS AND DELIMITATION OF THE STUDY

It was anticipated that the study would not be conducted without limitations. One of the limitations was the inaccessibility of mines and participants during the data collection period. The Covid-19 pandemic influenced the method, timing and duration of data collection. Face-to-face questionnaires were initially proposed, but had to be supplemented with other data collection methods, such as social media platforms. Because mines often have several working shifts – some employees work during the day, while others work in the evening – assembling people at a central and opportune time posed a challenge for face-to-face questions. To respond to this challenge, appointments were set beforehand to collect data to accommodate busy respondents. These were done with the support of human resource personnel at the mines, where data were collected during respondents' lunch breaks, when they were reporting for work and during knock-off periods. To address these limitations, access to mines was sought through the assistance of the researcher's employer, the MQA, which has the contact details of registered mining companies in South Africa.

In addition, the non-probability sampling technique limits the study's ability to generalise research findings and results to the study's population (women in technical mining positions in South Africa). As a result, the study's results and findings are limited to those who participated in it.

1.9 THE SIGNIFICANCE OF THE STUDY

Taking cognisance of the low numbers of women presented in the mining industry and more specifically in technical positions, it is salient to determine factors that are leading to the gradual improvement of women's representation in the industry. Since the introduction of democracy, different legislations and policies have been implemented to redress past inequalities. From these, opportunities have been developed for women to pursue careers that had been previously known as male-dominated. However, they remain underrepresented. This challenge is not unique to South Africa. According to Khan *et al*. (2013:18), findings from several surveys that had been conducted in developed countries revealed that despite the presence of gender equality laws, the mining industry workforce is still male-dominated. The study sought to clarify factors that attract and retain women in technical mining positions. In the same context, factors related to employee engagement were determined to establish the effect that engagement has on retaining existing employees and attracting potential ones. The research drew insight regarding factors influencing attraction, engagement and retention from different theories, such as Berthon *et al.'s* (2005)

employer attractiveness theory, the three-factor engagement model of Schaufeli *et al.* (2002) and Herzberg's two-factor theory, as well as additional literature.

There is a need for women to be equally represented in societal economic activities as their male counterparts, as this leads to improved global economic growth and market efficiency, ensuring that all human resources offered by society are well utilised and invested in (Ledwaba, 2017:25). In addition, the attraction, engagement and retention of women in the mining industry challenge gender stereotypes that portray mining as an unsuitable work environment for women. Therefore, their presence contributes to the promotion of gender equality in the industry (Consultancy Africa Intelligence, 2011:2).

Furthermore, although the theories used to investigate the attraction, engagement and retention of women in technical mining positions assist in contributing towards understanding of the topic of enquiry, there are gaps in addressing gendered and industry-related factors. Therefore, the study aimed to address this gap. As mentioned previously, there is also a gap in the literature of similar studies conducted on this topic (Lord & Eastham, 2011; MCA, 2005; MCSA, 2011). This research therefore sought to enhance existing knowledge in the area under investigation.

1.10 CHAPTER LAYOUT

Chapter 1: Introduction, problem statement and research methodology

This chapter provided the orientation, background, research questions and objectives of the study. The chapter also provided a comprehensive discussion of the research methodology and the significance of the study.

Chapter 2: Attraction, engagement and retention: a theoretical framework

Chapter 2 provides the conceptual clarification of the terms 'attraction', 'engagement' and 'retention' and the most prevalent theories pertaining to attraction, engagement and retention. This review forms the theoretical framework aimed at elucidating the factors affecting attraction, engagement and retention.

Chapter 3: Women in mining: global and national trends and perspectives

This chapter explores the global and national trends and perspectives regarding the attraction, engagement and retention of women in mining.

Chapter 4: Statutory and regulatory frameworks governing the inclusion of women in mines in South Africa

This chapter explores the statutory and regulatory frameworks guiding the inclusion of women in the South African mining industry.

Chapter 5: Empirical results and analyses of quantitative data

The chapter presents the empirical results and analyses of quantitative data. These include descriptive and inferential statistics.

Chapter 6: Empirical findings and analyses of qualitative data and discussion and interpretation of quantitative results and qualitative findings

The chapter presents the analysis of the empirical findings of the qualitative component of the study. In addition, it entails a discussion of the research results and findings against the theoretical framework, literature pertaining to factors influencing the attraction, engagement and retention of women in mining and the policy/legislative framework.

Chapter 7: Core summary, conclusions and recommendations

Based on the study's result, findings and literature review, conclusions and recommendations are drawn in Chapter 7 with the aim to assist organisations to successfully attract, engage and retain women in technical mining positions.

1.11 CONCLUSIONS

The chapter provided an introduction to the study. It began with a problem statement and then moved on to the research questions and objectives. The main objective was to determine the factors that influence women's attraction, retention and engagement in technical mining positions and, as a result, to determine what can be done to increase women's successful participation in the South African mining industry. The central theoretical assertion was followed by an elaborative discussion of the research methodology adopted. In addition, the ethical considerations that were implemented were discussed. Moreover, the study was not without limitations, which were highlighted. To demonstrate the necessity of conducting the research, a discussion of the study's significance was included. The next chapter discusses the theoretical underpinnings of attraction, engagement and retention.

CHAPTER 2

ATTRACTION, ENGAGEMENT AND RETENTION: A THEORETICAL FRAMEWORK

2.1 INTRODUCTION

This chapter presents a conceptual and theoretical exposition of attraction, engagement and retention. As reflected in Chapter 1, attraction, engagement and retention affect the long-term sustainability of organisations (Bidisha & Mukulesh, 2013; Deshwal, 2015; Ibidunni *et al*., 2016; Kundu & Kusum, 2017; Rossi, 2018). The attraction of employees plays an imperative role in an organisation's performance, which is crucial for providing employers with a competitive advantage (Brymer *et al*., 2014; Turnea, 2018). Correspondingly, employee engagement results in high levels of productivity and efficiency, as well as increased motivation and job satisfaction (Holbeche & Matthews, 2012; Hoole & Bonnema, 2015; Rich *et al*., 2010; Rothmann & Jordaan, 2006; Saks, 2006). Employee engagement also contributes to commitment, as employees become emotionally attached to their organisations, which in turn results in the improvement of employee retention (Balakrishnan *et al*., 2013:10). The absence of employee engagement results in disengaged employees who are likely to be less committed to their jobs and to a high probability that they would leave their organisations (Hoole & Bonnema, 2015; Rich *et al*., 2010; Saks, 2006). Therefore, in a competitive marketplace, employee retention is a primary driver for organisational success (Ibidunni *et al*., 2016:2).

This chapter provides a conceptual clarification of the terms 'attraction', 'engagement' and 'retention'. In addition, it presents a critical review of the most prevalent theories that are relevant to this research inquiry. To situate the study within an applicable framework, from these theories, a theoretical framework was tailored to inform and influence critical analysis suitable to achieve the objectives of the study.

2.2 A CONCEPTUALISATION OF THE CONCEPTS OF EMPLOYEE ATTRACTION, ENGAGEMENT AND RETENTION

This section provides a definitional framework for the conceptual understanding of the constructs attraction, engagement and retention. There is no singular definition of the terms and therefore, the conception of these terms differs depending on issues of time and contextual circumstances.

2.2.1 Attraction

The concept of attraction is observed from a binary lens; one focuses on employee attraction and the other on organisational attraction (Highhouse *et al*., 2003:989). Employee attraction includes the characteristics of the job itself, i.e. occupation attractiveness (Highhouse *et al*., 2003:989). Employee attraction is also the favourable interaction between potential employees and images as well as values and information regarding an organisation (Bratton & Gold, 2003:379). Organisational attractiveness stems from an individual's perceptions of viewing an organisation as a potential place for employment (Highhouse *et al*., 2003:989). Individuals define a set of satisfactory standards that are personally relevant and imperative for them based on their most suitable work environment (Magbool *et al*., 2016:53). Apart from being viewed as a potential place of employment, organisations influence perceptions of organisational attraction. Therefore, organisational attractiveness can also be defined as the anticipated benefits that prospective employees perceive from working for a particular organisation (Berthon *et al*., 2005:156). In assessing the attractiveness of an organisation, individuals process information about the organisation's image and select an implicit favourite job among the alternatives available (Ehrhart & Ziegert, 2005:903).

Employee attraction commences with launching a job and ends with the employment of an applicant (Turnea, 2018:74). Attractive work is not solely established by an individual's desire to form part of a particular organisation; however, it also comprises the characteristics of the job and occupational position (Åteg & Hedlund, 2011:3). For work to be deemed attractive, both the occupation and the organisational characteristics need to be viewed as attractive, as the former is located within the latter (Åteg & Hedlund, 2011:3).

In this study, attraction is examined on the basis of individual and organisational perspectives of attraction. In accordance with Ryne's (1989:3) and Berthon *et al.*'s (2005:156) definitions of attraction, this study defines attraction as an organisation's ability to positively lure individuals into viewing the organisation and its work as desirable and suitable for accommodating their envisioned benefits with which to initiate or resume an employment relationship. The study's concentration on attraction from the position of the individual and organisation is germane to

the objectives of the study, as most of the empirical research focuses on individual and organisational attitudes and behaviours, as later observed in the upcoming sections.

2.2.2 Engagement

The term 'engagement' was first coined by Kahn in 1990, indicating that individuals can engage in varying degrees of self-expression, physically, cognitively and emotionally, in work role performances, which has implications for both their work and their experiences (Kahn, 1990:692). Kahn (1990:694) argues that the manner in which people inhabit their work is reliant on their enthusiasm to immerse themselves in their roles. More specifically, Kahn (1990:694) defines 'engagement' as "the harnessing of organisation members' selves to their work roles" and 'disengagement' as "the uncoupling of selves from work roles". The construct of employee engagement can be inferred as a positive psychological experience, yielding an energised state and manifesting as behavioural tendencies oriented towards positive organisational outcomes (Kahn, 1990; Macey & Schneider, 2008; Rich *et al*., 2010). Kahn's (1990:698) definition of engagement also highlights a state where employees become attentively absorbed and passionately involved in their work. This definition is consistent with Schaufeli and Bakker's (2004:295) view that engagement is a continual, positive and effective motivational state of fulfilment that is characterised by vigour, dedication and absorption. These concepts are discussed in detail in section 2.5.2. Work engagement is therefore defined by high levels of energy and strong identification with one's work (Schaufeli & Bakker, 2004:5).

In light of the above definitions, engagement involves the enjoyment and belief in one's work and the feeling of being valued for undertaking the work (Wellins *et al*., 2005:2). The enjoyment of one's work brings a satisfaction that matches a person's interests, knowledge, values and skills, while belief signifies that people feel more engaged if they hold the notion that their contribution to the organisation is meaningful and valued (Wellins *et al*., 2005:2). Kahn (1990:704) proposes that the experience of meaningfulness, in turn, influences personal engagement or disengagement at work. Disengagement emerges when an individual's energy for positive emotions is absent (or exhausted by negative emotional experiences) (Green Jr *et al.,* 2017:7). Conversely, engagement emerges as a result of a psychological and emotional state whereby, irrespective of time and tasks, employees find themselves being filled up with energy and fully dedicated to their work (Markwich & Robertson-Smith, 2009:10).

Furthermore, researchers have consistently found engagement to be positively associated with attitudinal- and well-being-related outcomes such as commitment (Halbesleben, 2010; Hallberg & Schaufeli, 2006), work-related outcomes such as job performance (Bakker & Bal, 2010; Halbesleben & Wheeler, 2008), client satisfaction (Salanova *et al*., 2005) and financial rewards for organisations (Xanthopoulou *et al*., 2009). These research results indicate the

extent to which employees thrive at work, are committed to their employer and are motivated to do their best for the benefit of themselves and their organisations (Stairs *et al*., 2006).

A culture of engagement strives towards guaranteeing employees a sense of genuine commitment to the organisation and inspires them to be biased towards it alone and pride themselves in being associated with it (Russo, 2010:10). According to Chester (2005:31), "engaged employees work as if they are working for their organisations and believe that there is a direct connection with the outcomes created by every transaction". An engaged employee is aware of an organisation's commercial context and works with colleagues to improve performance within the job for the benefit of the organisation. Therefore, employee engagement entails ensuring that the enthusiasm and interests of employees are aligned with the organisation's goals (McBain, 2007:17). In turn, the organisation must work to develop and nurture engagement, which requires a reciprocal relationship between employer and employee (Robinson *et al*., 2004:9).

This study followed Schaufeli and Bakker's (2004) definition of engagement that takes into account elements of vigour, dedication and absorption for illuminating the fundamental principles leading to employee engagement.

2.2.3 Retention

The purpose of retaining employees in an organisation is not only to attract new employees, but to also retain and develop existing employees (Osaro, 2016:77). Retention is viewed as the voluntary determination by organisations to develop a work environment that engages employees for the long term (Onah & Anikwe, 2016:11). Taylor (2002:10–11) introduced two perspectives on retention. The first perspective contends that reducing the employee turnover rate should be desirable for all organisations, and therefore initiatives focusing on employee retention should aim at addressing these turnover rates. Turnover is the movement of individuals between jobs, organisations, and occupations and between statuses of employment and unemployment within different organisations (Abbasi & Hollman, 2000:333). There are two types of turnover, namely voluntary turnover, which takes the form of resignations or retirement and, involuntary turnover, which is a result of layoff or discharge (Bhattacharya, 2015:297). The second perspective suggests that human resource management policies should prioritise improving retention or turnover rates in general (Taylor, 2002:10–11).

The retention of employees is effected through the implementation of practices and policies aimed at preventing capable, talented and highly skilled employees from leaving the organisation (Brown, 2011:39; Knox, 2013:11; Samuel & Chipunza, 2013:98). Employee

retention policies are aimed at improving job satisfaction and reducing the costs of recruiting new employees (Onah & Anikwe, 2016:11). According to Taylor (2002:11), high rates of voluntary turnover are viewed as a sign of failure in human resource functions.

From an employee point of view, retention is the act to which an employee continues to undertake work-related exchange with a particular organisation on a prolonged basis (Sinha & Sinha, 2012:146; Zineldin, 2000). For employees, retention suggests a state in which employees willingly decide to work and remain within a particular organisation (Osaro, 2016:77).

Taking into account Taylor's perspectives on retention, the study's focus was on the exploration of employee turnover and retention practices provided by organisations, with a focal interest being why employees choose to stay or leave an organisation. The subsequent sub-sections present a discussion on the varying theories that are conceptually linked to attraction, engagement and retention. The first three sub-sections explore a wide range of theories that explain the constructs under investigation from different viewpoints. Emphasis is placed on widely cited and empirically supported theories. Thereafter, a customised framework incorporating the logic, assumptions and foundations of the connotations of attraction, engagement and retention is provided to illustrate what attracts, engages and retains employees in their workplaces.

2.3 THEORIES OF ATTRACTION

Given the transition of existing jobs becoming more complex and requiring highly qualified employees in the contemporary business world, organisations are faced with the challenge of competing for talent (Bakanauskiene *et al*., 2017:5). Being an attractive organisation is a fundamental factor to ensure that employers attract the relevant talents, considering that individuals are attracted to strong organisations that possess a positive reputation and prestige (Rousseau, 2008; Universum Communications Sweden, 2011). Therefore, organisational attractiveness is a consequence of efforts made by employers to influence prospective employees' intentions towards pursuing a career in a particular organisation (Adams, 2013:18).

Three overarching metatheories (environment processing, interactionist processing and self-processing) were established in an attempt to enlighten and explore individuals' attraction to organisations (Adams, 2013:18; Derous & Wille, 2017:5; Ehrhart & Ziegert, 2005:902; Rogelberg, 2016:1062). The first group of metatheories is the environment processing theory. It consists of two sets of theories: one that differentiates between the actual environment (i.e. the objective characteristics of the organisation) and the other that pinpoints the perceived environment (i.e. individuals' subjective perceptions of the organisation based on available information) (Ehrhart & Ziegert, 2005:903). This metatheory comprises six theories (see Table 2.1) that explain how characteristics of the actual environment are interpreted and processed, resulting in perceptions of the environment's characteristics, and how this interpretation ultimately results in attraction (Ehrhart & Ziegert, 2005:903). The theoretical practices of how individuals interpret characteristics of the actual environment consist of the heuristic-systematic model, image theory and signalling theory, while those related to the perceived environment consist of the expectancy theory; the generalisable decision-processing model; and the exposure-attitude hypothesis. The shared characteristic of these theories involves the emphasis on how the processing of information regarding an environment influences attraction (Ehrhart & Ziegert, 2005:904). This metatheory suggests that when faced with uncertainty, individuals process and organise information about what is known about the actual environmental characteristics, resulting in the development of their own unique perceptions of the environment, which in turn leads to attraction (Ehrhart & Ziegert, 2005:903).

The second group of theories entails the notion that attraction is a function of interaction (interactionist processing theory) (Åteg & Hedlund, 2011:8; Ehrhart & Ziegert, 2005:8; Rogelberg, 2016:1062). These theories suggest that individuals evaluate their personal characteristics such as personal needs and values to those of the prospective employer, which then determines their attraction (Rogelberg, 2016:1062). The theories contained in this

metatheory are interactional psychology, the need-press theory, the attraction-selection-attrition theory, the theory of work adjustment and the employer attractiveness theory. These are also discussed in Table 2.1.

The third and final group of attraction metatheory views attraction as a function of perceptions about the self (self-processing theory) (Åteg & Hedlund, 2011:8; Ehrhart & Ziegert, 2005:8; Rogelberg, 2016:1062). The theories included are consistency theory, social learning theory and social identity theory (Åteg & Hedlund, 2011:10). The self-processing theory reflects on the role of personal characteristics between subjective fit and an individual's perceived organisational attraction (Ehrhart & Ziegert, 2005: 910; Rogelberg, 2016:1062).

Accordingly, Table 2.1 discusses each metatheory in relation to their encompassed theories and propositions regarding employee attraction to provide a coherent and parsimonious framework explaining why individuals are attracted to organisations.

Table 2.1: Theories of attraction

Metatheory	Theoretical structure	Theories	Theorem
Environment processing metatheory	These theories provide an understanding of how individuals process information about organisations or work, and their perceived characteristics. These theories postulate that individuals may possess varying perspectives of the same organisation depending on which characteristics they focus on and how they process information about them.	Heuristic-systematic model (Eagly & Chaiken, 1984, 1993)	This model is a dual-process theory that distinguishes between two approaches of persuasion, namely heuristic and systematic processing (Stroebe, 2012:139). The model suggests that the type of cognitive processing (heuristic or systematic) that an individual implements is influenced by the characteristics of the message being processed (Ehrhart & Ziegert, 20115:904). Systematic processing comprises a cautious, deliberate and thoughtful assessment of the content of information that individuals utilise when making a judgement about a particular environment with the intent of understanding it (Ehrhart & Ziegert, 2005:904; Samson & Voyer, 2012:9; Vishwanath, 2015:574). When using systematic processing, individuals attempt to comprehend and evaluate information and assess its validity before making conclusions (Ryu & Kim, 2015:842). In contrast, heuristic processing involves individuals applying minimal effort in making judgement concerning information validity (Ryu & Kim, 2015:842). Therefore, information processing in a heuristic manner employs less effort and information (Ehrhart & Ziegert, 2005:904). On this note, the degree to which the organisation is processed either heuristically or systematically has an effect on how accurately the perceived environment represents the actual environment. (Ehrhart & Ziegert, 2005:905).
		Image theory (Beach, 1990)	The theory postulates that individuals evaluate the attraction of an occupation or organisation by making allowance of how the job or organisation's alternatives fit the image of what they desire (Stevens, 1998). Through the process of framing, individuals determine the information they regard as relevant to lessen the amount of information to be considered (Stevens, 1998).

Metatheory	Theoretical structure	Theories	Theorem
			Therefore, when judging attraction, prospective employees assess specific types of information more profoundly, while disregarding others. With this, individuals purposefully interpret certain aspects of the organisation or occupation to develop their own impressions of the organisation (Ehrhart & Ziegert, 2005:904).
		Signalling theory (Rynes, 1989; Spence, 1973)	The theory holds a notion that job applicants often possess minimal knowledge about an occupation and organisational characteristics when they decide to apply for a job (Larsen & Phillips, 2002). This is because, during the initial stages of recruitment, it may be challenging for them to have comprehensive knowledge of the organisation from which they would be seeking employment (Turban, 2001:295). Therefore, in the absence of this information, applicants interpret the limited knowledge they have as indicators of what they assume it would be like to be employed in that organisation (Breaugh, 2008; Rynes, 1989; Spence, 1973; Turban, 2001:295). In this definition of signalling theory, the applicant is the receiver of the signal and the organisation is the sender of the signal (Hendriks, 2016:29). Examples of such signals could be recruitment activities, recruiter characteristics or behaviour that could depict the working conditions of the organisation. Prosaic recruitment materials, for example, may signal that the company does not invest much in developing its human resources, resulting in low employee attraction (Ehrhart & Ziegert, 2005:904; Turban, 2001:295). On the other hand, a welcoming and warm recruiter signals a considerate and warm organisation, thereby increasing employee attraction to that organisation (Derous & Wille, 2017).
	These theories explain how perceptions of organisations or work are processed and related to employee attraction	Expectancy theory (Vroom, 1964)	Expectancy theory is a significant theoretical foundation for employee attraction (Ehrhart & Ziegert, 2005:905). The theory suggests that individuals are attracted to jobs or organisations that can be perceived to offer valued

Metatheory	Theoretical structure	Theories	Theorem
			characteristics (Vroom, 1964). In this theory, Vroom (1964) predicts attraction and job choice based on the degree of consistency between perceptions of the environment and the individual's desires, needs and objectives, i.e. an organisation is viewed attractive if it can fulfil individuals' desires (Åteg & Hedlund, 2011:7). In addition, Vroom (1964) distinguishes between occupational preference and occupational choice, where individuals' preferred occupation is the one that they view as having the most positive valence or attractiveness, while the chosen occupation is one with the most positive force and is viewed as a function of both the attractiveness or valence of the occupation and the expectancy for the attainment of the occupation (Brooks & Betz, 1990:57).
		Generalisable decision-processing model (Soelberg, 1967)	Soelberg (1967) argues that the act of choosing a job is an 'unprogrammed' decision where initially, an individual develops a set of criteria that include qualities such as location, organisational culture, work-life balance and rewards that they perceive as personally important for their ideal work environment. The selection of an individual's most preferred job or organisation would then be based on the evaluation of the organisation's characteristics in relation to what an individual personally considers as relevant before selecting a favourite among the acceptable alternatives. The perceptions of the alternatives are evaluated not only in terms of the set of criteria, but also against this implicit favourite (Ehrhart & Ziegert, 2005:905). As a result, the theory emphasises the significance of comparing an individual's perceptions of various organisations (Ehrhart & Ziegert, 2005:905).

Metatheory	Theoretical structure	Theories	Theorem
		Exposure-attitude hypothesis (Zajonc, 1968)	This hypothesis holds the view that individuals tend to develop a preference for particular elements that are more familiar to them than others (Falkenbach *et al*., 2013:1). With that, repeated exposure results in increased familiarity and positive evaluations (Ehrhart & Ziegert, 2005:905; Falkenbach *et al*., 2013:1). Familiarity with an organisation, for example, is reported to be positively related to ratings of its attractiveness (Ehrhart & Ziegert, 2005:905).
Interactionist processing metatheory	These theories gauge the degree to which the actual environmental characteristics interact with individuals' differences to predict the objective fit between an individual and an organisation.	Interactional psychology (Lewin, 1935)	This theory suggests that behaviour is an undertaking of interactions between an individual and situational characteristics (Ehrhart & Ziegert, 2005:907). Research on this theory (Bretz & Judge, 1994; Cable & Judge, 1996; Judge & Bretz, 1994; Judge & Cable, 1997) revealed that attraction can be predicted by observing an individual's similarities with an organisation's characteristics. The theory is recognised for being extensively applicable to attraction research due to its premise that individuals and organisations interact to produce behavioural outcomes. From this, some studies (Judge & Bretz, 1992; Judge & Cable; Lievens *et al*., 2001; Turban & Keon, 1993) have found compatibility between individuals and organisational values as better predictors of job acceptance than organisational values alone. In addition, interactive effects between one's personality and an organisational characteristic were also found to be good predictors of attraction.
		Need-press theory (Murray, 1938)	Murray's need-press theory is a foundational theory reflecting on the psycho-physical mechanisms of employees' need-fulfilment, which are distinguished between two sets of needs, namely viscerogenic (primary) and psychogenic (secondary) needs (Veerman, 1992:58; Yu & Cable, 2014:438). Viscerogenic needs emanate from generating physical satisfaction, while psychogenic

Metatheory	Theoretical structure	Theories	Theorem
			needs are those that are closely associated with work motivation (Veerman, 1992:58). Psychogenic needs are mostly influenced by trends in an organisation's social-cultural elements (Veerman, 1992:58). According to Murray (1938), organisations are represented by factors that either enable or obstruct individuals' satisfaction in the workplace. Accordingly, the need-press theory highlights the importance of matching individuals' needs with those of the organisation's 'positive press' or the ability to satisfy those needs (Ehrhart & Ziegert, 2005:906).
		Attraction-selection-attrition theory (Schneider, 1987)	The attraction-selection-attrition model is the most widely used theory in attraction research (Åteg & Hedlund, 2011:9). It proposes that organisations attract, select and retain (attrition) different kinds of people (Schneider, 1987:440). Prospective employees are believed to be most likely attracted to an organisation or occupation if their personalities are comparable to those of that organisation (Åteg & Hedlund, 2011:9). Through selection, which takes place during the recruitment phase, organisations lean towards recruiting individuals who share similar traits as those that are already employed. During their tenure, those whose personalities demonstrate incompatibility with existing employees tend to leave the organisation, thereby resulting in attrition (Schneider, 2001; Schneider & Goldstein 1996; Slaughter *et al*., 2005). The overall effect of this cycle is that individuals within the organisation progressively develop similar traits to one another, which then leads to homogeneity in the workforce (Billsberry, 2004:2).
		Theory of work adjustment (Dawis & Lofquist, 1984)	The theory does not entirely use the concept of attraction. However, it alludes to individuals' aspiration for 'correspondence' with their work environments, which is said to be attained and sustained through a process of work

Metatheory	Theoretical structure	Theories	Theorem
			adjustment (Ehrhart & Ziegert, 2005:907). This is generally performed during the recruitment stage (Åteg & Hedlund, 2011:9). Subsequent to the recruitment process, individuals continuously adjust themselves to changing personal or work circumstances (Åteg & Hedlund, 2011:9). The adjustment can be either active or reactive, whereby employees try to change themselves to improve their working circumstances (Dawis, 2005; Eggerth, 2008).
		Employer attractiveness theory (Berthon *et al*.,2005)	The theory emerged from the field of marketing (employer branding) and aimed to identify the various dimensions of employer attractiveness using the EmpAt scale developed by Berthon *et al.* (2005). The researchers derived five dimensions of employer attractiveness from this scale (interest, economic, social, development and application values) (Berthon *et al*., 2005). The importance of being employed in an innovative organisation that produces and values high-quality products and services is reflected in interest value. Economic value is the value placed on having attractive compensation packages and job security. The extent to which individuals value being employed in a fun and exciting work environment with good collegial relationships is referred to as social value. The extent to which an employer provides opportunities for career development and training is referred to as development value. Application value refers to the opportunities provided to apply what one has learned at the tertiary level, acceptance and belonging, and the opportunity to teach others what one has learned (Arrehag & Persson, 2014:39; Berthon *et al.*, 2005). According to Berthon *et al.* (2005:168), for organisations to attract employees, it is critical to understand the factors that contribute to employer attractiveness.

Metatheory	Theoretical structure	Theories	Theorem
Self-processing theory	These theories elucidate how individuals' perceptions about themselves and attributes play a role in influencing the relationship between suitability and attraction.	Consistency theory (Korman, 1967	The theory propounds that self-esteem has a positive association with attraction, and therefore individuals are more inclined to favour work that complements their self-image (Åteg & Hedlund, 2011:10). Individuals with high self-esteem often use their discernment about themselves to channel choices, leading them to select work that has close similarities with their self-image (Ehrhart & Ziegert, 2005:909).
		Social learning theory (Bandura, 1977)	In this theory, Bandura (1977) suggests that individuals tend to be attracted to occupations or organisations based on their notion that they could succeed. Therefore, individuals with higher self-efficacy are more likely to value their subjective perceptions of suitability more heavily when assessing their attraction to an organisation, in comparison to individuals with lower self-efficacy (Ehrhart & Ziegert, 2005:908). Those who believe they will succeed in a particular organisation will place more emphasis on how they believe they fit with that organisation than those who doubt themselves (Ehrhart & Ziegert, 2005:908).
		Social identity theory (Tajfel & Turner, 1986)	Similarly, as consistency theory, social identity theory also considers the role of the self in attraction image (Åteg & Hedlund, 2011:10). The theory sets forth that the self-concept is impacted by the evaluation of the group with which an individual identifies (Ehrhart & Ziegert, 2005:909). Individuals will often be attracted and perceived to be suited to a particular organisation that has a positive image (Ehrhart & Ziegert, 2005:909).

Inferring from the above theories, it is evident that employee attraction is an imperative consequence for both employees and organisations. Although these theories provide insights into employee attraction, they have experienced their fair share of criticism. Signalling theory, for example, has been used to explain reasons pertaining to why job contenders may be enticed towards or driven away from an organisation (Wright, 2010:10). Although the theory has been used in recruitment literature to explain how employee attraction ensues, some scholars criticise the theory for being premature in that it has neither been fully developed nor sufficiently tested in the area of attraction (Breaugh, 2008; Hausknecht *et al*., 2004). In addition, the theory lacks the profundity to specifically predict which variables are most critical for employee attraction and at which particular stages of the attraction process (Ehrhart & Ziegert, 2005:904). Similarly, image theory has been reported to have not been explicitly cited in attraction research (Deci & Ryan, 2000; Stevens, 1998). Considerably fewer studies have also used the heuristic-systematic model successfully (Samson & Voyer, 2012:9; Vishwanath, 2015). Nonetheless, signalling theory, image theory and the heuristic-systematic model collectively provide a framework for understanding how individuals process information about organisational characteristics, resulting in understanding of how these characteristics become perceived by individuals and ultimately lead to attraction (Ehrhart & Ziegert, 2005:905). These theories have been used in recruitment and occupational choice literature to explain how individuals become attracted to organisations and provide fundamental enlightenment about how information portrayed by organisational characteristics can positively impact the attraction of new employees (Breaugh, 2008; Ehrhart & Ziegert, 2005; Hausknecht *et al*., 2004; Ryan, 1993 Stevens, 1998).

In assessing theories that explain how perceptions of organisations or work are processed and related to employee attraction, there are varying views regarding their propositions. Views on the validity of expectancy theory are said to be varied, whereby researchers argue that the theory is not an accurate reflection of the job choice process (Armstrong, 2016; Baker *et al*., 1989; Beach & Mitchel, 1987). There are assertions that the theory concentrates only on the conceptual determinants of employee attraction and does not provide specific predictions of behaviour and intention (Luthans, cited by Suciu *et al*., 2013:184; Wanous *et al*., 1983:82). Although the exposure-attitude hypothesis contributes to a somewhat limited understanding of attraction, it does explain specific methods by which individuals process their perceptions of organisations to develop judgments of attraction (Ehrhart & Ziegert, 2005:907). The generalisable decision-processing model has not been widely incorporated in attraction research. Notwithstanding their shortcomings, these theories provide critical insights into the affiliation between perceptions regarding organisations and attraction (Ehrhart & Ziegert, 2005:906). There has been positive support instituted for expectancy theory, as it is

recognised as one of the most popular and relevant theories for assessing employee attraction and choices individuals make when seeking employment (Adams, 2013; Armstrong, 2014; Badawi, 2019; Lussier & Achua, 2015; Mabaso & Moloi, 2016; Ndeipanda, 2018; Van Hooft *et al*., 2006;). Expectancy theory has also been applied to other forms of motivational behaviour, such as work motivation, work performance and motivation to exit employment for a particular occupation or organisation (Adams, 2013:32). Similarly, although not at the same length as expectancy theory, the generalisable decision-processing model has been supported in some studies, such as those of Glueck (1974), Hill (1974), and Ehrhart and Ziegert (2005).

The need-press theory mainly serves as a framework influencing more recent theories that have built on Murray's ideas, but have been adopted by a few empirical studies (Ehrhart & Ziegert, 2005:907). On the other hand, interactional psychology is critiqued for being too generic; however, the theory applies to attraction research due to its broadly stated premise that individuals and organisations interact to produce behaviour, and theories stemming from this perspective have served as a foundation for studies of attraction (Ehrhart & Ziegert, 2005:907). Similarly, the theory of work adjustment is argued to be too broad and has not been explicitly applied and tested in the context of attraction. Although this is the case, the theory of work adjustment has been cited by attraction researchers, as it proposes that individuals pursue organisations that they perceive their fit, thereby contributing to the extent to which the actual characteristics of the organisation interact with individuals' differences (Ehrhart & Ziegert, 2005:907; Sekiguchi, 2004:179). The theory of work adjustment is unique in that it attempts to gauge how an occupation's characteristics and individuals' differences may influence basic processes of career adjustment (Bradley *et al*., 2002:42). Contrary to the need-press theory, interaction psychology and the theory of work adjustment, which have not profoundly studied attraction, the attraction-selection-attrition theory is the only interactionist processing theory that has gained support from various studies on its attraction component through demonstrating that individuals are differentially attracted to jobs and/or organisations with characteristics that they perceive to commensurate their own (e.g. Bretz & Judge, 1994; Cable & Judge, 1996; Dineen *et al*., 2002; Lievens *et al*., 2001; Turban & Keon, 1993). Despite its support, there are sentiments that the attraction-selection-attrition model contains no predictions about the strength of homogeneity across individual and organisational levels and also does not provide any specifications that homogeneity may show different forms at different organisational levels. The theory also does not suggest how individuals and organisations are related (Ployhart *et al*., 2006:662). In addition, the attraction phase of the attraction-selection-attrition cycle is disputed to be less influential than hypothesised in the selection and attrition phases of the cycle (Billsberry, 2004:3).

Berthon *et al.'s* (2005) employer attractiveness theory is the most widely used theory to explain the dimensions of employee attraction, using its EmpAT scale. Attraction has been studied using various demographics based on this theory, i.e. age, gender, different occupations, education and personalities (Alnıaçık & Alnıaçık, 2012; Carvalho, 2018; Tuzuner & Yuksel, 2009). The theory has been used to investigate attraction from a generational standpoint (Bakanauskiene *et al*., 2016; Krommendijk, 2020; Reis & Braga, 2016). Other studies examined employee attraction across industries, educational faculties and countries (Aboul-Ela, 2016; Mohanty, 2019; Noutel *et al*., 2021; O'Driscoll, 2017; Pingle & Kaur, 2019; Priyadarshini *et al*., 2016; Rozsa *et al*., 2019; Sivertzen, *et al*., 2013; Tamoniene, 2015; Vokić & Mostarac, 2019). In South Africa, the theories have also been used (Bush, 2012; Meehan, 2019).

It should be noted, however, that while the theory is widely accepted, it has received some criticism. According to Benraiss-Noailles and Viot (2020:4), because the theory was developed in 2005, individuals' expectations may have changed, necessitating a review of the various dimensions of employee attraction. They also point out that the theory fails to account for the differences in generational expectations (Benraiss-Noailles & Viot, 2020:4). However, based on the review of the literature, it can be established that this limitation has been addressed by the various studies that researched generational perspectives of employee attraction. Furthermore, the theory was previously criticised for failing to take into account aspects of cultural difference, as it was conceptualised in Australia (Alnıaçık & Alnıaçık, 2012). In their study, Berthon *et al*. (2005:167) acknowledge the study's exclusion of cultural differences as one of its limitations. In light of this, they suggested that future research should focus on understanding the impact of different cultures and nationalities on potential employees' perceptions of their employer brand. Taking into account the studies identified in the preceding paragraph, it is clear that this criticism is being addressed, as various studies have now used the theory to conduct research in countries and among different cultural groups.

Despite their criticism, interactionist processing theories are pertinent to employee attraction due to their implications for elucidating objective fit (correspondence between individual characteristics and the actual organisational characteristics) and subjective fit (the match between individuals' characteristics and perceived organisational characteristics) (Ehrhart & Ziegert, 2005:908).

Furthermore, from the self-processing theories, the social learning and consistency theories have been reported to have not explored issues of employee attraction extensively and were therefore critiqued for being too generic (Ehrhart & Ziegert, 2005:907). Social learning theory was found to have not been fully systematised and was said to be unsystematically organised.

In addition, several applications of the theory focus on one or two constructs, such as self-efficacy, while ignoring the others. This raised questions on how the theory is related to individualistic personalities and whether self-efficacy is merely another outcome of expectancy or situation-specific (Nabavi, 2012:18–19). Furthermore, social identity researchers have been reported to have ignored the role played by individual differences in the process of identity acquisition (Huddy, 2004:994). There are also debates concerning the connotation of the concept 'identity'. These debates question what identity comprises, where it is located within an individual and why it is important (Korte, 2007:171). There are also disconnections between describing and predicting behaviour. The self-processing theory provides critical enlightenment of the role that individual differences play in employee attraction by suggesting that individuals' perceptions about themselves and their attributes influence their relationship of subjective fit and attraction (Ehrhart & Ziegert, 2005:909).

The debates held on the concept of attraction above have provided versatility in the research and serve as the necessary foundation for this study's theoretical framework illustrating the importance of employee attraction in the workplace. The next section discusses theories of engagement and retention.

2.4 THEORIES OF ENGAGEMENT AND RETENTION

The ability to attract, engage and retain employees has become increasingly important in the world of work (Lockwood, 2007:2). The main concern of any organisation is its aptitude to attract, engage and retain suitable employees (Aguenza & Som, 2012:92). Attraction and retention are functions of employee engagement (Kapoor & Meachem, 2012:15). Literature has revealed that there are various theoretical cornerstones of employee engagement and retention that are interwoven (Adams, 1965; Deci & Ryan, 1985; Herzberg & Howe, 1959; Homans, 1958; Maslow, 1943; Walton, 1973). Research has consistently shown conclusive and compelling relationships between employee engagement and metrics of retention (Aguenza & Som, 2012; Åteg & Hedlund, 2011; Bhattacharya, 2015; Deloitte, 2017; Kapoor & Meachem, 2012; Kundu & Lata, 2017; Kundy & Wuliji, 2012; Morris, 2016; Munish & Agarwal, 2017; Pandita & Ray, 2018; Rossi, 2018; Simha & Vardhan, 2015). High retention of employees is characterised by highly engaged employees (Kapoor & Meachem, 2012:17). Research focusing on retention explores why employees stay or leave an organisation and argues that commitment, which is a component of employee engagement, anchors individuals to an organisation and thereby contributes to retention (Åteg & Hedlund, 2011:2). Organisations that invest in engagement programmes are pronounced to have an advantage of attracting and retaining the best talent (Kapoor & Meachem, 2012:15). Therefore, it is the responsibility of organisations to construct work environments that encourage engagement

and retention and that attract potential employees (Lockwood, 2007:5). It is for this reason that this section discusses theories of engagement and retention jointly.

To understand the bedrocks of employee engagement and retention, a wide range of theories explain their emergence and importance to employees in the workplace. The theories presented in Table 2.2 have been applied in various studies and within a range of contexts. Some of these theories demonstrate interwoven theoretical contributions to the fields of engagement and retention and denote that although the theories are founded on distinct individual theoretical underpinnings, they can be brought together within the broader perspective of representing facets pertaining to employee engagement and retention communally.

Table 2.2: Theories of engagement and retention

Metatheory	Theoretical structure	Theory	Theorem
Employee engagement and retention	These theories incorporate aspects of meeting human needs, social relationships, workplace motivational rewards, evaluating the quality of work-life (QWL) and factors that influence goal pursuits to provide an understanding of both employee engagement and employee retention.	Maslow's hierarchy of needs (Maslow, 1943)	The theory suggests that human needs have a distinct hierarchy that is depicted by a pyramid that demonstrates five sets of needs, namely physiological, safety and security, belongingness and love, social, self-esteem and self-actualisation (Badubi, 2017:45; Kispál-Vitai, 2016:4; Sahito & Vaisanen, 2017:210). These needs have to be satisfied, commencing with the basics and continuing sequentially to self-actualisation (Kispál-Vitai, 2016:4; Sahito & Vaisanen, 2017:210). Physiological needs comprise physical needs such as food, water, shelter and sleep. Safety and security needs involve physical protection such as security of income, i.e. salary and employment, having shelter, access to health-care and good well-being. Belongingness and love needs entail having affiliations with others, such as relationships with family, friends, colleagues, and members of the community. Self-esteem needs include status, respect, promotions, good grades and prizes, while self-actualisation needs consist of the realisation of potentials, abilities and fulfilment of capacities (Badubi, 2017:45; Sahito & Vaisanen, 2017:210).
		Social exchange theory (Homans, 1958)	The main characteristic of social exchange theory is that the relationship between two social entities depends on the extent to which each of these entities adheres to social rules and norms of exchange implicitly and explicitly agreed upon between the two parties (Cropanzano & Mitchell, 2005:876). Additionally, social exchange theory emphasises a relationship based on reciprocity (Cropanzano *et al*., 2017:875–878; Gouldner,

Metatheory	Theoretical structure	Theory	Theorem
			1960:170–171). Reciprocity is comprehended as "the pattern of exchange through which the mutual dependence of people, brought about by the division of labour, is realised" (Gouldner, 1960:170–171). The theory is also based on the paradigm of justice – in particular, what Cropanzano *et al*. (2002:326) describe as interactional justice, which is "the quality of the interpersonal interaction between individuals". Another characteristic of social exchange theory is that individuals will seek to maximise their gains while minimising their costs in an exchange relationship. In this regard, anyone involved in an exchange relationship tends to select engagements that will produce them the greatest reward, as social exchange encompasses actions that include rewarding others (Cropanzano & Mitchell, 2005:881). The exchange relationship is characterised by shared interests and rewards (Hung, 2005). Fundamentally, social exchange theory claims that employees are connected by a network made of ties whose strength influences their intention to retain or leave their job (Henha, 2019:33). Therefore, the consideration to leave a job by an employee can be viewed as a consequence of a transgression of implicitly or explicitly agreed-upon rules by management or colleagues. Consequently, management efforts to reinforce implicitly or explicitly agreed-upon rules can be considered as a retention strategy (Henha, 2019:34). From an employee engagement point of view, research on social exchange theory has demonstrated that employees' commitment to the organisation is derived from their perceptions of the employer's commitment and support for them. Employees interpret human resource practices as indicative of the personified organisation's commitment to them (Chew, 2004:7).

Metatheory	Theoretical structure	Theory	Theorem
		Herzberg's two-factor theory (Herzberg *et al*., 1959)	Herzberg's theory argues that there are various job-related factors linked to the content of an employee's work that lead to a satisfied workforce (Almaaitah *et al*., 2017:21). These are known as motivators or satisfiers. Motivators encourage performance and provide satisfaction, such as achievement, recognition, the work itself, responsibility, advancement and growth (Almaaitah *et al*., 2017:21; Berry & Morris, 2008:3). Herzberg argues that for employees to become truly motivated and for their job to be abundantly enriched, they need to be provided with opportunities for achievement and recognition, stimulation, responsibility and promotions (Ramlall, 2004 57). Other than factors related to the job content, there are non-job-related factors that contribute to employee dissatisfaction (Almaaitah *et al*., 2017:21). These are referred to as hygiene factors or dissatisfiers (Almaaitah *et al*., 2017:21). Hygiene factors do not necessarily satisfy employees, but their absence can lead to dissatisfaction (Almaaitah *et al*., 2017:21; Berry & Morris, 2008:3). Examples of hygiene factors include company policies, salaries or wages, co-worker relations and management (Almaaitah *et al*., 2017:21; Berry & Morris, 2008:3; Steers & Porter, 1991).
		Equity theory (Adams, 1965)	According to Adams (1965:272), employees' motivation is elicited from the desire to be treated fairly or equally in their jobs and is measured by the ratio of their inputs and outcomes. Employees' inputs are factors that they bring to the job, such as their skills, time and effort. In exchange, they expect certain outcomes from the job, such as a salary, benefits and other forms of compensation (Sun, 2016:6). Satisfaction is attained if employees believe that their inputs are equal to their outcomes (Sun, 2016:6). The

Metatheory	Theoretical structure	Theory	Theorem
			notion of fairness or equal treatment is formed in a four-step process. First, employees evaluate their perceptions of how the organisation treats them. Second, they form a view of how colleagues are treated within their organisation. Third, they make comparisons between their circumstances and a referent, which may be an individual or group of individuals, resulting in specific perceptions of equity or inequity. Lastly, feelings of inequity or equity (depending on their type and intensity) may result in specific behavioural outcomes (Coldwell & Perumal, 2007:199). Equity theory is useful for understanding the state of employees' level of engagement and the process individuals pass through when contemplating turnover (Berry & Morris, 2008:3; Gashgari, 2016:517). In many cases, employee turnover may be high if feelings of inequity are prevalent (Gashgari, 2016:517). Efforts by organisations to maintain an equitable work environment can be considered as a retention strategy; preventing turnover intentions (Henha, 2019:39).
		QWL theory (Walton, 1973)	QWL is defined as a process in which an organisation responds to its employees' needs and develops systems that enable them to be fully involved in making decisions that entail designing their lives at work (Robbins, 1989:207). Similar to the Herzberg theory, QWL is concerned with satisfying both the hygiene and the motivation factors to enhance employees' working conditions. The theory also draws a premise from Maslow's hierarchy of needs theory, where demands for employees are made to satisfy basic needs, followed by good working conditions and further satisfying the need for career planning, development and growth of human capabilities (Sushil, 2013:765). There are eight criteria proposed for measuring QWL, according to Walton (1973), namely adequate and

Metatheory	Theoretical structure	Theory	Theorem
			fair compensation, safe and healthy working environments, the ability to use and develop human capacities, career advancement, social integration in the workforce, democracy in the workplace, quality of life and social relevance of work (Gurudatt & Gazal, 2015:12; Sahni, 2019:287). In essence, the theory embraces the quality of the relationship between employees and the organisation (Korunka *et al*, 2008:409). It should be noted that employees possess varied career needs, and therefore the quality level of their work-life is determined by whether those needs are being met. While some people, for example, might be satisfied with a basic minimum wage, others may find it unsatisfactory (Venkata Subrahmanyam *et al*., 2013:2). The fulfilment of employees' needs is argued to trigger employees' satisfaction with their job, commitment to their job and the desire for long tenure within their organisations (Chinomona & Dhurup, 2013:367).
		Self-determination theory (Deci & Ryan, 1985)	Deci and Ryan (2000:228) explored the influence of competence, autonomy and relatedness as critical for understanding the what (i.e. content) and why (i.e. process) of goal pursuits. They associate intrinsic motivation with the job that has inherent uniqueness, challenge or aesthetic value (Deci & Ryan, 2000:252–253). Competence refers to developing proficiency in one's environment, feeling effective in ongoing interactions with one's social environment and having opportunities that enables the utilisation and expression of one's unique capacities (Deci & Ryan, 2000:252). Autonomy means to act volitionally, with a sense of choice (Deci & Ryan, 2008:15). Autonomy results in motivation that is intrinsic and freely chosen (Deci & Ryan, 2008:18). A lack of autonomy leaves only external motivation, which is characterised by perceived

Metatheory	Theoretical structure	Theory	Theorem
			pressures, demands and constraining expectations imposed on the individual (Deci & Ryan, 2008:16). Relatedness refers to the desire to feel connected to others, that is, to feel love and care, and to receive it through being loved and cared for (Baumeister & Leary, 1995; Bowlby, 1958; Harlow, 1958; Ryan, 1993). Satisfaction of the three psychological needs results in a motivated, productive and content individual (Deci & Ryan, 2000:252–253), which could contribute to increased employee retention and engagement levels (Brown, 2011:9). Dulagil (2012) also reports that the components of self-determination theory can be used to describe organisational commitment, job satisfaction and employee engagement. Autonomously motivated employees are reported to have fewer work absences and lower turnover intentions and are more likely to be strongly committed to their organisations (Gagné *et al*., 2014:14).
Employee engagement	These theories are primarily concerned with determining how physical, psychological and organisational factors influence employee engagement. These factors, in combination with the drivers of engagement, determine the level of employee engagement, with high levels of engagement resulting in engaged employees with improved	Kahn model of employee engagement (Kahn, 1990)	Kahn's model of employee engagement postulates two factors that elucidate employee engagement: first, that the psychological experience of the work itself influences employees' attitudes and their behaviours, and second, that their interpersonal, group, intergroup and organisational factors simultaneously influence these experiences (Kahn, 1990:695). Following these postulations, Kahn (1990:695) characterised the psychological conditions in which people personally engage and disengage at work. According to Kahn (1990:703), job engagement is associated with three psychological conditions, namely psychological meaningfulness, safety and availability. Collectively, these three psychological conditions shape how employees occupy their role in an organisation (Kahn, 1990:703). Psychological meaningfulness is "associated with work elements that create incentives or disincentives to

Metatheory	Theoretical structure	Theory	Theorem
	well-being, while low levels of engagement result in disengaged employees and negative organisational outcomes.		personally engage in the workplace". Psychological safety is associated with social systems components that have resulted in less threatening, anticipated and consistent social situations in which to engage. Psychological availability is related to "individual distractions that preoccupied people to various degrees and left them with more or fewer resources with which to engage in role performances" (Kahn, 1990:703). Kahn argued that employees would be engaged at work if they perceive that their role performance could be meaningful and safe and that they have available resources for investing themselves in task performances (Pham-Thai *et al*., 2018:952).
		Three-factor engagement model (Schaufeli *et al*., 2002)	The model was developed on the premise that engagement and burnout are two distinct concepts that must be examined separately. Schaufeli and Bakker (2004:295) view engagement optimistically, stating that it is a positive, fulfilling state of mind associated with work that is characterised by vigour, dedication and absorption. They argue that, while employees will perceive engagement and burnout as polar opposite psychological states, with the former possessing a positive quality and the latter possessing a negative one, both must be viewed as largely independent of one another (Schaufeli & Bakker, 2004:4). Therefore, employee engagement is characterised by a high level of energy and a strong sense of identification with one's work, whereas burnout is associated with low levels of energy, together with a lack of identification with one's work (Schaufeli & Bakker, 2004:5). In light of this model, the UWES was developed to assess the various dimensions of engagement.

Metatheory	Theoretical structure	Theory	Theorem
		Job demands-resources (JD-R) theory (Bakker & Demerouti, 2006)	The JD-R theory contends that all job characteristics can be carved using two different categories, namely job demands and job resources (Bakker *et al.*, 2014:399). Job demands are job characteristics that require sustained physical and/or psychological (cognitive and emotional) effort or skills and are therefore, affiliated with certain physiological and/or psychological costs (Bakker & Demerouti, 2006:312). Examples are heavy workloads, an unpleasant work environment and client interactions that are emotionally demanding (Bakker & Demerouti, 2006:312). Job resources refer to those physical, psychological, social or organisational aspects of the job that are critical in contributing towards the achievement of work objectives, reducing job demands and the associated physiological and psychological costs, and promoting personal growth, learning, and development (Bakker & Demerouti, 2006:312). Job resources have been identified as the main drivers of employee engagement, which in turn leads to increased well-being and positive organisational outcomes (Bakker *et al*., 2014:399). Increased job resources involve aspects such as social support, feedback, skill utilisation, rewards, autonomy, learning opportunities and career opportunities (Bakker *et al.*, 2008; Schaufeli *et al.*, 2008; Van den Broeck *et al.*, 2008). Engagement, in turn, leads to positive outcomes such as organisational commitment, intention to stay, extra-role behaviour, employee safety and superior work performance (Schaufeli, 2017:121).

Metatheory	Theoretical structure	Theory	Theorem
Employee retention	These retention theories seek to explain retention in two ways, namely why employees leave and why employees choose to stay within their organisations. Employees leave and stay for various reasons, not all of which are related to job dissatisfaction, as even satisfied employees leave.	The unfolding model of turnover (Lee & Mitchell, 1994)	Lee and Mitchell (1994:60) outline their use of image theory's concepts for understanding employee turnover. The unfolding model of turnover stresses that employees leave their organisations for different reasons and that employees do not leave due to dissatisfaction in the workplace; even those who are satisfied in their jobs may still leave the organisation (Harman *et al.*, 2007:53, Lee & Mitchell, 2001:198). According to the model, voluntary turnover is much more related to shocks than satisfaction (Harman *et al.*, 2007:52). A shock is described as an event in which an employee is confronted with information that causes them to reconsider their job-related values and goals, as well as their strategies for achieving those goals (Harman *et al.*, 2007:52). An employee's decision to leave a job can be influenced by an internal or external shock (Harman *et al.*, 2007:52). The unfolding model comprises five paths to voluntary turnover. In the first path, a shock triggers a pre-existing script where an employee would leave an organisation without extensive mental deliberation about his/her current and/or alternative jobs because leaving is a pre-programmed action plan for answering a specific kind of shock (e.g. a planned pregnancy) (Lee & Mitchell, 2001:203). In the second path, an employee is urged by the shock, where he/she re-examines his/her basic attachment or commitment to that of the organisation (Lee & Mitchell, 2011:204). In this case, an employee's values and personal principles influence his/her judgment about how well he/she can integrate his/her values with the shock (Lee & Mitchell, 2001:203). This judgement then assists the employee to ascertain whether he/she can attain these goals while employed with the current employee (Lee & Mitchell, 2011:203). If this cannot be attained, an employee will decide to leave his/her job

Metatheory	Theoretical structure	Theory	Theorem
			without seeking alternative jobs (Lee & Mitchell, 2011:203). The third path consists of a shock that prompts an evaluation of his/her existing job using three images (values, trajectory, strategic); if the information contained in the shock do not match the images, the individual may consider to leave. This path may result in a deliberate search for alternative employment and comprises an evaluation of at least one alternative (Harman *et al.*, 2007:50). Paths four and five, which Lee and Mitchell (2011) refer to as 4a and 4b, do not contain shocks. Path 4a describes a state in which an employee experiences low job satisfaction, which eventually leads him/her to leave the organisation without considering job alternatives. Path 4b reflects a more traditional view of turnover whereby dissatisfaction results in an intentional pursuit and evaluation of alternatives, an intention to leave, and subsequent turnover (Harman *et al.*, 2007:50).
		Job embeddedness theory (Mitchell *et al.*, 2001)	Job embeddedness is posited as a fundamental mediating construct between specific on-the-job and off-the-job factors and employee retention (Holtom *et al*., 2006:320). Rather than exploring reasons why employees leave, job embeddedness theorises reasons why employees stay in an organisation (Brown, 2011:51). The theory consists of three components: a) fit (i.e. an employee's perceived compatibility or comfort with an organisation); b) links (i.e. formal or informal connections between an employee and organisation or the people and activities that connect the employee to the job); and c) sacrifice (represents the perceived cost of material or psychological benefits that are forfeited by organisational departure, i.e. what the employee would lose if he/she were to leave an organisation) (Holtom *et al.,* 2006:319–320). Organisations can reduce employee turnover by increasing fit, links and sacrifice, or by supporting

Metatheory	Theoretical structure	Theory	Theorem
			job embeddedness, as job embeddedness is regarded as the sum of forces that ensures that employees remain embedded in their current job or occupation (Charlier *et al.,* 2016:109; Ferreira & Coetzee, 2014:10; Ghosh & Gurunathan, 2015:240; Halvorsen *et al*., 2015:1298; Marisi *et al*., 2016:142; Rossmann, 2010; Zhang *et al*., 2012:220).

In assessing the debates of the above-mentioned theories, literature contends that need-based theories (Maslow's hierarchy of needs, Herzberg's two-factor theory, self-determination theory and equity theory) explain individuals' behaviours, but do not explain why specific actions are chosen in specific situations to obtain specific outcomes, particularly with regard to the effects of job characteristics on employee motivation (Åteg & Hedlund, 2011:9, Ehrhart & Ziegert, 2005:906; Latham & Pinder, 2005:488; Yu & Cable, 2014:438). Maslow's theory is conveyed as relevant intuitively; however, research has refuted it, as it could not be fully validated empirically (Graham & Messner, 1998:196; Kispál-Vitai, 2016:4; Sahito & Vaisanen, 2017:211). Given the hierarchical nature of the theory, it cannot be assumed that people's needs can be achieved systematically, as they have different sets of needs, which are prioritised differently. Therefore, the theory is criticised for not being aligned with realities (Mawere *et al*., 2016:1). On the other hand, there is a debate that the Herzberg two-factor theory is only supportable when applying the original method used by Herzberg, which reduces the reliability of the theory and therefore demands the theory to be verified using different methods, and not only one (Renfors, 2017:19). Furthermore, the original sample of the theory's participants included engineers and accountants, who are perhaps not representative of a diverse working population as a whole and therefore argued to be biased (Armstrong, 2014:173). Individual differences were also said to have not been considered when studying participants' responses, such as the effects of age, gender and other variables (Armstrong, 2014:173; Badubi, 2017:46). Similarly, the draw-back of equity theory is that it has not accounted for individual differences (Al-Zawahreh & Al-Madi, 2012:166).

Self-determination theory has had its fair share of criticism. Concerns have been raised that the theory focuses primarily on the positive, optimistic, 'bright side' of life while ignoring the negative, pessimistic, 'dark-side' realities of most people's real-life situations (Sabbagah, 2016:78). Miles (2012:28) criticises the theory for assuming that all people have an active, growth-oriented nature. There is a notion that the three needs (influence of competence, autonomy and relatedness) postulated by the theory do not adequately define need satisfaction and do not explore when the three basic needs can conflict with one another (Miles, 2012:28). The theory falls short in explaining how people prioritise their needs and does not shed light on why they gravitate towards situations that meet their needs and avoid situations that do not (Miles, 2012:28).

Furthermore, equity theory's concerns are in the artificial laboratory conditions tested in the theory (Hofmans, 2012:474). As a result, there is a sentiment that the theory has challenges in predicting behaviours, especially when people act non-rationally (Sun, 2016:7). There are also assertions that equity theory does not address aspects of dynamics of equity and inequity; i.e. when, how and why ratios of inputs to outcomes change over time, how inputs and

outcomes are defined by individuals and how employees unify and evaluate their inputs to derive totals (Robbins, 1994:457).

Despite these judgements, Maslow's hierarchy of needs remains one of the most popular and significant motivational theories that attempt to explain job satisfaction and motivation of human behaviour (Badubi, 2017:46; Sahito & Vaisanen, 2017:210). This theory is believed to have laid the foundation of other later developed theories, such as Herzberg two-factor theory, self-determination theory, Alderfer's ERG (existence, relatedness and growth) theory, McClelland's achievement need theory, McGregor's theory of X and Y and the theory of Z created by Quchi (Kispál-Vitai, 2016:4; Uysal *et al*., 2017:213). Herzberg's theory is lauded for being easily and clearly understood and being based on real-life rather than academic abstractions (Armstrong, 2014:173). The theory is also considered a compatible framework that is extensively studied among numerous motivational theories that elucidate the role of motivation in engagement and retention (Berry & Morris, 2008; Castellanos, 2014; Lindholm, 2013; Owler & Morrison, 2015). Similarly, equity theory is reported to have strong associations with research on burnout (Mascha, 2007), turnover and retention (Abid & Butt, 2017; Berry & Morris, 2008; Calecas, 2019; Engelbrecht & Samuel, 2019; Mamah & Ulo, 2015; Test *et al*., 2003) as well job satisfaction (Balcazar, *et al*., 1998; Rochat, 2018; Sun, 2016). Equity theory is acclaimed for having a stronger validity than other organisational theories and has been credited for being beneficial and useful in yielding work outcomes that are fair to organisations (Al-Zawahreh & Al-Madi, 2012; Hatton *et al*., 1999).

According to Meyer and Gagné (2008:62), self-determination theory plays a significant role in the contribution of literature on employee engagement. In this regard, the theory can be used to explain the presence and absence of employees in the workplace (Meyer & Gagné, 2008:61). The theory has gained favour from researchers, with various studies advocating for its application as a theoretical framework for investigating employee engagement (Meyer & Gagné, 2008:62). Besides employee engagement, the adoption of self-determination theory has shown associations with positive work outcomes such as motivation, performance, satisfaction, retention, organisational commitment and trust in management (Deci & Ryan, 2008:17; Gagné & Deci, 2005:342). An additional advantage of the theory is its theoretical explanation for the consequences of mismanagement (Meyer & Gagné, 2008:62). In this perspective, needs theories demonstrate the criticality of understanding motivational factors to adequately attune employees' experiences in the workplace and develop systems that will ultimately lead to engagement and retention (Calecas, 2019:47).

Furthermore, Kahn's employee engagement model provides psychological conditions that are essential for engagement (Kular *et al*., 2008:6). William Kahn played a significant role in

contributing to the literature on employee engagement by introducing the term 'engagement' in 1990 (Chandel, 2018:199). Prior to Kahn's introduction of engagement, the term 'engagement' and its features were unheard of in literature, but later led to its immersion in organisational research (Chandel, 2018:199). Employee engagement was then observed as a new approach to employee motivation (Guest, 2014:142). Kahn's model remains relevant and has gained empirical support over the past years (Ferguson, 2014:40; Weidert, 2011:10). Various empirical research has used Kahn's model of employee engagement (e.g. Avery *et al*., 2007; Cartwright & Holmes, 2006; Freedman, 2008; Luthans & Peterson, 2002; May *et al*., 2004; Reynolds, 2008; Rich *et al*., 2010; Schaufeli *et al*., 2002) and confirmed some of his psychological conditions in predicting engagement. In addition, several researchers have developed scales based on his concept of engagement, such as May *et al*. (2004) and Saks (2006). Although extensively cited, Kahn's model was not exclusively flawless. There were arguments that the model lacked an established measure for assessing engagement (Weidert, 2011:10–11). Saks (2006:603) determined that Kahn's model of engagement had a limitation in explaining why individuals responded to the psychological conditions with varying degrees of engagement.

The limitation of Kahn's model's inability to explain how individuals respond to psychological conditions with varying degrees of engagement is addressed by social exchange theory, which is argued to provide a stronger theoretical rationale for explaining employee engagement (Kular *et al.*, 2008:6; Pham-Thai *et al*., 2018:953; Saks, 2006:603). Social exchange theory is among the most prominent theories that explain workplace behaviour (Cropanzano & Mitchell, 2005:974). The theory provides a theoretical foundation for why employees choose to become engaged or disengaged in their work and organisation (Kular *et al*., 2008:6). However, apart from its prominence, one of the main questions raised about social exchange theory is the degree to which human beings are certainly rational and make calculated judgements, as the theory maintains (Redmond, 2015:23–24). The questions raised are how often individuals in their relationships assess rewards and costs, determine profits, project the future and compare them to alternatives (Redmond, 2015:23–24). In addition, individuals vary in the reward values they place on different matters (Redmond, 2015:21). Therefore, the theory's position to explain human interactions solely in terms of costs, rewards, profits and exchanges discards other crucial factors that impact human exchanges.

Drawing on a few elements from social exchange theory and Kahn's employee engagement model, the JD-R theory has been used to predict work enjoyment and organisational commitment (Bakker *et al*., 2010), burnout (Demerouti *et al*., 2001), engagement (Bakker *et al*., 2007), job performance (e.g. Bakker *et al*., 2004) and connectedness (Lewig *et al*., 2007). Its strengths are in its applicability to various occupational settings, irrespective of the

particular demands and resources involved (Janse van Rensburg *et al*., 2013:3). In addition, the theory has been tested both locally and internationally, for example in Australia, Asia and Africa (Brough *et al*., 2013; Fouché, 2015). The introduction of the JD-R theory has provided critical explanations and predictions on occupational well-being (including burnout, engagement, motivation and employee health) and job performance, with the view of performance being a result of well-established well-being (Fouché, 2015:24). Although supported, there is an assertion that the theory requires further validation (Brough *et al*., 2013:7). There is minimal evidence found related to job resource interactions and job demands in the cross-sectional predictions of employee engagement and psychological strain. This suggests that the theoretical connotations between the job demands and job resources variables in predicting psychological strain and employee engagement may be more provisional than has been previously recognised (Brough *et al*., 2013:27). In addition, it is argued that studies that have conducted research by applying the JD-R theory in conjunction with employee engagement do not take the specific circumstances of certain occupations and contexts into account (Bakker *et al.,* 2014; Bickerton *et al.*, 2015; Gorgievski *et al.,* 2014).

Furthermore, the three-factor engagement model is regarded as one of the most popular engagement theories. Numerous studies have shown that the dimensions of vigour, dedication and absorption are the core dimensions of employee engagement (Brand-Labuschagne *et al*., 2012; Coetzee & De Villiers, 2010; Drake, 2012; González-Romá *et al*., 2006; Jordaan, 2005; Mäkikangas *et al*., 2014; Moshoeu, 2017). Unlike other theories that have struggled to develop a measuring instrument to assess their conceptualisations of engagement, the three-factor engagement model has risen to prominence thanks to its UWES, which has become the most widely used measure to assess engagement (Drake, 2012). This model and its measurement tool have been tested and validated in various occupational categories, cultural contexts and countries, including South Africa (Moshoeu, 2017:171). Although prevalently used, the UWES measure has been criticised for not being entirely unique in that its engagement dimensions were not independently developed, but, instead, relied on the inverse of three burnout dimensions (exhaustion, cynicism and lack of professional efficacy) (Kuok & Taormina, 2017:265). The UWES, according to Kuok and Taormina (2017:165), has the same limitation as the Maslach *et al.* (2001) measure in that it does not permit an individual to experience burnout and engagement simultaneously. Despite these flaws, Moshoeu (2017:171) contends that the UWES captures the robustness of vigour, dedication and absorption, and is therefore worthy of being used to measure employee engagement.

Research conducted on the QWL theory provides a useful foundation for exploring employee engagement and retention (Korunka *et al.*, 2008:411). Previous research has shown that the

concept of QWL provides explanations for organisational characteristics related to employee satisfaction and positive work-related behaviours (Jenitta & Elangkumaran, 2014; Koonmee *et al*., 2010; Noor & Abdullah, 2012). The theory also serves as a predictor of organisational viability and sustainability (Sushil, 2013:765). However, there is a lack of systematic tests of job or organisational factors in relation to retention and turnover conducted using the theory (Korunka *et al.*, 2008:411). This explains why there has been very little research on the link between employees' QWL and their turnover intention (Mosadeghrad, 2013:49–50). Moreover, according to Venkata Subrahmanyam *et al.* (2013:4), the implementation of programmes related to the QWL has proven to be complex, therefore requiring much effort to accomplish.

The unfolding model is said to be a significant model in retention and turnover literature (Morrell *et al*., 2008:131). The unfolding model of turnover emphasises that voluntary turnover is primarily a result of shocks rather than satisfaction (Harman *et al.*, 2007:52). However, researchers indicate particular limitations in the existing shocks-turnover literature debated by this model. The most impactful limitation is that the main methodology used to study shocks did not enable researchers to assess any estimates of variance in the traditional regression sense (Tenbrink, 2015:22). Therefore, researchers cannot determine the impact that shocks have on turnover behaviour. Likewise, even the methods used by present studies to test the model do not permit it to be falsified (Tenbrink, 2015:22). The unfolding model is greatly reliant on the shocks construct; however, information regarding shocks is collected after the actual act of leaving, which is questionable, especially if an employee did not leave an organisation on good terms.

Like to the unfolding model, research suggests that job embeddedness can play a vital role in shaping employees' organisational commitment, job satisfaction, retention and high organisational performance (Holtom *et al*., 2006:320; Potgieter & Ferreira, 2018:2). Empirical research indicates the predictive validity of job embeddedness (e.g. Felps *et al*., 2009; Holtom *et al*., 2006; Kraimer *et al*., 2012; Lee *et al*., 2014:212; Ramesh & Gelfand, 2010; Tanova & Holtom, 2008). However, being a young theory, there are uncertainties regarding clarity on the relationship between the type of employee organisational commitment and retention attitudes as well as employees' behaviour, which varies based on different employees' attributes (Potgieter & Ferreira, 2018:2). The definition of job embeddedness is considered to some extent vague and there are concerns that the theory is in short supply of studies that have extensively explored differences in gender, race, age, work location and locus of control through the lens of job embeddedness (Ghosh & Gurunathan, 2015:2; Young, 2012:46). Nonetheless, the job embeddedness theory is the first and only theory in retention research

that does not only view retention from the lens of voluntary turnover, but also takes into account reasons why individuals stay in their organisations (Lee & Mitchell, 2001:231).

The theories discussed above on engagement and retention have provided a theoretical foundation for this study's theoretical framework. In the next section, a critical analysis is provided of the most suitable theories relevant to achieving the objectives of this study.

2.5 DESIGNATED THEORIES SUITABLE FOR THE INVESTIGATION OF ATTRACTION, ENGAGEMENT AND RETENTION

The theories discussed in the preceding sections served as pertinent foundations for this study's theoretical framework. Although the majority of these theories borrow from disciplines other than sociology, their attributes are relevant to the study under investigation. Therefore, for this study, Berthon *et al.*'s (2005) employer attractiveness theory, the three-factor engagement model (Schaufeli *et al.*, 2002) and Herzberg's two-factor theory (1959), which were briefly discussed in the previous sections, were selected as a lens of inquiry through which attraction, engagement and retention were investigated. These theories are discussed in detail in the subsequent section.

2.5.1 Employer attractiveness theory

The most seminal research on employee attractiveness was conducted by Berthon *et al.* (2005). Berthon *et al*.'s (2005:151) study on employer attractiveness was inspired by the branch of marketing in which the concept of customers was brought to an internal or human resource perspective. Their inspiration came from Kotler's (1994) definition of internal marketing as the task of successfully hiring, training and motivating employees to provide excellent customer service. In terms of Kotler's definition of internal marketing, Berthon *et al*. (2005:152) focused on successful employee hiring. They aimed to assess employee recruitment beyond the human resource approach of advertising, taking into account how well an organisation is regarded as an employer of choice, thereby attracting the highest-calibre employees.

The study sought to identify and operationalise dimensions of employer attractiveness to develop a scale to assess employer attractiveness (Berthon *et al*., 2005:156). The foundation of their research was Ambler and Barrow's employer branding theory. Ambler and Barrow's (1996:185) research combined human resources and marketing disciplines into a single conceptual framework. They contend that employers can be viewed as a brand with which an employee develops a close relationship. As a result, an employee's and an organisation's performance will be influenced by brand awareness and positive attitudes and loyalty and trust

that the brand is there for the employee (Ambler & Barrow, 1996:185). Employer brand is defined as the collection of functional, economic and psychological benefits provided by a job and associated with the company in pursuit of recruiting a potential employee (Ambler & Barrow, 1996:187). Functional benefits are those that involve developmental and/or useful activities, economic benefits are material or monetary rewards, and psychological benefits involve feelings such as belonging, direction and purpose. From this point of view, the attractiveness of an employer is largely determined by job-seekers' beliefs about the organisation's characteristics (i.e. employer image) and their knowledge of its brand and reputation (Cable & Turban, 2001; Edwards, cited by Reis *et al.,* 2017). The more positive job seekers' perceptions of the organisation, the more likely they will be attracted to it and feel inclined to apply for available positions (Reis *et al*., 2017:1964). Being an employer of choice entails cultivating an image of a 'great place to work' in the minds of existing and prospective employees. Employers of choice invest time and effort in communicating what makes them desirable and unique and are concerned with attraction, engagement and retention initiatives aimed at enhancing the organisation's employer brand (Bakanauskiene *et al*., 2016:7).

In their quest to establish the dimensions of employer attractiveness, considering brand image, Berthon *et al*. (2005) held six focus group discussions with final-year university students in Australia. Participants in those group discussions were asked about their ideal employers, factors that they considered important when considering potential employers, organisations they would least like to work for, and how they go about looking for work. These groups aimed to develop a set of items that defined each dimension of the employer attractiveness construct. A total of 32 scale items were generated from the groups. Following the development of the scale with the focus group participants, the scale was then tested on 683 university students. Taking into account their research findings and results, Berthon *et al*. (2005) expanded the three dimensions of Ambler and Barrows's (1996) employer branding into five and named them interest, economic, social, development and application values. These five dimensions represent anticipated benefits that potential employees may seek in a company (Meehan, 2019:6).

Interest value is the degree to which an individual is attracted to an employer who provides an exciting work environment and unique work practices, and uses its employees' creativity to produce high-quality, innovative products and services. Berthon *et al*. (2005:159–162) define economic value as the degree to which an individual is attracted to an employer who offers a higher-than-average salary, a compensation package, job security and advancement opportunities. Social value is "the extent to which an individual is attracted to an employer who provides a fun and happy work environment with good collegial relationships and a team

atmosphere" (Berthon *et al*., 2005:159). The degree to which a person is attracted to an employer who provides recognition, self-worth and platforms that promote career advancement opportunities is measured by development value. Application value is the extent to which individuals are attracted to an employer who allows them to apply what they have learned and teaches others in a customer-oriented and humanitarian environment (Berthon *et al*., 2005:162).

As evidenced by various studies that have used the theory and the scale developed from it, Berthon *et al.'*s (2005) employer attraction theory is one of the most widely used theories for explaining attraction. Alnaçk and Alnaçk (2012) sought to identify the different dimensions of attractiveness in employer branding by investigating their perceived importance and determining the perceptual differences among 600 adults based on their age, gender, and employment status (300 employed and 300 unemployed college students). The factor analysis revealed six dimensions of employer attractiveness (social value, market value, economic value, application value, cooperation value, and workplace environment). Social value is regarded as the most important of these factors. These factors, however, differed slightly from the original five-factor model. Because the research was conducted in Turkey, the researchers attributed the minor differences in factors to cultural differences (Alnaçk & Alnaçk, 2012:1342).

Carvalho (2018) conducted research using employer attractiveness by also considering people's demographics. The study assessed how demographic factors such as age, gender, marital status, education and volunteer experience predict important aspects of employer attractiveness. A survey among 184 Portuguese respondents was conducted online. According to Carvalho (2018), gender influences the perceived importance of application value. More women value the opportunity to apply what they have learned, the opportunity to teach others, and a sense of belonging and concern for humanity. Unmarried individuals value aspects related to economic value and development value more than married individuals. The perceived importance of the interest, economic and development values was influenced by education level, with more qualified individuals emphasising the importance of working in an innovative environment that encourages creativity expression. Volunteers placed a premium on employers who value humanitarian and customer-oriented values when it comes to the volunteering experience (Carvalho, 2018:29). On the contrary, Carvalho (2018:29) discovered that age had no bearing on the attractiveness of employers. Contrary to popular belief, age had no bearing on how attractive employers are perceived (Carvalho, 2018:29).

Andreasen and Reinholt (2019) investigated how employer branding could be used to generate application intentions among forthcoming graduates. A total of 218 self-completion online questionnaires were administered. Andreasen and Reinholt (2019:97) used 13 of the

25 attributes on the EmpAt scale. Their survey results revealed that corporate brand has the greatest influence on application intentions among recent graduates and that graduates have a slight preference for symbolic attributes, where a person–organisation fit acts as a moderator of the application intention. Larsson and Rosell (2014) previously conducted research to describe employer attractiveness factors that influence corporate reputation and intentions to pursue a job application. A total of 278 students from the Luleå University of Technology in Sweden participated in the study. The results of the study revealed that the most important factor of employer attractiveness is social value, followed by development value.

Arachchige and Robertson (2013) conducted a study comparing the perceptions of employer attractiveness of 221 Sri Lankan final-year undergraduate business or commerce students with MBA students who had varying periods of employment experience. While the two groups appeared to have rated the EmpAt scale items differently, the researchers discovered that they both had similar perceptions of which employer attributes are attractive or detracting, with an emphasis on personal and career development opportunities and job security rather than structural organisational characteristics such as company size, reputation, product or service, and customer or employee relationships (Arachchige & Robertson, 2013:46). The greatest differences in perceptions between the two Sri Lankan cohorts related to the social and personal aspects of the work environment; respondents with work experience valued an exciting and fun environment and personal respect more than undergraduates, who prioritised using their university knowledge and future career opportunities (Arachchige & Robertson, 2013:46).

Eger *et al.* (2019) also used employer attractiveness among business students. The researchers had three objectives in mind when they conducted their research. The first was to identify the attractiveness dimensions of an employer brand among Czech business students. The second objective, based on previous research, was to examine the statistical difference in attractive dimensions based on gender, and the third objective was to identify similarities and differences between employer attractiveness dimensions through a cross-cultural comparison (Eger *et al*., 2019:524). The study's sample consisted of 281 final-year semester business students ranging in age from 21 to 25. According to the study, social value was the most important to business students, followed by interest, economic and development values. According to the gender analysis, women considered more factors to be important than men (social, interest, economic, development and application values). The only value that both men and women regarded as equally important was interest value (Eger *et al*., 2019:535–537).

Furthermore, Reis and Braga (2016) conducted a study titled “Employer attractiveness from a generational perspective: implications for employer branding” to determine which employer attractiveness attributes are prioritised by different generations: Baby Boomers (people born between 1946 and 1960), Generation X (people born between 1961 and 1981) and Generation Y (those born between 1982 and 2000). The sample consisted of 937 Brazilian professionals. Reis and Braga (2016:111) discovered that economic value appeared to have decreasing importance from younger to older generations when assessing the different cohorts. Generation Y rated application value higher, while older generations rated it lower. In terms of interest value, differences were found between Generation Y and Baby Boomers and Generation Y and Generation X; more experienced respondents appear to prefer employers who offer a challenging environment, new working practices and innovative products as well as a creative environment.

Bakanauskiene *et al*. (2018) also assessed generational perspectives using employer attractiveness. Bakanauskiene *et al*. (2018) sought to investigate the generational perspective on employer branding to gain a better understanding of the factors that drive organisational attractiveness in Lithuania. The sample included 143 Generation Y individuals ranging from 16 to 30 years old. According to the results of the study, recognition and economic value were the primary motivators for Generation Y. Furthermore, the study’s results revealed that wage paid on time, support for getting over mistakes, career opportunities, a manageable workload, valued efforts, a safe and comfortable work environment, effective conflict management, pay, meeting expectations and purposeful training was highly valued by Generation Y, thereby defining principles of a great workplace (Bakanauskiene *et al*., 2018:17). Krommendijk (2020) also used the EmpAT scale to assess generational differences in employer preferences in the Netherlands. The study’s main objective was to determine whether Generation Y differed from Baby Boomers and Generation X, and if so, whether this could be translated using the Dutch version of EmpAt. The survey had a total of 177 respondents. Except for development value, the researcher discovered no difference between generations in their appreciation of the values of employer attractiveness (Krommendijk, 2020:30).

Cahill (2018) investigated the impact of employer branding on employee attraction, recruitment and retention in the Irish drinks industry using employer attractiveness. His research results validated EmpAt as one of the scales that accurately predicts the factors that cause employees in Ireland’s drinks industry to be attracted to, and stay with an organisation. In terms of social value, the results showed that good working relationships with both colleagues and managers as well as working in a happy environment are the most important criteria for employees in the Irish drinks industry. The economic value results showed that

people have progressed from the traditional psychological contract to a more advanced, modern version in which job security remains paramount, but that an attractive overall package, or a 'total rewards package', is more appealing to employees than a higher-than-average salary (Cahill, 2018:33–44). The development and application value results, on the other hand, did not show much significance, indicating that this value is less important than the other values on the scale (Cahill, 2018:33–44).

In the South African context, Meehan (2019) investigated the nature of the relationships between different aspects of employer attractiveness and various career orientations, whether various career orientations predicted different aspects of employer attractiveness and whether these relationships were moderated by self-perceived employability. The security and technical/functional career orientations were found to be significantly predictive of development value in a sample of 193 third-year and postgraduate students. Entrepreneurial creativity, service to a cause, lifestyle, and technical/functional career orientations significantly predicted social value. Entrepreneurial creativity, service to a cause and technical/functional career orientations all predicted interest value significantly. Entrepreneurial creativity, service to a cause, security and technical/functional career orientations all predicted application value significantly, while entrepreneurial creativity, lifestyle, managerial and security career orientations all predicted economic value significantly (Meehan, 2019). Bush (2012) conducted research with 276 second and final-year university students to validate the EmpAt scale and expanded it by including the element of green values. Bush's (2012) findings preserved the majority of the original factorial structure of EmpAt, lending credibility to the scale.

Other than the studies mentioned above, there have been many more that have used employer attractiveness as a theoretical premise (Aboul-Ela, 2016; Khabir, 2014; Mohanty, 2019; Noutel *et al*., 2021; O'Driscoll, 2017; Pingle, & Kaur, 2019; Priyadarshini *et al*., 2016; Rozsa *et al*., 2019; Sivertzen *et al*., 2013; Tamoniene, 2015; Vokić & Mosta, 2019). From the above literature, it can be deduced that employer attractiveness is a significant theoretical foundation for explaining employee attraction, as demonstrated by various research that has been conducted using the theory.

The next section discusses the three-factor engagement model, which was used to investigate employee engagement.

2.5.2 Three-factor engagement model

Since 2002, there have been competing definitions of engagement (Kuok & Taormina, 2017:262; Leiter & Maslach, 2017:55). When Schaufeli *et al*. (2005) operationalised their

three-factor engagement model, they noticed that little attention was being paid to concepts concerning the antithesis of burnout. They noted that, while Kahn (1990) provided a theoretical model of the psychological presence of engagement, he did not propose an operationalisation of the concept. However, Maslach and Leiter (1997) developed a theory based on the assumption that engagement is defined by three dimensions: energy, involvement and efficacy, which are considered the opposites of the three burnout dimensions (exhaustion, cynicism and lack of professional efficacy). According to Maslach and Leiter (1997:17), employees become exhausted when they are overburdened emotionally and physically. When employees are cynical, they tend to be cold and distant towards their work and co-workers. Inefficacy is characterised by a decrease in feelings of competence and productivity at work (Maslach & Leiter, 2007:368). It develops in response to an emotional exhaustion overload and is initially self-protective – an emotional buffer of detached concern (Maslach & Leiter, 2007:368). This causes employees to reduce their involvement at work and even abandon their ideals (Maslach & Leiter, 1997:18).

According to Maslach and Leiter (1997:23), burnout is an erosion of job engagement, as what commences as important, meaningful and challenging work turns into unpleasant, unfulfilling and meaningless work. Employees' sense of engagement begins to diminish as a result of burnout, and there is a corresponding shift from these positive feelings to their negative counterparts. As a result, energy becomes exhaustion, involvement becomes cynicism and efficacy becomes ineffectiveness (Maslach & Leiter, 1997:24). Focusing on engagement signifies focusing on the energy, involvement and effectiveness that employees bring to a job and develop through their work (Maslach & Leiter, 1997:102). As a result, engagement is the positive pole, while burnout is the negative pole (Moshoeu, 2017:149). Maslach *et al*. (2001:417) define employee engagement as a persistent, positive affective-motivational state of fulfilment characterised by high levels of activation and pleasure.

In 2002, Schaufeli *et al*. developed a new perspective on engagement based on Maslach and Leiter's (1997) burnout theory. According to Schaufeli *et al*. (2002:74), burnout and engagement are conceptually distinct aspects that are not endpoints of some underlying continuum. They chose to view engagement through the lens of human optimal function, viewing it as a positive, fulfilling, work-related state of mind characterised by vigour, dedication and absorption (Moshoeu, 2017:164; Schaufeli *et al*., 2002:74). Vigour is demonstrated by high energy levels and mental resilience, employees' willingness to put effort in their work and persistence when faced with challenges (Schaufeli & Bakker, 2004:295). Dedication can be described as a sense of significance, enthusiasm, inspiration and pride in working for a particular organisation (Schaufeli & Bakker, 2004:295). Absorption is attributed to a pleasant state of association with one's work, whereby time passes rapidly without experiencing

challenges with detaching oneself from work (Schaufeli & Bakker, 2004:295). As a result, vigour and dedication are seen as the opposites of exhaustion and cynicism (Schaufeli & Bakker, 2004:5). Vigour and exhaustion have been labelled as energy or activation, while dedication and cynicism have been labelled as identification. While burnt-out employees are exhausted and cynical, engaged employees are energised and enthusiastic about their work, according to Schaufeli and Bakker (2004:3).

Professional inefficacy was omitted from the definition of engagement, as Schaufeli and Bakker's (2005:5) research found that exhaustion and cynicism are at the core of burnout, while professional efficacy appeared to play a lesser role. They noted that prior research had shown that rather than efficacy, engagement is best defined by being immersed and happily absorbed in one's work – a state of absorption. As a result, absorption is a distinct dimension of work engagement that is not synonymous with professional inefficacy (Schaufeli & Bakker, 2004:5).

In their burnout theory, Maslach and Leiter (1997) recommend the use of the Maslach Burnout Inventory (MBI) to measure both engagement and burnout, with each falling on the opposite end of the scale. Low scores on the MBI dimensions were considered to correspond with high levels of engagement (Drake, 2012:4). Although they agree that the constructs of burnout and engagement are conceptually opposites of each other, Schaufeli *et al.* (2002) disagree that engagement could be adequately measured by MBI scores (Moshoeu, 2017:164). They acknowledge that engagement is the positive antithesis of burnout; however, they argue that the measurement of these concepts should be different (Schaufeli *et al.,* 2002:75). Schaufeli and Bakker (2004:3) argue that assessing burnout and engagement with the same questionnaire has two drawbacks. First, they argue that it is impractical to expect both concepts to be negatively correlated, arguing that when an employee is not burned out, it does not necessarily indicate that he/she is engaged in his/her work and vice versa. Second, the relationship between burnout and engagement cannot be empirically studied when measured with the same questionnaire. Therefore, both constructs cannot be incorporated simultaneously into the same model to study their concurrent validity. It was in light of these sentiments that Schaufeli and Bakker (2004:3) chose to define burnout and engagement as two distinct concepts that should be measured independently. Schaufeli and Bakker (2004) developed the UWES to assess the three dimensions of engagement.

Various studies have been conducted over the last few years using the UWES from the perspective of the three-factor engagement model (Bosman, 2005; Drake, 2012, Jordaan, 2005; Moshoeu, 2017; Rathbone, 2006; Vosloo, 2015). Moshoeu (2017) researched the relationships between personality traits and work-life balance. The study used the UWES to

conduct an online survey of 1 063 adults. The findings indicated that positive work-home and positive home-work interactions appeared to be more strongly associated with engagement than the five personality trait dimensions (Moshoeu, 2017:7). Work-life balance, specifically negative home-work interactions, was found to be a significant predictor of employee engagement as expressed by survey respondents (Moshoeu, 2017:439). Employees were believed to be empowered by their perceptions of personal growth, learning and development because they believe they are capable in succeeding in their job roles, resulting in feelings of self-efficacy, intrinsic motivation and engagement (Moshoeu, 2017:442).

Rathbone (2006) conducted research in the mining industry to establish the relationship between work engagement and demographic characteristics, job characteristics and work-home interaction of mining employees with a random sample of 320 employees from various mining companies in the Gauteng and North-West provinces. There was a significant relationship between engagement and autonomy, task characteristics, social support and instrumental support (Rathbone, 2006:78). Individuals with the most freedom in carrying out work, the most influence over their decisions to complete specific tasks, the ability to choose the time spent completing tasks and the ability to solve problems themselves were more likely to be engaged in their work. It was also discovered that characteristics associated with work tasks that provide individuals with opportunities for personal growth, a sense of accomplishment, opportunities to participate in training courses, opportunities for advancement and task variety are strong predictors of high work engagement. Employees who were able to bring their good moods from home to work, who were better able to adhere to appointments at work since it was part of their home responsibilities, and who had better self-confidence at work as a result of their well-organised home lives were most likely feel more enthusiastic, inspired and proud of their work (Rathbone, 2006:79).

Bosman conducted a study in 2005 to investigate the relationship between job insecurity, affectivity, burnout and work engagement of 297 government employees. The UWES was one of the instruments used in the study, and it revealed that white respondents had higher levels of cognitive job insecurity and lower levels of engagement than black respondents. Increased engagement was associated with shorter tenure. It was discovered that respondents who had worked in the organisation for less than one year and those who had worked for two to five years had higher levels of positive affect than employees who had worked in the organisation for 11 years or more (Bosman, 2005:7).

Vosloo (2015) conducted a study to determine the level of work engagement in an international engineering management and development consulting firm’s design division. The aim was to determine the company’s employee value proposition (EVP), specifically the value attached

to the intrinsic reward component to determine whether there was a relationship between EVP and work engagement. Respondents demonstrated high levels of dedication, vigour and absorption, resulting in high levels of work engagement (Vosloo, 2015: 78). Vosloo (2015:79) discovered evidence to support a statistically significant relationship between EVP and work engagement, revealing significant relationships between career opportunity and vigour, organisation (attraction) and vigour and dedication, and work (attraction) and vigour and dedication. Absorption was the only work engagement subscale that did not correlate with EVP.

Another study, conducted by Boikanyo (2012), examined the effect of employee engagement on quality performance in the petrochemical industry using a sample of 200 employees. The findings indicated a strong positive statistical and practical correlation between vigour, dedication and absorption as dimensions of the UWES, indicating that energetic and dedicated employees are highly likely to be satisfied with their work to the point of being unable to detach from it (Boikanyo, 2012:71). Due to the construct validity and high level of reliability of the UWES, this study established that it is an acceptable measure of employee engagement in the petrochemical industry (Boikanyo, 2012:73).

Other studies that were conducted were based on validating the UWES as a measure of engagement. These include Jordaan's (2006) study on the work engagement of academic staff in higher education institutions in South Arica. Jordaan aimed to investigate whether the UWES was a reliable and valid measure of work engagement for the academic staff in those universities and to establish the relationships between work engagement, job demands and job resources. Drake (2012) compared the job engagement scale and the UWES to determine whether one scale was superior to the other or whether both were necessary to assess the construct domain adequately. Goliath-Yarde and Roodt (2011) assessed the differential item functioning of the UWES for different South African cultural groups in a South African information and communications technology company. Storm and Rothmann (2003) conducted a study to validate the UWES for the South African Police Service and to determine the construct equivalence and bias in different race groups.

The following section discusses the Herzberg two-factor theory, which formed the theoretical base for investigating retention.

2.5.3 Herzberg's two-factor theory

Herzberg's two-factor theory is considered a compatible framework that is extensively studied among several motivational theories that elucidate the role of motivation in retention (Almaaitah *et al*., 2017; Berry & Morris, 2008; Owler & Morrison, 2015). Frederick Herzberg

proposed a two-factor theory in 1959, which is also known as the motivation-hygiene theory (Castellanos, 2014:22). This theory was initially drawn from the examination of events in the lives of accountants and engineers to establish what makes employees feel good or bad about their job (Armstrong, 2014:172). The results emanating from this research distinguished between two elements termed ‘motivational factors’ and ‘hygiene factors’ that are completely unrelated and have no link to each other, but affect feelings of satisfaction or dissatisfaction (Herzberg, 2003:87).

According to Herzberg (2003:91), factors that make individuals satisfied and motivated in their job are different from those that make them dissatisfied. Job satisfaction is not the opposite of job dissatisfaction, “but rather, no satisfaction and no job dissatisfaction” (Herzberg, 1987:9). This infers that an employee whose dissatisfaction, for example, is due to unpleasant working conditions will not be satisfied if the working conditions become pleasant. The unpleasant working conditions cause the employee's dissatisfaction; however, they do not affect his/her satisfaction with the job (Henha, 2019:36).

Herzberg (1987:9) discovered that employees tended to describe two different types of satisfying experiences: intrinsic and related to the job content and is unique to human characteristics, their ability to achieve and through achievement, experience psychological growth and contribute to employee satisfaction. These factors are called ‘motivators’. Motivator or growth factors include achievement, recognition, the work itself, responsibilities, advancement and growth. On the contrary, dissatisfying experiences (hygiene factors) are extrinsic to the job and largely stem from extrinsic, non-job-related factors, such as company policies and administration, salary, interpersonal relationship with colleagues, working conditions, status, security and management styles (Herzberg, 1987:9). The term ‘hygiene’ is construed in the medical use of the term, signifying preventative and environmental (Armstrong, 2014:173). Astonishingly, one could question why salary is identified as a hygiene factor. In his study, Herzberg (2003:86) found that even though low salaries dissatisfied employees and demotivated them, increasing salaries would not satisfy or motivate them either. Improving hygiene factors will not satisfy employees, but will prevent them from being dissatisfied (French *et al*., 2011:169.). Hygiene factors neither satisfy nor motivate, but serve the purpose to prevent job dissatisfaction while having little effect on positive job attitudes (Armstrong, 2014:173). Herzberg argues that for an employee to be truly motivated, the employee’s job has to be fully enriched, where the employee has the opportunity for achievement and recognition, stimulation, responsibility and advancement (Ramlall, 2004:57). People often want to feel either acknowledged or recognised (competent) to experience their work as meaningful (Munn, 2013:407). Therefore, monetary benefits as a means of motivating employees to stay within their organisations seem to fall on a low priority scale compared to

career development options and an all-inclusive work environment that motivates employees and rewards them on individual performance (Gruman & Saks, 2011:136).

Motivational and hygiene factors can be considered as intrinsic and extrinsic drivers of employee retention. In the context of turnover, an employee will stay or leave his/her job not because of hygiene factors that affect his/her dissatisfaction, but because of the motivation factors that contribute to his/her satisfaction with the job (Henha, 2019:36). According to Chiboiwa *et al*. (2010), the reasons associated with employees' pursuit to either leave or remain within an organisation can be classified into intrinsic and extrinsic factors. These include unfair compensation systems, management style, lack of recognition and advancement opportunities, unpleasant working conditions, inadequate training and development opportunities (Chiboiwa *et al*., 2010). The theory highlights the importance of addressing these elements as critical measures for facilitating job satisfaction and causing employees to stay within their jobs (Ahmad & Azumah, 2012:34).

Employees start becoming receptive to turnover intentions when the factors that contribute to their satisfaction are affected (Henha, 2019:36). In their study on employee retention strategies, Ahmad and Azumah (2012:34) confirmed that an increase in salaries was identified as a hygiene factor, compared to career progression and exciting work, which were deemed as motivators in the workplace. The survey revealed that employees were content with their salaries, but concerned about their career progression and believed that they did not have adequate career advancement opportunities, which in turn, affected their motivational levels. With such factors accounted for, it would be advised that retention strategies should therefore seek to optimise motivation factors to inhibit employees' turnover intentions (Henha, 2019:36). Managers should aim at increasing motivator factors, such as developing an interesting work environment, creating opportunities for advancement, maximising competencies, enabling employees to be involved in tasks that offer more responsibilities and new challenges as well as providing employees with recognition whenever needed (Nguyen, 2017:23).

Despite extensive support for the theory, the merits of the two-factor theory have drawn its share of criticism (Renfors, 2017:19). Herzberg's two-factor theory is criticised for making unjustified inferences based on a small and specialised sample (engineers and accountants) (Armstrong, 2014:173). It has been claimed that the findings of Herzberg's study are inevitable results of the interviewing methods used by the interviewers (Armstrong, 2014:173). Victor Vroom, the inventor of expectancy theory, critiqued the critical incident interviewing method used in Herzberg's two-factor study as an approach that possibly led to respondents associating motivational factors as being under their personal control, therefore crediting themselves, and hygiene factors as being under the control of management, for which they

could not blame themselves, thereby resulting in biased reporting (French *et al.*, 2011:170). Individual differences were also said to have not been taken into account when studying respondents' responses, such as the effects of age, gender, culture and other variables. The criticism levelled against individual differences is in its assumptions that every individual will react in the same manner in similar situations and that everyone has the same needs (Armstrong, 2014:173; Badubi, 2017:46). The relationship between motivation and satisfaction was also posited to have been somewhat unclear (French *et al.*, 2011:170).

Notwithstanding the above-mentioned objections, the Herzberg two-factor theory continues to thrive and has not fallen out of favour to understand employee retention. Herzberg's theory is lauded for being easy and clear to understand and based on real-life rather than academic abstractions (Armstrong, 2014:173). Herzberg's two-factor theory has important implications for management and human resource practice, as it provides a nuanced understanding of the significance of work as a motivating factor for employees, taking into account the limited influence of hygiene factors (more money, fringe benefits and better working conditions) and the strong influence of motivators (achievement, recognition, responsibility and opportunities for advancement and growth) (French *et al*., 2011:170; Ndeipanda, 2018:17). It compellingly emphasises the positive value of the intrinsic motivating factors and highlights the need to consider both financial and non-financial factors when developing reward systems (Armstrong, 2014:173). The implications of this theory are clear, as it points out that motivation can be increased through basic changes in the nature of an employee's job, viz. job enrichment (Steers & Porter, 1991).

2.6 CONCLUSIONS

The chapter provided a conceptual and theoretical exposition of attraction, engagement and retention. Taking into account these variables, it emerged that employee attraction is an important apparatus for establishing the profile of employees that organisations seek and the type of employees desired to be engaged and retained (Rossi, 2018:33). Literature also demonstrated plausible and substantial relationships between employee engagement and metrics of retention and attraction. It can be deduced that organisations should strive to be desired and recognised as anchorages that harbour engaged employees with high retention levels, which, in turn, will result in attracting potential employees. Organisations need to exert efforts towards ensuring that they achieve the status of being employers of choice, whereby individuals voluntarily seek employment in those organisations because they are recognised as desirable places at which to work (Rossi, 2018:33).

Furthermore, although there is no single theory that has been exempted from criticism and is universally accepted to elucidate the constructs of attraction, engagement and retention, the different theories discussed provided a fitted framework that bestowed insights into the importance of attracting, engaging and retaining employees in the workplace in the most suitable approach that could enable eagerness and meritoriously enhance productivity in organisations (Sahito & Vaisanen, 2017:210).

Furtherance to the theoretical scrutiny of attraction, engagement and retention, the next chapter examines the drivers of these constructs, i.e. what motivates individuals to be attracted to and engaged and retained in an organisation. Subsequently, bearing in mind the primary objective of the study to investigate women in technical mining positions, a review of literature is presented on the statutory and regulatory frameworks governing the inclusion of women in South African mines and the global and national perspectives of women in the mining industry.

CHAPTER 3

WOMEN IN MINING: GLOBAL AND NATIONAL TRENDS AND PERSPECTIVES

3.1 INTRODUCTION

The previous chapter provided a conceptual framework of the terms ‘attraction’, ‘engagement’ and ‘retention’. Thereafter, general theories that are conceptually linked to attraction, engagement and retention were explored. From these theories, the Employer attractiveness theory, the Three-factor engagement model and Herzberg’s two-factor theory were selected to provide insights into what attracts, engages and retains employees, including women employed in technical mining positions, in their workplaces.

This chapter presents a general overview of women employed in the mining industry. The first section discusses a global, African and national perspective of women employed in the mining industry. The literature reviewed provides a historical context of women’s involvement in mining, their current presence in mines, the roles they play and challenges experienced in their employment. The second section discusses factors that affect the attraction, engagement and retention of women in the mining industry on a global scale.

3.2 AN OVERVIEW OF WOMEN EMPLOYED IN THE MINING INDUSTRY

The mining industry is perceived as male-dominated and often not a common and preferred field that women pursue (Botha, 2013:179; Fernandez-Stark *et al.,* 2019:3). Fernandez-Stark *et al.* (2019:3) estimate that, globally, women occupy approximately 5 to 10% of jobs in the mining industry and it is one of the lowest levels of participation of women among all economic sectors. This has been attributed to its traditionally masculine culture, accompanied by the physically intensive nature of its labour (Botha, 2016a:252). Historical laws, policies and traditional customs also played a role in perpetuating the underrepresentation of women in mining. In May 1937, the International Labour Organization (ILO) effected the Underground Work (Women) Convention 45 of 1935, which prohibited women of all ages from being employed in any mine for underground work under Article 2 (ILO, 2017). While this legislation has been revised and repealed, the ILO played a critical role in establishing labour standards. The Act was the only available template for some countries, especially European countries concerned with women’s work in mining (Lahiri-Dutt, 2019:5). This propagated the discrimination of women’s employment in mining.

Previously, women were considered unsuitable to operate under the labour-intensive operations in mines, thereby leading them to occupy mostly support and domestic roles such as general administration, clerical, human resources, finance, public relations and cleaning work, which are non-core mining-related positions (Botha, 2013:180; Heine, 2008:13; Hughes, 2012:24; Mutasa, 2017:13). In addition, the patriarchal system, a system whereby male authority oppresses women through social, political and economic conventions, was also held liable for perpetuating views of women being unsuitable for mining occupations and responsible for defining what was acceptable for women to pursue, or not (Asiyanbola, 2005:3; Moyo, 2011:67). The historical milieu of the mining industry brought about unequal relationships between women and men, which have caused the subordination of women in the workplace and their respective communities (Lahiri-Dutt & Macintyre, 2006).

Over the years, the need to reach gender parity and holistic inclusion of women has gained prominence in the mining industry. Gender parity is adjudged as a fundamental component of sustainable development (Nayak & Mishra, 2005:1). Following the United Nation's sustainable goal of achieving gender equality and empowerment of all women and girls, there is a belief that a society cannot remain healthy and achieve adequate economic well-being without the full participation of women in the different economic sectors, including mining (ASI-IWIM, 2017:13; Nayak & Mishra, 2005:2).

The section below discusses the global, African and national (South African) perspectives pertaining to women employed in the mining industry. The countries discussed were selected based on the availability of literature on the history of women in mining and the role they have played over the past years to ensure their full participation in the industry. The mining industry in these countries play a pertinent role in their economies, contribute largely to employment and share common features in the male-dominated mining labour force.

From the literature reviewed, it should be noted that all statistical figures presented are based on the latest available data made public. In some countries, literature on women in mining was scarce, which led to the need to rely on limited sources.

3.2.1 A global perspective

The section below provides a global overview of women's participation in the mining industry in Sweden, India, Chile, China, Mongolia, Australia and Canada. Literature is presented on women's historical involvement in the mining industry, their current state in contemporary mining and the roles they played and continue to play in the industry.

3.2.1.1 Sweden

The Swedish mining industry has been in existence for approximately 1 000 years (Johansson & Ringblom, 2017:630). To date, the industry continues to play a pivotal role in the economy of the country. On an annual basis, 130 million minerals with a worth of SEK40 billion are produced in Sweden. Iron production accounts for the greatest value of the minerals produced, alongside copper, followed by lead and zinc and then crushed bedrock (SGU, 2019). The mining industry also plays a significant role in creating employment, with a workforce of almost 7 000 in 2018 (Johansson & Ringblom, 2017:630, Olsson *et al*., 2019:9). Although the industry employs a large number of people, gender diversity remains a challenge, with the majority of the workforce constituting men (85%) (Andersson & Andersson, 2016). However, this was not the case historically.

In the pre-industrial era (1700–1850), women worked both above and underground in all mining production operations (Abrahamsson *et al.,* 2014:18; Blomberg, 2006:120). The labour representation of women and men in some mines stood at 50:50, with women occupying positions that were physically demanding and perceived as work associated with men (Abrahamsson *et al.,* 2014:18). This was an era when mining was seasonal and mine work was combined with other activities such as farming. In general, the whole household would be involved in the different work activities (Abrahamsson *et al.,* 2014:18).

Up to the year 1840, work in mines had no gender reservations. This, however, changed in 1842 when the number of women started decreasing as they became standby employees (Blomberg, 2006:120). The previous seasonal work norm changed to full-time and more men replaced women in mines (Blomberg, 2006:120). The situation worsened in 1900 when Sweden passed legislation prohibiting women from working underground (Abrahamsson *et al.,* 2014:18). Women's employment decreased from a representation of 15 to 20% in 1850 to 1% in 1950 (Blomberg, 1995). Blomberg (2006:121) argues that this regulation was "not only an expression of the fact that the boundaries between masculinity and femininity were debated, but also that it was regarded as necessary to regulate these boundaries via legislation". This promoted the culture of masculinisation, which undermined women's potential and involvement in male-dominated industries such as mining. This law was only abolished in 1978 (Abrahamson *et al.*, 2014:19).

Although the gender segregation law was repealed, the industry remains male-dominated, with 85 to 95% of its workforce comprising men (Segerstedt & Abrahamsson, 2019:617). Women who are employed in the industry mostly occupy positions that are non-core mining-related, with very few working underground (Abrahamson *et al.*, 2014:20; Andersson, 2012). These women face a range of challenges. There were occasions, for instance, where female miners were informally expected to be their male colleagues' caretakers, while dealing with implicit sexism (Abrahamson *et al*., 2014:21). Female miners also faced challenges of hostility and sexual harassment where derogatory language would be used by men, some of which posed physical hazards for them. In addition, male miners expressed a blatant resistance towards the advancement of women in mining. These challenges are compounded by men's reluctance to openly have discussions about gender equality (Abrahamson *et al*., 2014:21).

As the social conduct of Swedish mining communities is reluctant to change, mining companies still tend to employ men primarily (Abrahamson *et al*., 2014:18). This presents a challenge in achieving gender diversity in the industry, as the recruitment of more men indicates an elevation of male domination in an industry where this norm is strived to be dismantled. Considering the challenges women faced historically and currently, Segerstedt and Abrahamsson (2019:617) argue that gender equality should be regarded as a strategic profile challenge in Swedish mining that will require continuous research and collaborative efforts from the industry, its companies and local communities.

It is encouraging to note that women are not alone in their quest to combat inequality in the mining industry. Women in Mining Sweden (WIM Sweden) is a network managed by the Sveminan (Swedish) industry organisation for mines that focuses on promoting gender equality in the Swedish mining and minerals industry and serves as a platform for women to interact with one another and share experiences of their employment in the industry (Svemin, 2020). The next section discusses women's involvement in mining in India.

3.2.1.2 India

India is the seventh-largest country in the world, with abundant supplies of mineral resources. Crude oil and gas, coal, iron ore, copper and bauxite are among some of its minerals. The mining industry is one of the major economic sectors that supply raw materials to other industries such as power generation, iron and steel, cement, petroleum and natural gas, petrochemicals, fertilisers, precious and semi-precious metals or stones, electrical and electronic equipment, glass and ceramics (Ministry of Mines, Government of India, 2016:6–7).

India's mining industry dates as far back as over 3 000 years ago. Similar to Swedish mines, ancient mines in India were small and operated by families, where labour was divided within the family unit (Ghose, 2004:16). This was done alongside agricultural activities. Within these

mines, women worked both in underground and opencast mining and represented 44% of the total employees in 1900 and 37% in 1920 (Ghose, 2004:17; Lahiri-Dutt, 2012:10). In certain coal mines, such as Jharia and Raniganj, there was a 55% representation of women working underground alongside their husbands, 30% worked with their relatives and 20% worked on their own (Romano & Papastefanaki, 2020:10). In those work settings, men would cut the coal while their wives and children carried and hauled it (Romano & Papastefanaki, 2020:10). Women's employment in mines, particularly underground, was a norm until 1928, when regulations prohibiting their employment were drawn. These regulations, complemented by the gradual industrialisation of mining operations, distorted the nature of women's work in mining and carved a path that ultimately forced them out of the industry (Ghose, 2004:17).

The regulation that prohibited women from working in underground mining was promulgated in 1929 and from then, the industry experienced a decrease of women employees in the industry (Lahiri-Dutt, 2012:204). This law was in effect until 1946 (Nite, 2015:31). The abolishment of this law, however, did not resolve women's problems entirely, as the Mine Act of 1952 came into force in 1953 and section 46 of this Act prohibited women's employment in underground mining and above ground, except between 06:00 and 19:00 (Republic of India, 1952). In addition, coal mines were nationalised in 1973 (Lahiri-Dutt & Macintyre, 2006:75). As a result, the work roles of women in the coal mining subsector further declined under state ownership (Ghose, 2004:17; Lahiri-Dutt & Macintyre 2006:76). It was only after 67 years (2019) that the Central Government lifted the ban relating to the employment of women in any mine, above ground and underground, from the provisions of section 46 of the Mines Act, 1952. This exemption also included extending women's working hours until 22:00, instead of 19:00 (Ministry of Labour & Employment, 2019).

Currently, women made up 6% of the mining employees in India (Measham & Zhang, 2019:364). Women's involvement in the mining industry has been in marginal positions such as cleaners or attendants in mining offices (Ghose, 2004:17; Nayak & Mishra, 2005:6). Women's occupancy in marginal positions is often overlooked and conceals their significance as an imperative cohort of the mining workforce (Ghose, 2004:17).

Besides being less represented, work-related practices result in the slow integration of Indian women into the industry. Trade union activities in the coal mining subsector, for example, have been criticised for promoting a gendered image of the industry that portrays women as a 'special' category, where they are excluded in leadership and policy development and are also discouraged from participating in union meetings (Lahiri-Dutt & Macintyre, 2006:81). There is a perception within Indian mines that attaches women's role to domestication, with the belief that women belong in the home and those who work do not possess the physical ability to

produce the expected hard labour demanded by coal mining (Lahiri-Dutt & Macintyre, 2006:82). In this regard, there is a perception that women are physically incompetent to carry out work undertaken by men in mining. Considering that mining has always been a male-dominated and patriarchal industry, there has been hostility and discriminatory attitudes towards women's participation in the industry, with the view that they play an insignificant role in the industry (Ghose, 2004:17; Lahiri-Dutt, 2015:531; Nayak & Mishra, 2005:6). This has stimulated the marginalisation of gender issues where women's needs and interests are neglected by both employers and trade unions (Lahiri-Dutt, 2012:460). In addition, there have been cases in which women were sexually exploited in mining (Lahiri-Dutt, 2015:531; Nayak & Mishra, 2005:7). An example was provided of a mine where women were coerced into working night shifts, which made them targets of sexual abuse (Lahiri-Dutt, 2015:531; Nayak & Mishra, 2005:7).

Over and above the work-related challenges women face, there are cultural stereotypes associated with the employment of women in mining. Cultural identities such as ethnicity, caste, and religion strongly influence the social and gender relationships within the formal labour force in India (Lahiri-Dutt & Macintyre, 2006:76). These institutions contributed to the binary exclusion of women, whereby a women's ethnic or caste identity established a position of double minority for female miners, especially those in collieries (Lahiri-Dutt & Macintyre, 2006:82). There were also myths that women's presence in mines results in mining-related fatalities (Nayak & Mishra, 2005:6). As a result of this perception, women were regarded as unfit and seldom employed in the industry (Nayak & Mishra, 2005:6).

To address the challenges facing women in the Indian mining industry, various measures are being undertaken by different entities to advocate gender equality and the creation of opportunities for women working in the industry. For example, the mines, minerals & PEOPLE (mm&P) alliance is a women's mining network that was established in 1998 and is aimed at addressing gender-related mining issues with a focus on understanding the status of women in mining, working for the rights of female mine employees and women displaced or affected by mining, advocating for gender-sensitive mining policy for the country, establishing links of women's struggles and campaigns nationally and internationally to gain strength and solidarity for their struggles, fighting for women's legal rights to gain control over land and other natural resources that have traditionally been male-oriented, fighting against the employment of girl-child workers and addressing women's health and hazard challenges in mining areas (mm&P, 2020; WRM, 2004). The mining industry is also a member of the International Women's Rights Action Watch (IWRAW) Asia Pacific. IWRAW is a feminist organisation committed to the realisation of women's human rights by pursuing their equality in the workplace (IWRAW, 2020). The organisation acts to combat any structures, systems and institutions that violate

the human rights of women and engages in a movement that strengthens women's voices and activism to create alternative political narratives and spaces (IWRAW, 2020). Dhaatri is another initiative aimed at fostering equality in the mining industry. Its work includes providing support related to challenges experienced by rural and indigenous women. Collaboratively with Prithvi Trust, Dhaatri raises awareness on concerns regarding wages and occupational health illnesses such as silicosis in the diamond mines and stone quarries for female mine workers (Dhaatri Resource Centre for Women and Children, 2020). The presence of such initiatives raises optimism in the struggle to achieve a just and equitable mining industry that accommodates women. The section below provides a discussion of women's involvement in Chile's mining industry.

3.2.1.3 Chile

The mining industry is one of the largest industries in Chile that accounts for 52.3% of the country's exports and 9% of the GDP contribution (Mining Council, 2020:39-41). Chile has plentiful metals and minerals such as copper, gold, lithium, silver, zinc, iron, lead and manganese, mainly in its northern region. Copper is the most critical metal in the country's mining industry, with its production ahead of leading countries such as the USA, China and Peru. This is followed by gold and molybdenum, which are by-products from copper mining that are ranked second and fifth, respectively, in terms of production (KPMG International, 2014).

Despite being one of the most prevalent industries, mining in Chile has perpetually remained allied with masculinity, with reference made to its image as one resembling that of a man (Barrientos *et al.,* 2009:389). Before 1986, women were barred from working in the Chilean mining industry (Dirección del Trabajo, 2018). This proscription was mainly due to cultural superstitions that prevented women's presence in mining sites in any capacity, as mining was perceived as a man's job, accompanied by remote locations of mines, which were believed to be an interference to women's work-life balance demands and as a result affected their participation in the industry (Fernandez-Stark *et al.,* 2019:2).

In 1996, the Chilean government's judgement prohibiting women from entering the mining industry, more specifically large-scale mining, was repealed (Salinas *et al.*, 2018:628). Since then, the government, alongside mining companies, has been making efforts to bring change within the industry by pledging to hire women and to provide them with better education to reduce occupational segregation (Salinas *et al.*, 2018:628). Companies have made strides in their organisations by incorporating gender-based clauses and encouraging labour unions to include measures that guarantee the integration of women into their boards (SERNAM, 2017).

Furthermore, the implementation of innovative technological developments such as mechanised and hydraulic powered equipment removed the reliance on physical strength as a key job requirement in mining (Consejo Minero, 2009). In conjunction with infrastructure adaptations such as on-board/portable bathrooms and modifications for operator size, these technological developments have reduced concerns regarding the inclusion of women in mining sites (Fernandez-Stark *et al.,* 2019:11). Safety and environmental improvements have also been implemented to alleviate trepidations revolving around health and safety matters (Fernandez-Stark *et al.,* 2019:11).

The abolishment of previous discriminatory laws and policies and the introduction of improved infrastructure and technology was aimed at stimulating the recruitment of women, not only in administrative positions, but also in technical posts (Consejo Minero, 2009; Fernandez-Stark *et al.*, 2019:11). Despite the implementation of these reforms, women's participation in Chile's mining industry remains low. In 2018, 8.5% of women were employed in the Chilean mining industry (Mining Council, 2020). According to Fernandez-Stark *et al.* (2019:8), a minimum level of secondary education is required to acquire employment in the mining industry. Women tend to be more educated than men in all three levels of the organisational structures in Chilean mines (Ramos, 2017). In 2017, there were 89% of women in supervisory positions, compared to 69% men, 73% men versus 49% women in maintenance and 57% women versus 17% men employed as operators, who possessed a post-secondary education and training as a highest qualification (Ramos, 2017). In total, 81% of women had a university degree (Fernandez-Stark *et al.*, 2019:16). However, even though women tend to have higher levels of education, this has not translated into career development, thereby discouraging qualified women from pursuing mining-related careers (Fernandez-Stark *et al.*, 2019:16).

The barriers to women's employment in Chile's mining industry are similar to those of other countries employing women in mining. Gender stereotypes entrenched in masculinity remain prevalent, as mining is still regarded as men's work with views that labour in the industry still requires strength and stamina (Fernandez-Stark *et al.*, 2019:19). Due to this perception, men in mines perceive women as weak and they are excluded from performing labour-intensive work and have limited opportunities to advance to higher positions (Salinas, 2013:1842). This perception is also aggravated by cultural stereotypes. Chilean society stigmatises women in mining and favour women's occupations for more traditional roles such as education, healthcare and domestic work (ComunidadMujer, 2018). In addition, because the industry's networks are mostly men, this makes it challenging for women to access workgroups, obscuring their visibility and limiting their job satisfaction (Fernandez-Stark *et al.*, 2019:19). The existence of such perceptions and realities in mines limits women's opportunities to

permeate the mining industry and therefore affects their inclusion and proliferation in the industry.

To address the existing gender stereotypes and other challenges faced by women in Chile's mining industry, WIM Chile was established in 2015 to promote and support the development of women in mining and their participation in leadership positions and also on boards of mining companies. The organisation, through collaborative and training networks, also supports and enhances the labour development of female miners and is a reference point in matters concerning women in the workplace (WIM Chile, 2020). The following section deliberates on women's involvement in mining in China.

3.2.1.4 China

During the Sino-Japanese war, which took place between 1937 and 1945, the majority of China's mines and processing plants were damaged. After the war ended, strides were made to rebuild the industry, and coal, as well as steel production, became the main drivers of China's growth (Greenovation Hub, 2014:16). Alongside coal, China is a major producer of minerals such as iron ore, gold, manganese, copper, bauxite, lead and zinc (Greenovation Hub, 2014:16–17). Over the years, the mining industry has provided benefits such as employment and contributes significantly to the local and national GDP of the country (Greenovation Hub, 2014:16). The industry not only employs those working in mining, but also creates downstream employment to industries outside mining (Greenovation Hub, 2014:6).

Looking at the industry's employment, previously, Chinese women were at the bottom of the social hierarchy for a long time and were excluded from social and political life (Yao, 2006:227). Women were viewed as inferior to men, with the belief that their position in society belonged in the home to take care of their husbands and raise their sons (Tiefenbrun, 2017:3–4). This custom prohibited women from working outside the home and those who did were either prostitutes or entertainers, which were regarded as indecent and immoral (Tiefenbrun, 2017:3).

In 1949, the former chairman of the People's Republic of China, Mao Zedong, invigorated women's equality by encouraging them to work and participate in all sectors of the Chinese economy, including mining (Tiefenbrun, 2017:1; Yao, 2006:227). However, even with Zedong's advocacy for women to work, up to the present time, women are still perceived as primary caregivers and expected to stop working after they had children to look after their households and families (Catalyst, 2020). Since women's penetration into the Chinese labour market, their employment has been declining from 73.2% in 1990 to 60.5% in 2019, in comparison to 75.3% of men's employment in 2019 (Catalyst, 2020). Women tend to dominate the lowest-paying occupations in industries such as hotels and catering services, financial

intermediation, education and health, social securities and social welfare (Dasgupta *et al.*, 2015:12).

Mining and quarrying, specifically, were perceived as a masculine industry, dominated by men in both large and small companies (Yao, 2006:227). Comparable to Sweden, India and Chile, Chinese women were previously permitted to work both in underground and surface mining occupations (Yao, 2006:227). This changed when the law of Provision for the Protection of Working Women was implemented in 1992, which prohibited women from working underground (Yao, 2006:227). The reasons attributed to this ban were notions that women were less efficient, unreliable and yet expensive for underground-related work, taking into account their need to also accommodate family responsibilities, which would require them to take leave at times (Mudimba, 2017:21). Therefore, labour provided by men was considered cheap, which enabled companies to employ them in large quantities, thereby limiting the probabilities of employing women (Yao, 2006:238). In addition, men's physical structure enabled them to adjust to harsh working conditions where they could work without clothes. This made the work environment inconvenient for men and women to work together (Yao, 2006:238). This resulted in gender discrimination, as women were adjudged as unsuitable for work in mining and men became the most preferred employees (Botha, 2013:162; Mudimba, 2017:21). External factors such as cultural beliefs perpetuated the notion of mine work being a masculine activity. This view coincided with superstitions whereby in many Chinese communities, it was considered unpropitious to have women present in mining tunnels (Yao, 2006:238). Women's physical abilities were also limited due to the foot-binding custom, which limited women's mobility (Yao, 2006:238).

The Provision for the Protection of Working Women law yielded a new labour law in 1994, which reinforced the restrictions of women in underground mining jobs (Yao, 2006:239). As a result of these restrictions, women working in Chinese underground mining do so illegally (Mercier, 2011:35). This law has further intensified the low representation of women in mining. There are no recent publicly published statistics on the number of women employed currently in the Chinese mining industry. The last released statistics were in 2008, when women represented 19.4% of the mining workforce (Cooke, 2011:265). Cooke (2011:268) explains that women are underrepresented due to the high risk and physically demanding nature associated with mining jobs. As a result, most mining occupations in China are gender-specific, making them not all available to women (Huang & Ali, 2015:935). Moreover, women in some universities are discouraged from studying mining-related qualifications, with reasons ascribed to the belief that women do not have the physical strength to carry heavy equipment or are able to escape a mine as quickly as men in an emergency (Steinfeld, 2014:138–139). Justification of this view is also strengthened by the rationalisation that Chinese law already

suggests that mining work is unsuitable for women, and therefore women are requested to refrain from pursuing mining courses (Validakis, 2013). It should be noted, however, that these restrictions are being contested to ensure women's equal access to opportunities in education and employment (Validakis, 2013). Women's involvement in mining in Mongolia is discussed in the next section.

3.2.1.5 Mongolia

Mongolia hosts some of the largest copper, coal and uranium reserves in the world (Daley *et al.*, 2018:2). The mining industry plays a significant role in the Mongolian economy with a GDP contribution of 21% (Purvee, 2019). Prior to 2008, labour regulations restricted women's involvement in a wide range of activities in mining, thereby preventing them from undertaking jobs in the industry (Khan *et al.,* 2013:16). The restrictions included all kinds of underground work and any form of physical labour, irrespective of whether it was mechanised or not (e.g. geologists, engineers or mine surveyors) (Khan *et al.,* 2013:16). The justification of these restrictions was pinned on the notion that they were addressing health and safety concerns. However, Khan *et al.* (2013:16) argue that these justifications were injudicious, as the health and safety concerns could have been more directly addressed to benefit both men and women, as opposed to exclusionary labour regulations, also taking into consideration that other countries were already employing women in the mining industry. Even after 2008, gender stereotyping continues to shape people's notions of women working in mining, with women encouraged not to pursue jobs in mining, as they are thought to be unsuitable and unsafe and that women should be protected from hard jobs that are inherent to mines (Khan *et al.,* 2013:16). As a result of these restrictions, women are mostly employed in the informal sector, largely concentrated in support service positions such as in retail, catering, cleaning, brick-making and farming (Khan *et al.,* 2013:16–17; MERIT, 2016:4).

As of 2019, 6% of women were working in the Mongolian mining industry (Purvee, 2019). This is in spite of the fact that the number of women pursuing mining-related qualifications has been increasing since the late 1990s from 15% to 60% in 2016 (WIMM, 2016:7). Women's level of education is higher than that of men. In 2018, 60.4% of women possessed a doctorate as a highest qualification, compared to 39.6% of men, 64.9% possessed a master's degree compared to 35.2% of men and 59.35% had a bachelor's degree, compared to 40.7% men (Purvee, 2019). While women are more educated, few of them possess technical skills and those who do are often not recruited in mining and therefore pursue employment in other industries (JICA, 2013:23). There is a perception that it is not easy for women to acquire employment in mines. In their study titled *Gender, land and mining in Mongolia*, Daley *et al.* (2018:91) assert views that women are not employed in mining companies without difficulty,

even if they are qualified. Daley *et al.* (2018:91) provide an example of a qualified woman mining engineer for whom it took five years to acquire employment in a mining company. There were also cases where companies hiring from universities would request male employees as opposed to women (Khan *et al.,* 2013:16). In addition, opportunities are even less for managerial positions, with very few women found in management (Purevjav, 2011:203). Instead, opportunities are found in positions such as cooking and cleaning (Daley *et al.,* 2018:91). While women may be better positioned to participate in the mining industry, taking into account their high education levels, their involvement in the industry does not mirror that.

Age discrimination is another factor contributing to the low level of women's representation. There is a subtle predisposition towards employing young individuals. Women who are 18 to 35 years old are more likely to be employed, as those who are older are considered elderly. This is contrary to men, whose elderly age is considered age 40 (Cane *et al.,* 2015:24). The only opportunity for women above 36 is in artisanal mining (Daley *et al.*, 2018:93). Women are more likely to participate in artisanal mining due to their exclusion from employment in large-scale mines (Cane 2014; Cane *et al.*, 2015; Purevjav, 2011). Within artisanal mines, women often face a greater risk of violence and exploitation, while not having access to adequate protection and social services (JICA, 2013:24–25). Women are also exposed to hazards such as poisonous substances arising from their involvement in artisanal mining (JICA, 2013:24–25). Consequently, the health impacts of artisanal mining are high, with miners prone to tuberculosis, dust exposure, inadequate ventilation workspaces due to insufficient health and safety measures in place and lack of personal protective equipment (PPE) (Cane *et al.,* 2015:72).

In addition to employment marginalisation, women have also been victims of other forms of discrimination. Women tend to be more subjected to sexual harassment (Cane, 2014:188). Khan *et al.* (2013:17) refer to an ILO study where women working in Mongolian mines reported cases of sexual harassment and lack of gender-sensitive company policies regarding living and working conditions. This view is similarly echoed by Cane *et al.* (2015:24), who stress that there are no regulatory measures in place to prevent, address and report sexual harassment in mines. Women are often reluctant to report cases of harassment and disrespectful treatments, as such behaviours are regarded as a norm in mining (Khan *et al.,* 2013:17). Above and beyond sexual harassment, mines' living and work schedule arrangements are not designed to adequately cater to women with families. Limited support is provided to women with families, as some mining companies require women to reside at the mine and charge them a daily fee if a family member wants to stay over. Others share living accommodation with men, thereby increasing their susceptibility to being prey to sexual harassment (Khan *et al.,* 2013:17).

In the quest to promote gender equality, similar to Sweden and Chile, Mongolia also has its own WIM organisation. Women in Mining Mongolia (WIMM, 2020) aims to improve diverse and inclusive decision-making practices within Mongolia's mining industry. Its mission is to establish dialogues with stakeholders on issues related to women in mining by educating, attracting and recruiting women in the industry, supporting their advancement in the workplace as well as coaching and mentoring leadership and accountability skills (WIMM, 2020). In addition to WIM Mongolia, the National Committee on Gender Equality (NCGE) is responsible for the implementation of gender equality and supporting women leaders in the workplace to encourage gender equality in the workplace (MERIT, 2016:1). The main functions of the NCGE are to coordinate and organise the formulation, implementation and monitoring of gender policies, programmes and special measures to ensure public and private industries' and citizen participation in the promotion, enhancement and protection of gender equality and to develop cooperation with international organisations and foreign countries on aspects of gender equality (NCGE, 2019). The country also has a project called Mongolia: Enhancing Resource Management through Institutional Transformation (MERIT), which aims to improve responsible resource management to ensure that both women and men can benefit equitably from the contribution of the extractive industry to provide sustainable economic and social development (MERIT, 2016:1). The upcoming section provides an overview of women's involvement in the Australian mining industry.

3.2.1.6 Australia

The Australian mining industry has been growing over the past years. This growth is attributed to the national and global demands of the country's mineral resources, which make it possible for the industry to remain significant (Lozeva & Marinova, 2010:1). The country is recognised as a world leader in the mining industry and ranked top 5 in its production for 19 commodities, including gold, aluminium, iron ore, rare-earth metals, mineral sands, zinc, lead and coal (Britt *et al*., 2017:1). Although this is a thriving industry, mining in Australia is a non-traditional industry for women (Layman, 2014). The state of male dominance in the industry can be traced back historically, whereby previous laws did not authorise the employment of women in mining. As seen in the preceding sections, this reality is not unique to the Australian mining industry.

Various legislations prohibited the employment of women in underground mining, as men were perceived as ideal employees who could drive production without obligations of domestic responsibilities (Kljajevic, 2015:15). The Tasmanian Mine Inspection Act of 1968 and the Mine Regulations Act 1964–1983 both barred the employment of women in underground mining unless they were approved by the Chief Inspector of Mines (Bailey, 1988:53). On the other

hand, the Mines Inspection Act of 1901 banned the employment of women underground unless they were employed in positions that did not require them to perform manual work such as in management, or if they were health or welfare practitioners, if they were engaged in studies that required practical training underground or if they were occasionally required to go underground on duties that did not require them to perform manual work (Bailey, 1988:54). As a result of these laws, most women resorted to occupying traditional female roles such as nursing and teaching, including being mining wives who provided physical and emotional support to men (Kljajevic, 2015:10). Those who worked in mining were mostly in support service positions. Under these circumstances, women were obstructed from opportunities to progress to leadership positions, as most of them were in clerical and administrative positions, which meant, if they did not get married, they could become invaluable office managers (Layman, 2014).

The prohibition of the employment of women in underground mining was eradicated in the mid-1970s (Malan, 2010:255). Although currently permitted to work in all strata of the industry, similarly to other mining industries globally, Australia's mining industry remains highly gender-segregated (Malan, 2010:256). Over the past years, the number of women employed in mining has been fluctuating. In 1997, women accounted for 11% of the workforce in the industry, and that figure rose to 15% in 2012, 22% in 2013, 19% in 2014 and 15% in 2016 (Kljajevic, 2015:3; Pattenden & Brereton, 2015:16). In 2018, women comprised 16.1% of Australia's mining workforce. Of these women, 4.5% were technicians, 11.1% were machinery operators and drivers, and 13% were manual labourers (Connell & Claughton, 2018; Pactwa, 2019:2). These are positions that were mostly permeated by men historically and that encounter most of the skills shortages, as they are regarded as non-traditional roles for women. According to Kljajevic (2016:3), non-traditional roles are those roles that were historically not associated with women, such as trade and technician roles, senior management, and executive and supervisory positions (Kljajevic, 2015:3). Instead, women are overrepresented (70%) in traditionally female occupations such as human resources and administration (AHRC, 2017:29; Kljajevic, 2015:20).

To address the underrepresentation of women, the Australian government has played its role in promoting women's participation in non-traditional occupations, accompanied by industry bodies that have come to recognise the benefits of employee diversity in mines (Layman, 2014). However, the low representation of women in mining, in general, and specifically in non-traditional occupations, indicates that women have not seized these opportunities profusely. In 2012, PWC published a report titled *Mind the gap: solving the skills shortage in resources* in which skills shortages in the traditional areas of work were identified and strategies were developed that could be implemented to enable female-friendly work

environments to make the mining industry more attractive to women; however, the recommendations provided from these strategies have not yielded absolute results, as women remain a minority and an underutilised talent (Kljajevic, 2015:3).

There are various factors ascribed to the low representation of women in Australia's mining industry. In the main, women are not encouraged to pursue traditionally male careers (Kljajevic, 2015:52). Pattenden's 1998 study revealed that women were not receiving the same career development opportunities as their male counterparts. On the other hand, the New South Wales Minerals Council (2014:9) indicated that although women employed in the mining industry would encourage women outside of the industry to consider a career in the industry, many did not believe that enough was being done to promote mining as a career choice for women. In addition, discrimination against women persists despite decades of policies and initiatives attempting to enhance their representation in the industry (Helbert, 2018). The work environment and culture in mines are thought to be sexist. According to Kljajevic (2016:29), women believe that the harassment and discrimination they experience are due to them being female. In view of that, women who possess relevant skills and experience are discouraged to pursue careers in mining, as the industry is perceived as hostile and unfriendly towards women (Kljajevic, 2015:3).

The discrimination of women in mining is exacerbated by the lingering masculine and patriarchal image of the industry. Mayes (2014:122) states that the low representation of women in mining can also be attributed to its masculine culture. This is further supported by Kljajevic (2015:144), whose study revealed that although some women were not discouraged from working in non-traditional mining roles, some companies still have dominant patriarchal work environments that continue to allow discriminatory attitudes that privilege men and compel women to work harder to fit in with the established masculine culture. It should be noted that the challenges experienced by Australian women in mining are not exclusive to them solely, but can be observed in other countries as well.

In its response to address the low levels of representation and work injustices of women in Australia's mining industry, in 2003, the Women in Mining and Resources Western Australia was established and aims to encourage women to permeate the industry to increase their presence, to provide a network for women and to advocate for the proactive attraction and retention of women in the industry (WIMWA, 2015). In addition, the Workplace Gender Equality Agency is an Australian government statutory agency established by the Workplace Gender Equality Act of 2012, which is mandated to promote and improve gender equality in Australian workplaces. The agency works with employers and provides them with advice, practical tools and education to assist and enhance gender performance in the workplace

(WGEA, 2018). Likewise, the Diversity Council Australia, formally known as the Council for Equal Opportunity in Employment, is an independent non-profit organisation focusing on promoting diversity in employment, reflecting changes in practices to embrace all areas of diversity in human resources (DCA, 2020). Further, the Women Leaders Institute was established to promote women's leadership advancement by providing a safe and supportive environment to inspire emerging women leaders to grow and connect across Australia, New Zealand and Asia (Women Leaders Institute, 2020). The last global perspective of women's involvement in mining includes a discussion on the mining industry in Canada.

3.2.1.7 Canada

Canada is a country rich with mineral resources and home to nine of to the top 50 global mining companies (Els, 2017; Peltier-Huntley, 2019:11). In 2018, the country was among the top 5 countries in the global production of 16 minerals, first in potash, second in uranium and niobium, third in nickel, gemstones, indium, aluminium and PGM, fourth in cobalt, cadmium, graphite and sulphur and fifth in diamonds, titanium, gold and mica (Marshall, 2018:25). The mining industry plays a crucial role in contributing to the country's economy and employment (MiHR, 2019b:13). In 2019, Canada's direct and indirect employment stood at approximately 626 000, of which 409 000 were direct jobs (Marshall, 2019:12). Although mining contributes positively to the country's employment, the industry is reported to be facing challenges in drawing women (MiHR, 2019a:20). This challenge dates back historically when male domination was rife.

In 1890, the Ontario Mining Act that mirrored the 1842 Mines and Collieries Act from the United Kingdom banned women from working in mining (Keck & Powell, 2006:293). This ruling did not only ban women from working in mining, but was also instrumental in playing a role in the male domination culture in Canada's mining industry (Peltier-Huntley, 2019:12). However, during the Second World War, in 1942, a temporary repeal of the ban was implemented and women were recruited to work in surface operations such as operating ore distributors, repairing cell flotation equipment, piloting ore trains and working in machine shops (Mercier, 2011:33). This repeal was short-lived, as the banning of women in mines was reinstated in 1960 and this resulted in the restoration of previous gender-discriminatory rulings (Mercier, 2011:33). The prohibition of women's employment in surface jobs remained effective until 1970 and for underground jobs until 1978 (Keck & Powell, 2006:293).

The experiences of the first generation of women employed in Canada's blue-collar mining jobs since the post-war period was recorded at Inco (formally the International Nickel Company) in the 1970s (Keck & Powell, 2006:281). Being new to the industry, women at Inco experienced various challenges. These included being pressured to adapt to masculine work

culture, dealing with men who probed their capabilities to work in mining, particularly mastering physically demanding work, and coming across men who refused to train them (Botha, 2013:152; Keck & Powel, 2006:286). Women also experienced challenges related to work-life balance. The eight-hour working shifts made it difficult for them to accommodate their family responsibilities, with some reporting that they missed out on their children's lives. Single mothers were forced to organise childcare support from family members, as no organised childcare services were available in mining communities (Keck & Powel, 2006:286). In addition, some men were reported to have used sexual harassment to maintain masculine dominance. These harassments were in the form of sexual language, crude jokes and threats as well as verbal and physical assaults (Keck & Powel, 2006:286).

The integration of women into Canada's mining industry has been slow, as they continue to be underrepresented (MiHR, 2017; Peltier-Huntley, 2019:11). According to the 2016 census, women made up 48% of the Canadian workforce and only 16% were in mining (MiHR, 2019b:28). This percentage is the same as that pointed out in the 2011 census (MiHR, 2019b:28). Women mostly occupy support role positions, with the highest percentage of them employed as administrative assistants (97%), general support workers (80%) and human resource professionals (65%). Mining jobs with the least percentage of women include mechanical contractors and supervisors (<1%), heavy-duty equipment mechanics (1%) and carpenters (1%) (MiHR, 2018). These jobs form part of specialised occupations that contribute to labour shortages in Canada (MiHR, 2019a:17). Considering the labour shortages within these occupations, women's infiltration into these occupations could increase their numbers in the industry. Furthermore, considering that most women are employed in support role positions, they often face challenges in advancing to higher executive roles, which are customarily accorded to those working on the operational side of mining (Ozkan & Beckton, 2012:6). Women remain a minority in senior leadership roles with a representation of only 9% as board directors and 14% as executive officers (Catalyst, 2019).

Despite the abolishment of laws barring women from mining, the popular image of a miner as male prevails (MiHR, 2017). The cultural aspects and challenges experienced by women historically persist in Canada's mining industry. In 2016, the MiHR found that women had more unpleasant work experiences than men and were victims of harassment. Almost one in three of the surveyed respondents mentioned that they experienced harassment, bullying or violence compared to less than half as many men (MiHR, 2016:14). Women also still experience work-life balance challenges. The ability to integrate work with personal and family demands is still a challenge for women who want to work in the industry, particularly for mines located in remote areas or when allocated fly-in and fly-out assignments (MiHR, 2016:14).

To address the above-mentioned challenges, since 2009, Women in Mining Canada has always strived to promote and empower women in mining. Its mission is to support women by providing them with an education that entails the provision of tools and resources to create awareness of diversity and inclusion, to build skill sets for women to become future leaders, to elevate them through the provision of platforms that foster excellence and best practice and celebrates reward recognition, and to empower them by developing access to broad training opportunities and networking to increase their numbers in the industry (WIMC, 2020).

From the section above, it is evident that women have long been present in the mining industry. However, their presence was hindered by past legislation that barred their employment in the industry, especially in underground mining. This confined women mostly to domestic roles at home and in soft positions such as those in administration, human resources, cleaning, etc. Even after the abolishment of these discriminatory laws, women remain underrepresented and seldom occupy core mining occupations that often have more employment opportunities. The same applies to managerial positions, as very few women are in decision-making roles. In other countries, women are better equipped, as they possess the relevant qualifications and skill sets, yet they are still not permeating the industry. This is partly due to the industry's masculine image, lack of opportunities for advancement, work environments that do not accommodate a work-life balance and sexual harassment that prevails in the industry and is a deterrent for attracting more women, among other reasons. However, with organisations such as WIM present in different countries, it is encouraging to note that the challenges faced by women in mining are not being overlooked considering that their main determination is to promote the inclusion of women in the industry and help fight the prejudices that they encounter during their employment. The next section discusses the participation of women in Africa's mining industry.

3.2.2 An African perspective

Africa is home to an estimated 30% of the world's total mineral resources and is an attractive destination for foreign direct investment (Adu *et al.,* 2018:5). The continent ranks as the second-largest reserve globally for bauxite, cobalt, industrial diamonds, phosphate rock, PGM, soda ash, vermiculite and zirconium (KPMG, 2020:2). These minerals are mostly found in sub-Saharan African countries, which are the mainspring of the region's economy and account for more than 80% of the total GDP (IBIS, 2014). The availability of these minerals indicates Africa's linkage to the rest of the world, as all these commodities are found in everyday life usage (KPMG, 2020:2).

Although the mining industry is a key driver of Africa's economic growth, employment does not benefit all members of society, as it is highly male-dominated (Armah *et al*., 2016:471;

Baah-Boateng *et al.,* 2016:9; Chichester *et al.,* 2017:3; Hinton, 2012:13, 2016:24; Keba, 2017:84; Kilu *et al.,* 2017:2; Muchadenyika, 2015:715; Musonda, 2020:34; Ndlovu *et al.,* 2019:139; Nguluwe, 2016:2; Phiri & Chilese, 2015:1226; Rufai *et al.,* 2014:265; Weldegiorgis *et al.,* 2018:1). Similar to other countries globally, the underrepresentation of women in mining is attributed to historical regimes that alienated the industry by using legislation that barred women from mining (Hove & Hlongwana, 2015:100).

Women in Africa have long been in mining. In Zimbabwe, for example, women previously worked both on the surface and in underground mining. Women in Lesotho worked in underground mining in diamond mines until they succumbed to killings by men who wanted to avoid sharing their diamond finds (Ralushai, 2003:15). Zambian women worked in mining until the colonial era, when women were prohibited to work in mines (Phiri & Chileshe, 2015:1226).

The attainment of independence by most countries prompted the introduction of non-sexist legalisation and policies that promoted the inclusion and participation of women in mining (Chichester *et al.,* 2017:5; Hove & Hlongwana, 2015:100; Phiri & Chileshe, 2015:1226). One of these policies is the Africa Mining Vision, which has an action plan for women's empowerment and defines the integration of gender equality in mining policies, laws, regulations, standards and codes as a key short-term country-level goal (Rickard *et al.,* 2017:13). Even with the introduction of these policies, the number of women on the continent participating in mining remains disproportionately low. There are disparities in access to types of employment for women working in mining. Although statistics are challenging to obtain, it is presumed that the majority of women (25–30%) are employed in artisanal small-scale mining, while very few (10%) are in large-scale mining (Phiri & Chileshe, 2015:1226; Rickard, 2017:16).

The poor representation of women in mining can be attributed to the industry's gender stereotypes and traditional masculine image, the lack of technical expertise and appropriate education levels among women, which is stimulated by minimal or inappropriate training opportunities at an organisational level, gender-biased recruitment policies and restricted career development opportunities (Chichester *et al.*, 2017:8; UN, 2014:2). In some sub-Saharan African countries, superstitions still exist. It is believed that the presence of women makes minerals disappear (Chichester *et al.*, 2017:8). Therefore, in large-scale mining, women are commonly involved in lower-paying jobs such as cleaning, food preparation, and other unskilled occupations. Their lack of expertise minimises their opportunities for well-paying formal employment (Action Aid Zambia, 2015:15). Few women are involved in semi-skilled jobs such as machine operation or dump driving (Action Aid Zambia, 2015:24). Similar trends are observed in small-scale artisanal mining, as women are usually involved in menial

jobs such as transportation and ancillary occupations in the industrial mining setting (Baah-Boateng *et al.,* 2016:6–7). These jobs are low-paying and do not offer secure employment, as they are associated with unstable earnings (Baah-Boateng *et al.,* 2016:7). The prevailing gender stereotypes and the low number of women employed in the mining industry heighten the perception that mining-related careers are incompatible for women. According to Chichester *et al.* (2017:8), this makes it challenging for women to infiltrate the industry and causes them to self-select themselves out, as they perceive the industry to be unfavourable and inhospitable.

During their tenure in mining, women face the following challenges in sub-Saharan Africa (Chichester *et al.*, 2017:11):

- Negative perceptions towards women's role in mining. The industry's image of male domination has perpetuated an internal culture that views women as unwelcome.
- There are inadequate mining equipment and facilities that accommodate women. PPE, accommodation for pregnant women and appropriate ablution facilities are not available in remote mining locations. Labour-intensive processing activities in artisanal small-scale mining exacerbate the health and safety risks, including women's direct exposure to dangerous substances.
- Remote workplace locations place financial and workplace pressures on working mothers. This is accompanied by unsociable working hours and expectations of working overtime, which puts a strain on balancing household and childcare responsibilities. As a result of household responsibilities, research conducted in mining areas in Mozambique, Tanzania and Uganda discovered that women on average work five to eight hours more per day than men.
- There is a lack of female role models and mentors, particularly in senior roles. This makes it difficult for women in junior positions to envisage a career development path in the industry and seek professional guidance from those who have already been promoted to higher-echelon positions.
- Women are also prone to gender-based violence in mines. There have been reports of sexual harassment and gender-based violence in many sub-Saharan mining regions. These were said to be prompted by the influx of migrant labourers, increasing disposable incomes, alcoholism and higher rates of prostitution.
- Consultation on issues affecting women and their communities is often exclusionary. Traditional norms, educational levels or household burdens prohibit women from participating in discussions that enable them to voice issues that affect them.

In the quest to integrate more women into the industry and also taking cognisance of the challenges of those already employed, various entities have been established to advocate for women's employment and conducive work environments in mining. The SADC Women in Mining Regional Trust was founded in 1997 and aims to mobilise all female miners in the formal and informal mining industries in SADC countries through research and seminars. In addition, the Association of African Women in Mining Network that was launched in 2003 aims to create a platform for a vibrant and transparent industry where gender imbalances do not exist and where access to and control of resources are equally distributed (Botha, 2013:169–172).

The above section highlighted that the male domination image of the mining industry is a cross-cutting issue across different continents, including Africa. Similar to other countries globally, the presence of African women in mining was largely affected by previous legislation that banned their employment in the industry. Even after redressing past inequalities through the introduction of policies that promote a gender-balanced mining industry, women's participation in mining remains very low. This is attributed to various challenges that taint the image of mining as being unfavourable to women. The next section examines the national (South African) perspectives of women employed in the mining industry.

3.2.3 A national perspective

The mining industry plays a significant role in South Africa's economy and the country is ranked among the top 10 countries globally in the production of manganese ore, chrome, ferrochrome, iron ore, gold, platinum, piped medical gases, coal and nickel. The country also accounts for 91% of the world's precious PGM, 75.2% of chrome, 29% of manganese, 18.8% of zirconium, 17.5% of vanadium and 11.1% of gold (MQA, 2019b:4). The mining industry supports a vast number of communities through employment. There are at least two other jobs created in allied industries for every direct mining job, while each mining employee supports between five and ten dependants (MCSA, 2020). Taking into account the role assumed by mining in South Africa's communities, there is a notion that the industry remains of crucial importance to address the country's triple challenges of poverty, unemployment and inequality (Fabricius, 2019:2). However, the industry's progression towards achieving gender equality has been slow, as it remains male-dominated (MQA, 2020b:23).

Similar to other countries discussed above, former South African legislation played a role in embedding the masculinisation and exclusion of women in mining (Benya, 2017:83). Before women were restricted from working underground, few mines permitted them to work on the surface. These included occupations such as sorting out copper ore for bagging, nursing and social work as well as administration and training management (Ralushai, 2003:24–25). The

prohibition of women in mining was legislated in 1911 by the Mines and Works Act No. 12, which precluded the employment of boys under the age of 16 or any woman (Benya, 2017:80). Eighty years later, the South African Minerals Act of 1991 also banned women from working underground (Simango, 2006:15). It was only with the election of the democratic government in 1994 that past discriminatory laws were repealed.

The South African Minerals Act of 1991 was challenged by the Constitution of the Republic of South Africa and the Bill of Rights, which laid the foundation of democracy and is the supreme law that provides legitimacy to subsidiary legislation (Benya, 2017:83; Botha, 2013:174; MQA, 2020b:13). South Africa's gender equality policy regime is founded upon section 9 of the Constitution of the Republic of South Africa, which promotes gender justice in society and the workplace (Botha, 2013:109; MQA, 2020b:13). Furthermore, the MHSA (No. 29 of 1996) eradicated the restrictions of women's employment in underground mining (Ranchod, 2001:22). The MPRDA (No. 28 of 2002) aimed to redress past inequalities to promote the employment of women (RSA, 2002:12). Both the MHSA and the MPRDA reversed previous exclusions of women and enabled opportunities for women to work underground (Benya, 2017:83). To give effect to the MPRDA, the first Broad-based Socio-economic Empowerment Charter (the Mining Charter) was promulgated in 2004 and aimed to "create an industry that would proudly reflect the promise of a non-racial South Africa" (RSA, 2004:6). Among other prerequisites, the Charter required a 10% representation of women employees in the mining industry by 2009 (RSA, 2004:12). The Charter also implemented nine elements, namely ownership, procurement and enterprise development, beneficiation, employment equity, human resource development, mine community development, housing and living conditions, sustainable development and growth in the mining industry, and reporting, which were aimed at redressing past discrimination and inequality within the sector. As years went by, concerns were raised on several terms in which the mining industry was implementing the different elements of the Charter, which led to the amendment of the Charter in 2010 (RSA, 2010a:1). The amended Mining Charter of 2010 sought to strengthen and sharpen the Mining Charters' effectiveness in promoting transformation and competitiveness in the mining industry (monitoring and evaluation) (RSA, 2010a:1). The current Mining Charter of 2018 goes beyond setting quotas for women's overall inclusion, but includes quotas that incorporate their participation in key decision-making positions. The Charter requires a minimum of 20% women represented at top management, 25% in senior management, 25% in middle management and 30% in junior management (RSA, 2018b:22). These legislations are discussed in detail in Chapter 4.

Currently, 17% of employees in mines are women (MQA, 2021:18). This is an improvement from a 5% representation in 2005 (MQA, 2006:7). Even though this appears to be an

improvement, far more men (83%) are employed in the industry. The majority of women (52%) are employed in clerical support positions and 19% are in top and senior management (MQA, 2019a:13–14). Despite efforts by the Mining Charter to promote the participation of women in the industry and their advancement into management echelons, women remain a minority and in non-core mining occupations.

The low number of women in South Africa's mining industry can be attributed to various factors. One of these is the low enrolment of women in mining-related qualifications. According to an analysis of post-school education enrolment by the Department of Higher Education and Training, more women (58%) than men (42%) enrolled in public higher education institutions in 2016 and 57% female versus 43% male students were enrolled in technical and vocational education and training the same year. However, more men than women enrolled in five of the six listed mining-related qualifications, as indicated in Figure 3.1 (MQA, 2018:37).

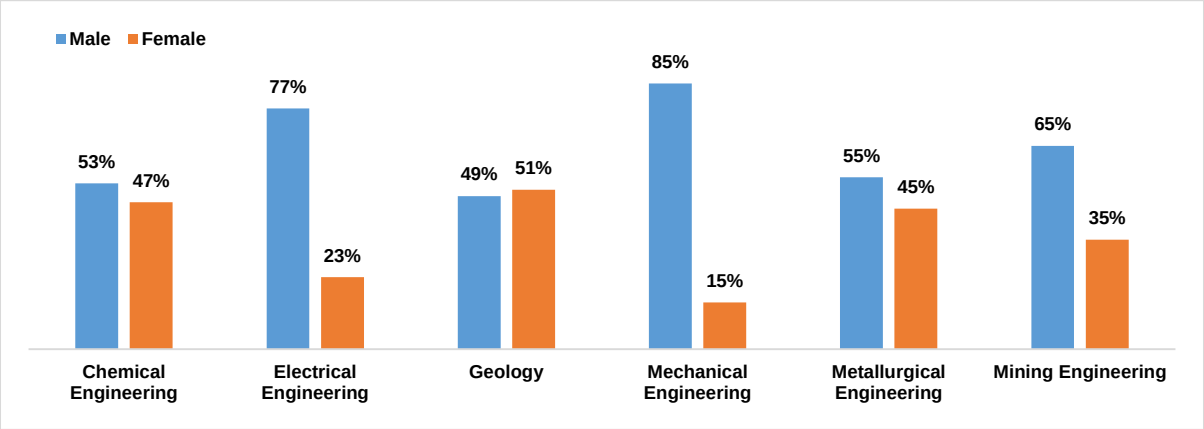


Figure 3.1: Percentage of graduates in mining-related qualifications in 2016 (by gender)

Source: MQA (2019b)

Women who are eventually employed in mining encounter various challenges. These include the following:

- Opposition from male employees who stigmatise women's employment as 'quotas', meaning women have to work hard to prove their capabilities to prove those that despise them wrong (Reichardt, cited by Campbell, 2007)
- The lack of adequate and easily accessible hygienic ablution facilities, which places their occupational health and safety at risk (Ledwaba, 2017:28; Matshingane, 2017:14)
- Having to work with inappropriate PPE that is not suited for their physiological makeup; as a result, women have to work with equipment or machines initially designed for men (Matshingane, 2017:14; MQA, 2020a:105)

- Feeling isolated in the male-dominated environment, which makes them feel uncomfortable and unsafe in the presence of many men (Botha, 2016a:259)
- Sexual harassment in the form of foul language, touching to sexual assault, rape and exchanging of sexual favours (Botha, 2016b:4)
- The lack of career development support perpetuates the industry's male-dominance image and promotes the perception of mining not being an appropriate environment for women (Mokotong, 2016:32). This hinders women's promotion into managerial positions and constrains their social status to attract more women in the industry (Kaggwa, 2019:4).

The challenges experienced by women in South Africa's mining industry are not entirely ignored. WiMSA was established in 2003 to mobilise and promote women's participation in mining (De Klerk, 2012:11). The association aims at mobilising women into becoming active participants in the mining industry, establishing women's needs through the provision of support and recognition of women in mining and providing training to enhance the skills of female miners (DMR, 2011:4). Through such organisations, women's concerns are being addressed for the retention of existing employees and the attraction of future employees.

The above section revealed that the underrepresentation of women in South Africa's mining industry is mostly attributed to past discriminatory laws that prohibited their employment. Even after these laws were repealed, the impact of women's exclusion can still be felt in democratic South Africa, as the employment growth rate of women is at a snail's pace. As a result of the masculine image of the industry, the challenges experienced by women are mostly rooted in the male-dominated culture of the industry. These challenges are comparable to those experienced by countries discussed in the preceding sections. From the challenges discussed, a linkage is shown in a later section (section 3.4) of how these challenges affect the attraction, engagement and retention of women in mining.

3.3 THE QUEST TO PROMOTE THE PARTICIPATION OF WOMEN IN THE MINING INDUSTRY GLOBALLY

The ILO's objective to foster workplace non-discrimination and equality is relevant to this study. The ILO is an agency of the United Nations that connects 187 countries' governments, employers and work representatives to establish labour standards and develop policies and programmes that promote decent work for women and men (ILO, 2020). The ILO is committed to promoting social justice and internationally recognised human and labour rights. It is also committed to pursuing its mission of making social justice vital for universal and lasting peace. The ILO has a work agenda that assists in advancing economic and working conditions that

provide all employees, employers and government with opportunities for long-lasting peace, prosperity and progress (ILO, 2020).

The ILO lays down provisions in its Decent Work Agenda to promote decent employment for women and men under conditions of freedom, equality, security and human dignity. Unlike previous discriminatory laws, such as those that prohibited the employment of women in underground mining, the ILO sets international labour standards (conventions and recommendations) to improve the working and living conditions of men and women and to promote equality in the workplace. The Discrimination (Employment and Occupation) Convention, 1958 (No. 111) is among the most widely endorsed worldwide, with 161 countries having demonstrated their commitment to its principles. The Convention postulates that to eliminate discrimination, member states should proactively declare and pursue a national policy to promote equal opportunities and treatment in relation to employment and occupation (ILO, 2012:5).

Specific to the mining industry, the International Women in Mining, as the sole international platform supporting women in mining, aims to lead a global change in attitudes and behaviour to achieve gender parity and to promote a strong and unified voice of women in mining. The organisation acts as an agent for industry change through diversity, gender parity and inclusion to make mining a better industry. The organisation also acts as a WIM champion to strengthen and coordinate WIM organisations to achieve global cohesion and is also a trendsetter for diversity in gathering and distributing knowledge to support the enhancement of the role and participation of women in the industry. International Women in Mining has successfully supported numerous women in mining and WIM organisations globally since its inception in 2008. With over 40 WIM organisations globally and over 10 500 members and followers across 100 countries, the organisation has established long-lasting supportive relationships (IWiM, 2020).

The entities referred to above share a common interest in enhancing women's mining participation and eliminating any form of discrimination against them. However, as previously discussed, women remain underrepresented. To understand possible reasons for this, the next section discusses factors affecting women's attraction, engagement and retention in the mining industry.

3.4 FACTORS AFFECTING THE ATTRACTION, ENGAGEMENT AND RETENTION OF WOMEN IN THE MINING INDUSTRY

The above section revealed that cultural and organisational norms in the mining industry have contributed to the underrepresentation of women in mining. The mining industry is still perceived as an environment where women do not ordinarily aspire to work (Jeffrey *et al*., 2018:3). This is due to existing barriers that make it challenging for them to integrate into an industry that has traditionally been dominated by men (Salinas & Romani, 2014:92). Therefore, attracting and retaining women in industries such as mining is perceived as difficult (Salinas & Romani, 2014:92). Moreover, the experiences of women who are already employed in the industry can either motivate or demotivate other women aspiring to enter the industry (Kaggwa, 2019:1). The section below discusses how challenges experienced by women affects the attraction, engagement and retention of women in mining.

3.4.1 Compensation and benefits

Compared to other sectors of the economy, the mining industry is known for paying its employees higher wages than the average remuneration (Pactwa, 2019:10). According to Hutchings *et al.* (2011:91), employees will be attracted to organisations that have good employment practices such as competitive remuneration, which could be in the form of overtime pay, bonuses, annual anniversary allowances, options, profit sharing, share purchase plans, subsidised rent, cash in leave, extra superannuation for employment service, living away from home allowances, contract completion bonus, salary sacrifice, car leasing, etc. In view of the industry's attractive remuneration packages, women's interest in mining is partly due to the industry's provision of competitive compensation in the form of salaries, pensions and benefits that allow for a good quality of life (Nyabeze *et al*., 2010:3). In their study on the experiences and views of women involved in the mining industry across the Canadian mining industry, Nyabeze *et al.* (2010:6) established that attractive salaries and benefits are among the main reasons why employees elected to pursue employment in mining. There are perceptions that people are often attracted to work in mines based on the views that the industry offers competitive salaries and fringe benefits (Rothman & Baumann, 2014:517).

Furthermore, attractive salaries and benefits also motivate women to remain engaged in their work and also plays a role in their retention in the mining industry (Nyabeze *et al*., 2010:6; Van der Walt, 2008:41). In his study on job demands, job resources, burnout and engagement of employees in the mining industry in South Africa, Van der Walt (2008:6) found that poor salaries and benefits could contribute to burnout and disengagement from work among employees. Salaries occasionally serve as a motivating factor for employees in need of money

(Ntsane, 2014:26). Women in mining are motivated by economic benefits to stay in the industry (Salinas, 2013:1841). Salinas (2013:1841) conducted a study in Chile's mining industry on the discourses that the mining culture sustains and tensions associated with the integration of women and found that the challenges experienced by women, such as prejudices, hostility and resistance to women's integration by men in the industry, were counterbalanced by the compensation and benefits that their companies had to offer. In their study on the exploration of women's workplace experiences in the South African mining industry, Mangaroo-Pillay and Botha (2020:481) found that half of a sample of 129 women who participated in their study indicated that they worked for mining organisations because of income benefits rather than free choice. Previously, Mangaroo-Pillay (2018:93), revealed that if women had other opportunities to earn a similar income elsewhere, they would opt to leave. Similar sentiments were shared by women interviewed in Bailey-Kruger's (2012:50) study on the psychological well-being of women operating mining machinery in a fly-in fly-out capacity. These women expressed that the high wages they receive from the mines were a motivating factor in retaining their employment in the industry, despite having constant thoughts of wanting to leave due to the working conditions (Bailey-Kruger, 2012:50). According to Hutchings *et al.* (2011:14), maintaining competitive compensation is an imperative factor in retaining employees. In addition, poor salaries and benefits could contribute to burnout and disengagement from their work (Van der Walt, 2008:41).

It should be noted, however, that although compensation and benefits affect the attraction, engagement and retention of women, it is not the sole motivator, as other aspects are equally important. Employees have more expectations from their jobs than salaries and fringe benefits. The use of remuneration and fringe benefits to attract, engage and retain employees will not be sufficient. Low remuneration will often not drive employees to leave their employment; however, high remuneration will not retain them either (Chew, 2004:48). These aspects are elaborated in the subsequent sections.

3.4.2 Career development opportunities

Career development occurs when organisations build promotion opportunities for their employees by providing them with training and development that enable organisations to develop and place employees in positions that are compatible with their career interests, needs and aspirations (Meyer & Smith, 2000:323; Nyambura & Kambara, 2017:511). Training and development are critical instruments for attracting, engaging and retaining employees (Guest, 2014:146; Ledwaba, 2017:60).

As discussed in the next chapter, training and development of employees in the workplace are enforced by the Employment Equity Act (EEA) (No. 55 of 1998) and the Skills

Development Act (SDA) (No. 97 of 1998) (Botha, 2017:27). This is also a prerequisite of the 2018 Mining Charter human resource development component, which stipulates that mining companies should commit at least 5% of their leviable amount to the development of essential skills (RSA, 2018b). Mining companies are also mandated by legislation to submit to the Department of Mineral Resources and Energy a Social and Labour Plan that stipulates, among other things, provision for bursaries, internship, mentorship and a career path plan to develop employees (Botha, 2017:27; RSA, 2010a).

According to Khabir (2014:135) and Aguenza and Som (2012:90), development values and career progression opportunities are perceived as key factors in determining employer attractiveness. One of the main findings of the MQA's women in mining study (2020b:74) was that the main reason why women opted for careers in mining was due to the prospect of acquiring new skills and development opportunities once employed. This finding corroborates with previous studies (AusIMM, 2009; CSRM, 2006; Gibson & Scoble, 2004; Nyabeze *et al*., 2010; Pattenden, 1998) that reported that the career development of women in mining is a key factor in attracting them in the industry. An organisation that offers training and development opportunities could denote its concern for employees' welfare, which, in turn, could possibly be perceived as positive and favourable by potential employees, thereby increasing employer attractiveness (Kumari & Saini, 2018:447).

The unavailability and inaccessibility of career development opportunities are major reasons for employees' intention to leave organisations (Coetzee & Stoltz, 2015:89; Ibidunni *et al.,* 2016:7). Baily-Kruger's (2012:40) study on the psychological well-being of women operating mining machinery in a fly-in-fly-out capacity found that women were not provided equal training opportunities as their male counterparts. In that study, women held the notion that men were favoured over them. Similarly, in her aim to uncover the barriers that women encounter in the mining industry, Botha (2017:24) revealed that women working in core mining positions expressed concerns about the availability of equal development opportunities in the industry, as skills and career development opportunities favoured male employees rather than female employees, as there are still persistent perceptions that mining is a man's environment.

Career development plays a major role in the retention of women in mining (AusIMM, 2009; CSRM, 2006; Gibson & Scoble, 2004; Pattenden, 1998). Ampoty (2014:54) revealed in his study that employees were more likely to stay in an organisation if they were offered opportunities to develop. Therefore, the amount of career development received by an employee was positively correlated with their intention to remain with their employer (Ampoty, 2014:54). Women who perceive that they are not provided with the same career development opportunities as their male counterparts were previously reported as more likely to leave the

industry (WIMC, 2010:20). This is also related to the prospects of getting a promotion. Breaking the glass ceiling has been identified as one of the challenges hindering women's advancement in mining (Khoza, 2015:25). The glass ceiling refers to the failure of organisations to provide the desired promotions to women or minorities and their discrimination in their workplaces. It is referred to as the glass ceiling because the effect is invisible and this invisible barrier affects women or minorities who aspire to be promoted and find it challenging to overcome it (Durusu *et al*., 2020:3). The glass ceiling was previously cited as one of the reasons women sought to leave the mining industry as soon as other opportunities presented themselves (Letlape, 2014:108). As a result of the glass ceiling, women in mining believe that they have minimal probabilities to advance to higher organisational ranking (Moraka, 2018:5; PWC, 2015:28). In other instances, women previously reported occurrences where they received training but were not promoted to positions that matched their training exposure. Communication of job openings is also reserved for men (MiHR, 2016:2). Career progression in mining is said to be at the discretion of senior management, and women are often at a disadvantage (Khoza, 2015:64). The study of Ledwaba (2017:59–60) supports the findings of the MiHR, as her findings also revealed that in some instances, women received training that could have enabled them to perform certain jobs, but they lost hope in the process, as their training was not aligned with development prospects in the industry. This partially explains why few women in mining assume management roles. This perpetuates the male domination model of career progression, thereby resulting in the marginalisation of women and hindering their development (Ledwaba, 2017:61).

Moreover, there is a strong association between career development and employee engagement (Guest, 2014:146). Hlapho (2015:71) found that human resource development practices such as training and development, employee feedback, career development opportunities, employee welfare schemes as well as reward and recognition schemes are key drivers of employee engagement. This assertion is supported by Ledwaba (2017:60), who established that inadequate training and development prospects for women affect their morale and leave them hopeless in terms of growing within the mining industry. Organisations with high levels of engagement provide employees with opportunities to develop their abilities to acquire new skills and knowledge and to realise their potential (Simha & Vardhan, 2015:5). Employees are more likely to commit to organisations that provide them with opportunities that facilitate career improvement (Aguenza & Som, 2012:90). A lack of growth opportunities could lead to disengaged employees (Van der Walt, 2008:40). According to Hutchings *et al*.'*s* (2011:14) study on employee attraction and retention in the Australian resource sector, improving the provision of career development opportunities should be one of the mining

industry's main strategies for attraction and retention, particularly tertiary training and other government-related training initiatives. Acknowledging the need to invest in the career development of women by employers is therefore essential in attracting, engaging and retaining women in the industry.

3.4.3 Work-life balance

Work-life balance employment practice involves providing employees with an environment where they can balance what they do at work with responsibilities and interests outside the work environment (Almaaitah *et al*., 2017:26). The mining industry has not been unsusceptible to the challenges of fostering work-life balance for their employees. In most instances, challenges related to work-life balance tend to affect women more than men, as they continue to have the primary responsibility of taking care of the needs of their families (Kanwar *et al.,* 2012:32).

The work-life balance of women working in the mining industry is mostly affected by mines' remote locations and unfriendly work schedules (shift work and overtime working hours). According to Hutchings *et al.* (2011:96), the challenges experienced by the industry in providing family-friendly work environments are due to mines being located in remote locations where support is minimal, thereby making employment unattractive. The ability to integrate work with personal and family responsibilities is a challenge for women who aspire to be employed in the industry, particularly in remote locations (MiHR, 2016:14). As a result, this affects their participation in the industry (Fernandez-Stark *et al.*, 2019:2). Work-life balance also impacts the retention of women in the industry (Botha, 2014:439; Hughes, 2012:25). Working in remote locations, alongside the lack of work-life balance, was previously cited as a deterrent for women to stay in the industry (Hughes, 2012:73; MiHR, 2011:17).

Work schedules in mines are also an additional challenge to women's work-life balance. According to Botha (2014:181; 2017:26), mine work impacts women's family life, as they tend to work longer hours than men due to their added responsibilities to take care of their households and children. The unfavourable work shifts, alongside the expectations of overtime work, make it difficult for women to achieve a good work-life balance (Lord & Eastham, 2011:20; Mining Dot Com, 2014; Nyabeze *et al*., 2010:4). Such conditions may not suit women's family commitments and might drive them to leave the industry (Nyabeze *et al*., 2010:4).

Work-life balance is important for employee engagement (Lockwood, 2007:4). Employees are most likely to be engaged and attached to their organisations if they recognise that their employers consider their family life (Simha & Vardhan, 2015:6). The study by Van der Walt (2008:40) on the engagement of employees in the mining industry in South Africa revealed

that a lack of work-life balance was one of the factors that lead to disengaged employees. Women in mining, particularly, are most likely to take advantage of employment outside the mining industry that offers them more family-friendly work environments and arrangements that offer them less physical, more comfortable jobs with higher salaries and higher social status (Botha, 2014:200).

Botha (2017:26) points out that employers can play a key role in implementing measures to assist women in balancing their work and family life. By implementing work-life balance measures such as supporting flexible working arrangements, providing paid or unpaid leave and assisting with caring for children, e.g. offering childcare facilities, mining organisations could play a significant role in levelling out the challenges that women face regarding balancing paid work and family responsibilities. Organisations that fail to achieve a work-life balance for their employees could experience challenges attracting and retaining the most capable and motivated employees (Robbins & Judge, 2008:16).

3.4.4 Negative gender stereotypes and workplace culture

The United Nations (2014) defines gender stereotypes as a generalised perception of attributes or characteristics believed to be held by women or men or the roles that women or men perform or should perform. These can be either positive or negative, for example women are nurturing or are weak (UN, 2014). However, in most instances, gender stereotypes are often associated with negative connotations (Mihalčová *et al*., 2015:1261). By virtue of being female, women in mining are subjected to negative gender stereotypes that classify them as lazy and incapable of executing mine work (Benya, 2009:79–80; Khoza, 2015:56). Women are perceived as weak and unable to handle pressure emotionally than their male counterparts (Khoza, 2015:56; Salinas, 2013:1842). Men in mining have a perception that women are unable to endure difficult tasks, perform heavy duties and handle machinery better than them (Kilu *et al*., 2017:11). Others hold conventional notions that a woman's place is in the kitchen and at home (Benya, 2009:79).

Taking into account the male domination of the mining industry, there are perceptions that men are better miners and that women lack the capacity and strength to perform mining jobs (Kilu *et al*., 2017:11). In her research, Benya (2009) found that gender stereotypes influenced mining organisational cultures, often leading to views of what is considered appropriate occupations for men and women as well as acceptable behaviour for men and women in the workplace. These perceptions perpetuate women's exclusion and alienation, which poses a threat to their successful inclusion in the industry (Benya, 2009:80; Khoza, 2015:15; Ozkan & Beckton, 2012:25).

A male-dominated workplace culture creates biases in attracting women in mining and leads to different forms of discrimination against their employment (Ozkan & Beckton, 2012:25). Organisational or workplace culture is a pattern of values, norms, beliefs, attitudes and assumptions that may not have been expressed, but influences the way people behave and do things in organisations (Armstrong & Taylor, 2014:120). Benya's study (2009) on women's challenges in terms of occupational culture in mines revealed that male interviewees reported that it was hard for them to accept women into their teams, as they were seen as disturbing the male macho mining occupational culture. Women, on the other hand, are very aware of such stereotypes and prejudices and the resistance to their integration into the industry (Salinas, 2013:1841). Matshingane (2017:36) found that women working underground were not treated the same as their male counterparts, with some reporting that they felt unwelcome to work underground and that they were not taken seriously by their supervisors. However, the challenge is not only in treatment, as the male domination reality in the industry has also created occupational biases where men commonly occupy positions that reflect masculine stereotypes associated with power, authority, being a provider and being superior over women. The occupational culture of the industry has been perceived as a hindrance to the full integration of women, reduces the appeal of the industry and deters women from considering a career in mining (Botha, 2014:201; Ledwaba, 2017:61; PWC, 2013:20).

Furthermore, workplace culture plays a role in employee engagement (Lockwood, 2007:4; Moletsane *et al*., 2019:128). For employees to be engaged, an organisation needs to establish its employees' feelings about their work environment (Moletsane *et al*., 2019:128). Effective engagement is also likely to depend on the type of organisational culture that is perceived by employees (Guest, 2014:153). The overt prejudice, discrimination and resistance towards women in mining could affect their engagement, resulting in disengaged employees. The disengagement and alienation of women in mining are largely due to unequal workplace culture, the low perceived value by men and the perceived lack of respect (AWRA, 2014). This assertion was corroborated by Hlapho (2015:71), whose findings revealed that the work environment and relationship with colleagues has a significant relationship with employee engagement.

Moreover, workplace culture was found to have a significant impact on discouraging the retention of women in mining (MiHR, 2016:8; Ozkan & Beckton, 2012:18). The industry's image, the hostility of the workplace culture in mines and the isolation of being the only women in their teams are contributing factors that lead to women's departure from the industry (Lord & Eastham, 2011:19–20; MiHR, 2016:9–15). Those who decide to stay in mining do so due to the economic benefits they receive, which are used to satisfy their individual and family needs. In retrospection, the compensation and benefits provided by mining companies are said to

recompense their difficulties (Salinas, 2013:1841). Until such stereotypical attitudes and workplace culture persist, women's attraction, engagement and retention in the sector remain a challenge.

Mining companies should develop a culture in the workplace that integrates and embraces diversity issues. This can be achieved by supporting a work environment that promotes a vision for gender diversity and appointing women in non-traditional roles (Botha, 2017:26). Creating a women-friendly workplace culture will not only be beneficial to women, but to organisations as well, as it could lead to the attraction of more women in the industry and will enhance the engagement and retention of those already employed in the industry.

3.4.5 Hazardous working conditions and safety risks

The MHSA (No. 29 of 1996) has the mandate to protect the health and safety of mining employees and, among other aspects, to ensure that employers eliminate, control and minimise risks related to mining health and safety (RSA, 1996b). Working in a mine comes with risks that can affect the health and safety of employees and it is often viewed as a physically demanding environment. Women working underground in mining face additional health and safety risks than their male counterparts (Badenhorst & Platinum, 2009:62; Botha & Cronjé, 2015a:9–10; Hermanus, 2007:532; Matshingane, 2017:2–3). Women are expected to go through the same rigorous employment tests as men, although they are not anatomically and physiologically the same (Matshingane, 2017:13; Zungu, 2011). Botha and Cronjé (2015b:666) found that women working in core mining positions were at a disadvantage in terms of their capacity to perform work that demanded strength and stamina, as they encountered physiological strain while undertaking lengthy and strenuous physically demanding tasks. In addition to being physiologically strained, some women reported cases where they were not treated well, as they would be instructed to work under unsafe conditions. These women reported that they were not given light responsibilities upon reporting that they were pregnant (Botha & Cronjé, 2015a:9). This is contrary to the provisions of the Constitution, the EEA, the Basic Conditions of Employment Act (BCEA) and the Promotion of Equality and Prevention of Unfair Discrimination Act (PEPUDA), which allude to the prohibition of discrimination against pregnant women. All of these Acts are discussed in detail in Chapter 4.

Women are also expected to use machinery, tools, and equipment designed for men (Zungu, 2011). According to Benya (2016:171) and Heine (2008:36), the mining industry is characterised by labour-intensive activities associated with the use of heavy machinery alongside extremely harsh working conditions, thunderous noise, intense heat, a humid environment and confined spaces. Therefore, the harsh working conditions associated with the general image of the mining industry have contributed to the perception that the industry

is more suitable for men and not an ideal environment for women (Letlape, 2014:33). As a result, this has prompted negative attitudes towards women in mining and has led to very few women pursuing technical mining positions (Sohn & Lee, 2008:142–157).

Botha and Cronjé (2015a:9) found that some mining companies still did not have appropriate PPE for women, as the ones made available were designed with men in mind. The actual work environment also presented health and safety challenges for women. Dust was identified as a major concern, as it was said to affect the lungs, eyes and ears. Women also got a rash from working in dusty areas and sometimes had to take a day off to recover. In addition to the dust, it was reported that work environments involving vibration and the operation of heavy vibrating equipment and machines are not good for women, as they tend to affect their menstrual cycles. Such vibration is also a hazard to pregnant women, as it could increase miscarriages (Botha & Cronjé, 2015b:9; Hermanus, 2007:534).

The above challenges could negatively impact women psychologically, as they may feel incompetent or diffident about their capability to execute work, especially because mining is production-driven (Matshingane, 2017:13). Consequently, women are often viewed as a risk to mining organisations and men are frequently preferred over women, particularly in senior positions, leaving women with less prominent, low-risk positions (Roos, 2014:74). Such perceptions and the physical nature of mining work are regarded as the main obstacles hindering women from entering the industry (Botha, 2014:439).

The hazardous working conditions and safety risks in the mining industry affect women's attraction and lead to the disengagement of those employed in it, which ultimately results in them leaving the industry as a whole (Bailey-Kruger, 2012:15; Botha, 2014:439; Simha & Vardhan, 2015:5). Simha and Vardhan (2015:5) highlight that the engagement levels of employees are affected if they do not feel secure or safe while working. Yuan *et al.* (2015:169) found that social interactions (co-worker support) and perceptions of safety practices (organisational commitment to safety) can collectively lead to high levels of engagement and safety behaviours. Therefore, it is imperative for organisations to implement appropriate measures to ensure equal health and safety measures for the engagement and retention of their employees.

3.4.6 Sexual harassment

According to the South African Labour Guide (2021), sexual harassment is defined as unwanted conduct of a sexual nature. Sexual harassment can take the form of unwelcome physical, verbal or non-verbal conduct. Examples of these include the following (South African Labour Guide, 2021):

- Physical conduct of a sexual nature involving all undesirable physical contact, from touching to sexual assault and rape, including body searches conducted by or in the presence of the opposite sex
- Verbal sexual harassment, which comprises unwanted insinuations, suggestions, sexual advances, comments with sexual overtones, sex-related jokes or insults, or inappropiate graphic comments about a person's body made in their presence or directed towards them, improper enquiries about a person's sex life, and unwelcome whistling directed at a person or group of persons
- Non-verbal sexual harassment, such as unwelcome gestures, indecent exposure and the unwelcome display of sexually explicit pictures and objects
- Quid pro quo harassment (sexual favouritism), which is where an owner, employer, supervisor, member of management or colleague undertakes or attempts to influence the process of employment, promotion, training, discipline, dismissal, salary increment or other benefits of an employee or job applicant in exchange for sexual favours.

The Minerals Council South Africa (MCSA, 2019:3) reported that in South African mines, there have been incidents where women were raped underground, requested to trade sexual favours for employment or other benefits and in one case murdered. Botha (2016b:9) found that women working in and at mines were exposed to verbal harassment, physical conduct and quid pro quo harassment. Women were said to be exposed to sexual harassment regularly, mainly when transported in crowded cages (Botha, 2016b:9). Men in mining were accustomed to communicating in certain ways with women and often used bad language when undertaking heavy tasks. Women found offence by how men would communicate and the type of language they used (Botha, 2016b:9). Moreover, sexual favouritism occurs in mines. In Botha's study (2016b:10), male participants and, to some extent women, alluded to instances where women fell in love with their supervisors to get promotions easily. Working night shifts also placed women at risk of sexual harassment, as male colleagues took advantage of those conditions, resulting in women not feeling safe while working with men during the night (Khoza, 2015:67).

According to Khoza (2015:67), sexual harassment is rarely reported despite all these challenges. This is due to intimidation and poor or no follow-up on reported cases (Khoza, 2015:67). This was confirmed by Benya (2016:42), who spent ten and a half months working in mines and lived with mineworkers to gain an in-depth understanding of female mineworkers' occupational culture and general identities in mining. Benya (2017:42) reflects on instances where she experienced and witnessed sexual harassment and did not report it in her ethnographic study. Although management took sexual harassment seriously, Benya

(2017:42) found that most women remained silent and chose to ignore it, as they feared that reporting the cases would lead to a hostile work environment. In other instances, women were said to have been unsure of their rights to report these harassments and those who were aware feared reporting sexual harassment attempts (Botha, 2016b:9).

Similar to hazardous working conditions and safety risks, incidences of sexual harassment in the mining industry affect women's attraction to the industry, contribute to low engagement levels, and heightens their probability of leaving (Bailey-Kruger, 2012:15; Botha, 2014:439; Simha & Vardhan, 2015:5). Addressing these issues would be imperative for the well-being of those already employed in the industry and for those intending to pursue careers in mining.

The prohibition of sexual harassment is enacted by the EEA (No. 55 of 1998) (RSA, 1998a) and PEPUDA (No. 4 of 2000), which prevents the unfair discrimination of people and promotes the protection of human dignity (RSA, 2000).

The above section demonstrated how the experiences of women employed in the mining industry affect their attraction, engagement and retention in the mining industry. Despite the industry's attractive salary and benefits packages, it emerged that financial benefits are not sufficient to attract, engage and retain women in their workplace fully. Given the opportunity to earn a similar income, the prospects of women moving to a more gender-balanced industry become high. Other than financial benefits, the provision of training and development is crucial, as employees are more likely to stay in organisations that offer them opportunities for career development. This is accompanied by a family-friendly work environment that considers women's need to balance their paid work and family responsibilities. In addition, the workplace culture of the industry plays a role in its appeal to those who aspire to enter the industry. The image of the industry's male dominance is viewed as a deterrent to integrating women into the industry, affecting their engagement and retention levels. It is equally imperative to ensure a healthy and safe work environment that also incorporates the elimination of sexual harassment. Unsafe working conditions and incidences of sexual harassment affect women's attraction and retention and lead to disengaged employees. It will be important for mining organisations to pay attention to such issues to increase the number of women in the industry and to engage and retain those who are already employed in the industry.

3.5 CONCLUSIONS

This chapter provided an overview of women employed in the mining industry. The chapter provided a global, African and national overview of women's participation in the mining industry and factors influencing their attraction, engagement and retention. Literature from this chapter revealed that the mining industry plays a critical role in the economy and employment

of most countries globally. Although mining is a key driver of employment, women have not equally benefited from it compared to their male counterparts. This is attributed to historical legislation that played a huge role in shaping the male dominance and exclusion of women in the industry. As a result of the male dominance image of the industry, discrimination and a negative attitude towards the employment of women in mining ensued. Although there have been efforts made in addressing past discriminatory laws that barred women from mining, gender segregation is still evident, as seen by the low representation of women in mining. In some countries, women are better equipped compared to men due to higher levels of education; however, this has not translated to their inclusion. As a result, women predominantly occupy support function positions, thereby necessitating the need for them to permeate technical and managerial positions. Besides increasing the number of women in mining, there are organisational and cultural norms that affect the attraction, engagement and retention of women in mining. These are related to compensation and benefits, career development opportunities, remote workplace locations, work-life balance, gender stereotypes, workplace culture and hazardous working conditions, safety risks and sexual harassment. It can be deduced from the literature above that the challenges experienced by women at individual, organisational and societal levels are consequences of their unequal relations compared to their male counterparts. As a result, these factors affect how the industry is perceived by those who aspire to work in it, impacting the engagement levels of those already employed and their decision to stay within the industry or leave. The next chapter discusses the statutory and regulatory frameworks that regulate the inclusion of women in the South African mining industry.

CHAPTER 4

STATUTORY AND REGULATORY FRAMEWORKS GOVERNING THE INCLUSION OF WOMEN IN MINES IN SOUTH AFRICA

4.1 INTRODUCTION

The previous chapter presented a comprehensive literature review of global, African and South African perspectives on women working in the mining industry. The literature review provided a better understanding of the historical context of women's participation in the industry, the roles they perform and the challenges they encounter in their workplaces. The chapter also elaborated on factors affecting women's attraction, engagement, and retention in the mining industry.

This chapter addresses the statutory and regulatory frameworks regulating the inclusion of women in the South African mining industry. The legislation is an essential instrument of government that organises and protects citizens in a country. Without adequate implementation, the law has little or no meaning (De Jager, 2000:3). For women, in particular, the availability of adequate and effective legislation ensures their complete integration into the labour market and guarantees them equal rights and opportunities, while protecting them from any form of discrimination (Legislation Line, 2020; OECD, 2018:5). Therefore, legislation and policies are crucial aspects to resolve gender imbalances in the workplace (Chiongson *et al*., 2011:24).

As seen in Chapter 3, South Africa's introduction of democracy paved a path to eradicate past inequitable laws and policies that discriminated against the employment of women in the mining industry. With democracy, fundamental legislative changes were made to promote gender equality and to redress past disparities. These reforms included the Constitution, which abolished past practices and repealed laws that fostered inequality and discrimination, labour laws that play a role in endorsing the achievement of equality in South Africa's labour market and sector-specific legislation that governs the inclusion of women in mining. This chapter unfolds as follows: first, the Constitution is discussed, as it provides effect to other legislation in the country. Second, different labour laws relevant to gender issues in the workplace are presented. Third, mining legislation and policies governing the inclusion of women in mining are discussed. The laws and policies discussed in this chapter create enabling conditions for the attraction, engagement and retention of employees, including women, in the workplace. The discussion of these laws and policies is primarily limited to relevant elements relating to gender equality, fairness and diversity in the workplace.

4.2 THE CONSTITUTION OF THE REPUBLIC OF SOUTH AFRICA

The Constitution of the Republic of South Africa was signed in December 1996 and implemented in February 1997 (Botha, 2013:5; RSA, 1996a:5). The Constitution is observed as the supreme law, as no other law can conflict with it because it sets the standard by which all other laws are judged. In addition, the government cannot do anything to interfere with it (Department of Justice, 2020). Chapter 2 of the Constitution comprises the Bill of Rights, which conveys the rights of all people in the country and affirms the democratic principles of human dignity, equality and freedom (RSA, 1996a:7). Equality is enshrined in section 9(2) of the Bill of Rights, which postulates as follows (RSA 1996a:7–8):

1) Everyone is equal and has the right to equal protection and benefit from the law.
2) Equality shall include the full and equal enjoyment of all rights and freedoms. To promote equality, legislative and other measures designed to protect or advance persons or categories of persons disadvantaged by unfair discrimination may be adopted.
3) The state may not unfairly discriminate directly or indirectly against a person on one or more grounds, including race, gender, sex, pregnancy, marital status, ethnic or social origin, sexual orientation, age, disability, religion, conscience, belief, culture, language, and birth.
4) No person may, on one or more grounds, unfairly discriminate directly or indirectly against anyone in relation to factors referred to in subsection (3). National legislation must be enacted to prevent or prohibit unfair discrimination.
5) Discrimination on one or more of the grounds set out in subsection (3) is unfair unless it is established that the discrimination is fair.

Freedom of trade, occupation and profession is provided for in section 22, which stipulates, in part, that "[e]very citizen has the right to choose their trade, occupation or profession freely" (RSA, 1996a:10). According to the Constitution, everyone has the right to fair labour practices. Employees have the right to establish or join a trade union and participate in its activities and programmes as well as to strike (RSA 1996a:10).

As noted above, gender equality is a constitutional right under which women are accorded the same status as men and ensures the elimination of discrimination of any kind against women (Bangani & Vyas-Doorgapersad, 2020:1). It can be argued that through the Constitution, women can participate in all spheres of life and enjoy equal rights as men, and it assists in curbing injustices that may result from gender-based bias. However, although the Constitution promotes equality and prohibits discrimination, gender inequality and discrimination still exist in the mining industry. The Constitution was implemented in 1997, yet women in mining still face overt discrimination, as discussed in Chapter 3. Chapter 3 revealed that some men find it difficult to

accommodate women in mining and women are much aware of the stereotypes, prejudices and resistance to their integration. In addition, the industry is lagging in achieving the Constitution's objective of freedom of trade, occupation and profession. Freedom of trade and occupation implies that women have the same opportunities as men in terms of the jobs they can occupy; however, there are still instances of occupational bias in the industry, where men commonly occupy positions that are technical and associated with power and authority. This indicates that women are in unfair and unequal positions compared to their male counterparts. As supported in Chapter 3, failure to address these gaps creates barriers to attracting more women in the industry and leads to disengaged employees who later on leave the industry.

As the supreme law, the Constitution is the starting point in the review of the legislative framework pertaining to women. As will be seen in the subsequent discussions, the Constitution gives effect to other legislation that expresses the inclusion of women in the labour market, including the mining industry. The next section discusses labour legislation related to gender issues in the workplace.

4.3 LABOUR LEGISLATION

Labour law is relevant to the topic of women in mining, as issues concerning gender in the workplace are regulated by, among other legislation, the Labour Relations Act 66 of 1995 (LRA), the BCEA (No. 75 of 1997), the EEA (No. 55 of 1998) (EEA), the SDA (No. 97 of 1998) and PEPUDA (2000), which are all labour-related laws. These laws have been legislated to give effect to the Constitution and to protect all employees, including women, in the workplace (Cliffe Dekker Hofmeyr, 2017:2). The first labour law that is discussed is the LRA.

4.3.1 The Labour Relations Act (No. 66 of 1995)

The LRA (No. 66 of 1995) was promulgated in December 1995 and is an essential legislation that gives effect to section 23 of the constitutional right to provide fair labour practices. The purpose of the Act is to advance economic development, social justice, labour peace and the democratisation of the workplace (RSA, 1995).

The LRA protects employees and those seeking employment. According to the LRA, employees have freedom of association, whereby they have the liberty to decide on joining or to participate in establishing a trade union or federation of trade unions, the right to collective bargaining and the right to strike as well as the right to training through the SDA (Nel *et al.,* 2011:45; RSA, 1995). Women are also protected by the LRA from unfair dismissal. According to the Act, a dismissal is considered unfair if one is dismissed due to pregnancy, intended pregnancy or a pregnancy-related reason (Cliffe Dekker Hofmeyr, 2017:2). Since its promulgation, the LRA has undergone

certain amendments, with the most recent being the Labour Relations Amendment Act 8 of 2018, which came into effect on 1 January 2019.

The LRA can be commended for recognising the need for employees to have freedom of association, the right to collective bargaining and the right to strike as well as access to training. The right to form part and participate in trade unions can play a crucial role in improving the employment conditions of employees. For women, in particular, this could contribute to the enhancement of gender equality in the workplace (Tavora, 2012:1). The mining industry in South Africa tends to have a high level of union membership and is said to have a firm commitment to transforming existing gender inequalities in the workplace and the public (Benjamin, 2015:4). Women's presence in such platforms could play an advocacy role, whereby participation in collective bargaining, for example, could provide them with a voice to express their concerns and needs. Therefore, through such platforms, women have the potential and ability to negotiate their priority actions in their workplaces (Dickens, 2000:197). Collective bargaining platforms also enable women to develop different agendas to promote their interests, encourage the recruitment of other women and also accelerate transformation, which in turn, challenges the prevailing masculine ideologies and practices that underpin bargaining (Dickens, 2000:197; Ledwith & Munakamwe, 2015:413). Training, on the other hand, is essential to ensure that women are equipped with the necessary competencies (knowledge, skills and attributes) to remain relevant and competitive in the industry and can also lead to their infiltration into leadership positions. This could ultimately lead to improved attraction, engagement and retention of women in the industry, as discussed in Chapter 3.

It should be noted that although the LRA recognises specific rights, these rights are generalised to all employees. The Act does not take cognisance of gender-related issues. As seen in Chapter 3, women's experiences in mining are different from those of their male counterparts. This gap needs to be addressed to increase the visibility and participation of women in mining as well as the industry's prosperity. The next section provides a discussion of the EEA.

4.3.2 Employment Equity Act (No. 55 of 1998)

The EEA (No. 55 of 1998) was adopted in October 1998 and takes into consideration the impact that previous apartheid discriminatory laws and practices such as disparities in employment and occupational income had on disadvantaged people (ILO, 2014; RSA, 1998a:2). In view of this, the Act promotes the constitutional right of equality, the exercising of democracy and the eradication of unfair discrimination in employment. This is done to facilitate the implementation of employment equity to ameliorate the effects of discrimination to reach a diverse workforce with broadly representative individuals through the promotion of economic development and efficiency among employees, as well as to give effect to the responsibilities of the country as a member of the ILO (RSA, 1998a:2). In essence, the purpose of the EEA is to achieve workplace equity by assisting to promote equal opportunities and fair treatment in employment by negating unfair discrimination and implementing affirmative action measures to remedy past employment injustices and to ensure equal representation of employees in all occupational levels (RSA, 1998a:2).

In light of the above assertion, Chapter 2 of the EEA states that no person may unfairly discriminate directly or indirectly against an employee in any employment policy or practice on one or more grounds, including race, gender, sex, pregnancy, marital status, family responsibility, ethnic or social origin, sexual orientation, age, disability, religion, HIV status, conscience, belief, political opinion, culture and birth (RSA, 1998a:14). In addition, harassment is regarded as unfair discrimination and is prohibited according to this Act (RSA, 1998a:14).

Affirmative action is covered by Chapter 3 of the EEA and requires employers to take the necessary steps to implement affirmative action measures for individuals from designated groups. Black people, women and people living with disabilities are referred to as designated groups (RSA, 1998a:3). Affirmative action measures are measures designed to ensure that adequately qualified individuals from designated groups have equal employment opportunities in all occupational levels within an organisation (RSA, 1998a:19). Employers are expected to develop and implement an equity plan to stimulate equal opportunities in the workplace and promote workplace diversity to support equity. If underrepresentation of individuals from designated groups has been identified, employers must set numerical goals to ensure that appropriately qualified individuals from designated groups are well represented (RSA, 1998a:22).

Taking into account the EEA, in 2012, the Employment Equity Bill was published. Relevant to this study, the following amendments were made (RSA, 2012:3-4):

- Section 6 of the principal Act is hereby amended – (a) by the substitution for subsection (1) of the following subsection: (1) No person may unfairly discriminate, directly or indirectly, against an employee, in any employment policy or practice, on

one or more grounds, including race, gender, sex, pregnancy, marital status, family responsibility, ethnic or social origin, colour, sexual orientation, age, disability, religion, HIV status, conscience, belief, political opinion, culture, language, [and] birth or on any other arbitrary ground.

- An employee may refer the dispute to the CCMA for arbitration if – (i) the employee alleges unfair discrimination on the grounds of sexual harassment;
- By the substitution for subsection (1) of the following subsection: (1) Affirmative action measures are measures designed to ensure that suitably qualified people from designated groups have equal employment opportunities and are equitably represented in all occupational categories and levels in the workforce of a designated employer.
- Section 1 of the EEA, 1998 (hereinafter referred to as the principal Act), is hereby amended – by the substitution for the definition of 'designated groups' of the following definition: 'designated groups' means black people, women, and people with disabilities who – (a) are citizens of the Republic of South Africa by birth or descent; or (b) became citizens of the Republic of South Africa by naturalisation – (i) before 27 April 1994; or (ii) after 26 April 1994 and who would have been entitled to acquire citizenship by naturalisation before that date, but who were precluded by apartheid policies.

The EEA (No. 55 of 1998) was amended by the Employment Equity Amendment Act (No. 47 of 2013), which came into effect on 1 August 2014 (Ebrahim, 2016:1). The amended Act marked the first amendment of the EEA (No. 55 of 1998) and for the very first time, adopted legislation governing equal pay claims (Ebrahim, 2016:2). Additions were made to section (6) of the principal Act by adding subsection (4), which suggested as follows (RSA, 2013:4):

> … a difference in terms and conditions of employment between employees of the same employer performing the same or substantially the same work or work of equal value that is directly or indirectly based on any one or more of the grounds related to race, gender, sex, pregnancy, marital status, family responsibility, ethnic or social origin, colour, sexual orientation, age, disability, religion, HIV status, conscience, belief, political opinion, culture, language and birth is unfair discrimination.

In light of this, the Minister published the Employment Equity Regulations of 2014, which set out factors that should be used to evaluate whether jobs are of equal value (Ebrahim, 2016:3). Before the Employment Equity Amendment Act (No. 47 of 2013), South Africa did not have a specific provision regulating equal pay claims (Ebrahim, 2016:2). A Code of Good Practice on Equal Pay for Work of Equal Value was also published on 1 June 2015 aimed at directing employers and employees on how to implement the principle of equal pay for work of equal value in their workplaces (RSA, 2015:9).

The most recent modification of the EEA was gazetted in July 2020. The 2020 Employment Equity Bill aims to identify sectoral numerical targets to ensure the equitable representation of suitably qualified people from designated groups and to provide for related matters connected therewith. Relevant to this study was the introduction of the National Minimum Wage Commission, established in terms of section 8 of the National Minimum Wage Act (No. 9 of 2018).

From the above, it can be deduced that by continuously reviewing and revising employment equity legislation and its enforcement, government is making strides to achieve gender equality in the workplace (Botha, 2013:116). The EEA is a crucial law to promote equality and fair treatment in the workplace. For the mining industry, this is important, as women experience unfair treatment, particularly in underground mining, where they often feel unwelcome and not taken seriously by their male colleagues. It is also encouraging that employers are expected to develop and implement equity plans to stimulate equal opportunities through affirmative action. This will assist in combating the unequal representation of women in the industry, thereby fostering gender diversity that will possibly lead to the attraction, engagement and retention of women in the industry. The next section provides a discussion of the Basic Conditions of Employment Act.

4.3.3 The Basic Conditions of Employment Act (No. 75 of 1997)

The Wage Act of 1957 was repealed by the Basic Conditions of Employment Act (BCEA) (No. 75 of 1997), which took effect on 1 December 1998 in the private sector and on 1 May 2000 in the public sector (Botha, 2014:112). The BCEA aims to promote economic development and social justice by fulfilling the primary objective of giving effect to the right of fair labour practices set out in section 23(1) of the Constitution (RSA, 1997:12). This is done by establishing and applying the basic conditions of employment and regulating the rights of employees concerning fair labour practices.

The BCEA establishes minimum conditions that should be contained in the employment contract between an employer and employee. The Act provides the regulations as listed in Table 4.1.

Table 4.1: Regulations of the BCEA

Hours of work	● The maximum working hours an employee may work in a week is set at 45 hours. ● Working hours should be determined by an Act governing the occupational health and safety of employees. The MHSA governs the occupational health and safety of mining employees. ● An employer may only require or allow an employee to work night shifts if agreed, when remunerated by an allowance and when transportation is made available at the beginning and end of employees' shift between their residence and the workplace.
Meal intervals in the workplace	● Employees working continuously for more than five hours should be given continuous meal intervals of at least an hour. ● An employer and employee may enter into a written agreement to reduce the meal interval to not less than 30 minutes.
Daily and weekly rest period	● Employees should be permitted a daily rest period of at least 12 consecutive hours between the end and recommencement of work and a rest period of at least 36 consecutive hours, unless otherwise agreed, including Sundays. ● For every hour worked on a Sunday, an employer must pay employees double their wages, unless they normally work on a Sunday, where the employer must pay an employee one and one-half of the wages for each hour worked.

Leave (annual, sick, family responsibility and maternity)	● An employer must grant employees at least 21 consecutive annual leave days on full remuneration for each annual cycle (the period of 12 months).
	● An employee is entitled to one day of paid sick leave for every 26 days worked.
	● Pregnant women are entitled to maternity leave of at least four consecutive months.
	  ○ An employer must ensure that during the pregnancy, for a period of six months and after birth, employees are provided with appropriate, alternative employment under the terms and conditions that are not less favourable than their ordinary employment agreements.
	  ○ A Code of Good Practice on the protection of employees during pregnancy and after birth is available to guide employers and employees on the protection of women's health from possible hazards in their workplace during pregnancy, after the birth of a child and during breastfeeding to protect women.
	● An employee who has worked for more than four months in an organisation is entitled to a paid family responsibility leave of at least three days.

Payment of remuneration	● An employer must pay its employees remuneration in a South African currency either daily, weekly, fortnightly or monthly.
Termination of employment	● Employment contracts may be terminated only on notice of prescribed periods. Notices should be in writing, unless if given to an illiterate employee. In that case, notice can be given verbally.
Prohibition of employment of children and forced labour	● An employer may not employ a child who is under 15 years or the minimum school-leaving age in terms of any law.
Prohibition of forced labour	● All forced labour is prohibited. ● No person may be in breach of the law or cause, demand or impose forced labour for his or her benefit or benefit of someone else.

Source: RSA (1997:12–40)

In 2018, an amendment Bill for the BCEA was introduced. This was done to replace and insert definitions that provide for the daily wage payments that apply to certain employees, to repeal certain provisions dealing with sectoral determinations and to disestablish the Employment Conditions Commission. An extension was also provided to the jurisdiction of the Commission for Conciliation, Mediation and Arbitration. The Bill also extended the provisions for monitoring and enforcement by the labour inspectors; it included the provisions of the National Minimum Wage Act of 2018, the Unemployment Insurance Act of 2001 and the Unemployment Insurance Contributions Act of 2002. It also provides claims for underpayment and transitional arrangements and regulates sectoral determinations currently in force (RSA, 2018a:2). Furthermore, sections 1 to 7 of the Labour Laws Amendment Act of 2018, which amends the BCEA to provide, among others, parental leave, was introduced on 1 January 2020. The Bill states that an employee is entitled to 10 days of parental leave after the child of the employee is born, when a child is legally adopted by an employee or when a child is placed in the care of a prospective adoptive parent by a court (South African Labour Guide, 2021).

The BCEA can be commended for ensuring that employees are not discriminated against in the workplace and that their employment conditions are not exploited. The provisions of family responsibility and maternity leave, for example, ensure that women have additional days to accommodate the responsibilities that come with looking after their families. However, while prescribed working hours are set in a way that should provide employees with what is considered to be adequate daily rest periods, it could be argued that this is not sufficient for women in the mining industry who experience challenges related to work-life balance. The prescribed working hours and a family responsibility leave of three days might not be sufficient for working mothers to adequately accommodate both their work and their family responsibilities. As discussed in Chapter 3, work-life balance challenges affect women more than men and impact their engagement and retention levels. The chapter also showed that women are most likely to be attracted to family-friendly work environments. Therefore, providing flexible work environments and hours would be a significant opportunity for mining companies, particularly with the introduction of innovative technologies that allow certain jobs to operate virtually. On the other hand, the introduction of the 10 days' parental leave is encouraging, as it is not only a benefit for men, but can also alleviate the burden of working women after their children are born or adopted. The next section discusses the SDA.

4.3.4 The Skills Development Act (No. 97 of 1998)

The SDA (No. 97 of 1998) was enacted in February 1999 to replace the Manpower Training Act (No. 56 of 1981) and the Guidance and Placement Act (No. 62 of 1981) (Nel *et al*., 2011:109). The SDA aims to (RSA, 1998b):

- develop the skills set of the South African labour force by improving the standard of living of employees, their prospects of employment and labour mobility as well as improving productivity in organisations and the competitiveness of employers;
- promote self-employment and optimise the delivery of social services;
- increase the degree of investment in education and training in the labour market and enhance the return on such investment;
- encourage employers to use their workplace as an active learning environment by offering opportunities to employees to obtain new skills; employers are also encouraged to expand opportunities to novice entrants to the labour market to acquire work experience and to employ those who ordinarily struggle to be employed;
- encourage employees to partake in learning programmes and to ensure equality in its provision;
- improve the employability of persons previously disadvantaged by unfair labour discrimination and to remedy such disadvantages through training and education;
- assist those who are actively in search of employment to find work, retrenched employees to re-enter the labour market and employers to find qualified employees; and
- provide and regulate employment services.

According to the Department of Basic Education (DBE, 2020:45), in 2019[2], women made up the largest proportion of students in public higher education institutions (59.1% vs. 40.9%). Statistics also show that two-thirds of graduates (62.4%) are female compared to 37.5% who are male (DHET, 2020:20). Interestingly, slightly more women (52% vs. 48% men) were science, technology, engineering and mathematics graduates. This is encouraging, as the majority of qualifications in the mining industry require a foundation of knowledge in science, technology, engineering and mathematics. However, although this is encouraging, the mining industry is still lagging behind in attracting women to mining-related qualifications, as there are very few female enrolments in mining-related qualifications. Furthermore, despite having the highest number of graduates compared to men, there are more unemployed women than men in South Africa. South Africa's unemployment rate stood at 34.4% in the second quarter of 2021. Among the 34.4%

[2] The statistics are the most recent publicly available

unemployed individuals, women's unemployment rate was higher (36.8%) compared to that of men (32.4%) (Stats SA, 2021:26–28).

Among other objectives, the SDA aims to increase the investment of education and training as well as employment prospects. However, women remain poorly represented in mining and have a high unemployment rate compared to men. This indicates that women are in unfavourable circumstances. In view of this, concerted efforts are required to address these challenges. Creating opportunities for employment and career development through skills training or education is critical in enabling the attraction, engagement and retention of women in mining. Therefore, the investment in training and education should be prioritised by organisations, as suggested by the SDA. The next section discusses PEPUDA.

4.3.5 Promotion of Equality and Prevention of Unfair Discrimination Act (No. 4 of 2000)

Parliament passed PEPUDA (No. 4 of 2000) in February 2000 and enacted it into force in September 2000 (Botha, 2014:118). The objectives of the Act are to (RSA, 2000:6):

- enforce legislation required by section 9 of the Constitution that alludes to the provision of equality;
- implement the ethos of the equal enjoyment of all rights and freedom by every person, values on non-racialism and non-sexism, the prevention of unfair discrimination and protection of human dignity as well as the prohibition of the promotion of hatred based on race, ethnicity, gender or religion that constitutes incitement to cause harm as set out in the Constitution;
- provide measures that enable the eradication of unfair discrimination, hate speech and harassment based on race, gender and disability;
- provide procedures to identify circumstances where discrimination is unfair;
- provide public education and awareness-building measures on the importance of promoting equality and overcoming unfair discrimination, hate speech and harassment;
- provide remedies for victims of unfair discrimination, hate speech and harassment and persons whose right to equality has been infringed;
- establish measures to develop persons disadvantaged by unfair discrimination; and
- facilitate compliance with obligations of international law, including treaty obligations, the Convention on the Elimination of All Forms of Racial Discrimination and the Convention of Elimination of All Forms of Discrimination against Women.

With regard to women in the workplace, the Act specifically states that no individual may discriminate unfairly based on gender against any person, including (RSA, 2000:8):

- gender-based violence;
- any practice that negatively affects women's dignity and undermines their equality, including undermining the dignity and well-being of girls;
- any policy or behaviour that unfairly restricts women's access to land rights, finances and other resources;
- discrimination on the basis of pregnancy;
- limiting the access of women to social services for benefits such as health, education and social security;
- the refusal of access to opportunities, including access to services or contractual opportunities to provide services, or failure to take measures to meet the needs of such persons in a reasonable manner; and
- systematic inequality of women's access to opportunities due to the sexual division of labour.

Section 11 of PEPUDA speaks to the prohibition of harassment. It states that no individual may subject any person to harassment (RSA, 2000:9). Although harassment is prohibited, the shortcoming of this decree is that it is not precise in providing details on the type of harassment that is prohibited.

Furthermore, section 29 identifies the following labour and employment practices as unfair (RSA, 2000:24):

- Creating artificial barriers to equal access to employment opportunities through the use of certain procedures for recruitment and selection
- The implementation of practices relating to human resources, development, promotion and retention that discriminate unfairly against persons belonging to groups identified by the prohibited grounds
- Non-compliance with the principle of equal pay for equal work
- Perpetuating unbalanced income differentials stemming from previous unfair discrimination.

Based on the legislation referred to above, women in mining are equal to men in the workplace. The current challenges faced by women, such as gender stereotypes, sexual harassment and lack of career development opportunities, are forms of discrimination prohibited by PEPUDA. This demonstrates the need for exertions to be taken to guarantee the protection of women from such discrimination and to help promote equality in mining. In support of the protection of women

against discrimination and their empowerment, the Women Empowerment and Gender Equality Bill was introduced. The Bill is discussed further in the next section.

4.3.6 Women Empowerment and Gender Equality Bill (2013)

The Women Empowerment and Gender Equality Bill, 2013 was introduced in the National Assembly and gazetted in November 2013. The Bill was drawn by the Department of Women, Children and People with Disabilities to support gender equality and to identify and prevent discrimination against women on the basis of gender and race (RSA, 2013:13).

The first objective of the Women Empowerment and Gender Equality Bill is similar to that of PEPUDA (No. 4 of 2000). The objectives are to (RSA, 2013:4–6):

- give effect to the ethos of the Constitution, in particular by ensuring the equal enjoyment of all rights and freedoms by every person by promoting gender equality and the values of non-racialism and non-sexism;
- facilitate compliance with public and private bodies to comply with the country's obligations of international agreements;
- support and implement all aspects of the law in relation to the empowerment of women as well as their appointment and representation in decision-making positions and structures;
- facilitate the development and implementation of plans and strategies designed by public and private bodies to enhance women's empowerment and gender equality, and submit those plans and strategies to the Minister for consideration, evaluation and guidance;
- provide for the implementation of measures to ensure the progressive recognition of at least 50% of women as well as their representation in decision-making structures, including boards of designated public and private bodies;
- provide for gender mainstreaming to be implemented by designated public and private bodies; these measures may include the integration of managers' gender consideration into organisational policies, structures, systems and processes; measures to ensure that the analysis of gender equality is guided by the decisions and activities of a designated public or private body; as well as remedial measures to prevent potential prejudice in any form, to reduce gender disparities and to take steps to ensure compliance with the obligations contained in the legislation in force; the implications of these measures should be assessed in relation to gender mainstreaming; and
- provide for the formulation and implementation of public education programmes on practices that unfairly discriminate people on the grounds of gender, as provided for in applicable legislation and international agreements, with a view to promoting gender equality and social cohesion.

With respect to the prescript for public and private bodies to develop and implement plans and measures in accordance with applicable legislation and international agreements, the following provisions are prescribed (RSA, 2013:5–6):

- Address the prevalent discriminatory patriarchal attitudes and effects of apartheid faced by women in the education system and ensure that women's childbearing responsibilities are not the cause for drop-out or exclusion, to attain increased participation of access to education for all.
- Educate and upskill women to achieve a progressive fulfilment of equitable and sustainable development for women and gender equality.
- Capacitate and empower women to assimilate and develop knowledge, skills and values that are necessary to achieve a progressive achievement of at least 50% equal representation and meaningful participation of women in decision-making structures and economic empowerment. These should also include improving the understanding and attitudes of communities to accept women's abilities and involvement in the labour market as equals and developing support mechanisms for them.
- Improve access to education on reproductive rights for women, particularly young women.
- Eliminate prejudices and current practices that impede the achievement and pleasure of gender equality and social cohesion.

The Women Empowerment and Gender Equality Bill, 2013, could be seen as a relevant tool that can be used to ensure women's equality in mining, taking into account its advocacy for gender equality and the prohibition of discrimination in the workplace. While policies such as the Mining Charter, which is discussed in detail in section 4.4.2.1, also promote equitable access to employment and other opportunities for women in the workplace, the quotas set out by the Charter are well below 50%, thereby perpetuating gender inequality. It is positive that the Bill addresses this inequity through its proposal to have at least 50% women's representation in the workplace, including in decision-making structures. The Bill does not only seek to ensure the numerical representation of women, but also considers the need to empower them by encouraging the creation of opportunities for educating and upskilling them. The Bill also pay heed to other challenges that are vital to women's well-being in the workplace. These include addressing prevalent discriminatory patriarchal attitudes faced by women or any other forms of discrimination affecting them. As discussed in Chapter 3, male dominance in mining has created a workplace culture that creates bias in terms of attracting women and also affects their engagement and retention in the industry. The Bill's proposal for organisations to develop and implement policies, structures and remedial measures that will ensure equality and also reduce any forms of

discrimination or gender disparities contributes to the promotion of equality and prevents discrimination in workplaces.

4.3.7 Overview of labour legislation

The section above demonstrated that there are various pieces of legislation supporting women's participation in the mining industry. Such legislation not only seeks to ensure representation in terms of numbers, but also addresses issues related to unfair labour practices and discrimination, which are the main factors affecting the attraction, engagement and retention of women in mining.

The Constitution provides that everyone is treated equally and prohibits unfair discrimination on one or more grounds. Section 23 of the constitutional right to provide fair labour practices is enforced by the LRA, while the EEA promotes the constitutional right to equality, the exercise of democracy and the eradication of unfair discrimination in employment. Similarly, the BCEA gives effect to the right to fair labour practices highlighted by section 23(1) of the Constitution by establishing and applying the basic conditions of employment and regulating the rights of employees about fair labour practices. PEPUDA reinforces the legislation required by section 9 of the Constitution, which alludes to the provision of equality and advocates the provision of measures that eradicate unfair discrimination, hate speech and harassment based on race, gender and disability. The Women Empowerment and Gender Equality Bill can be viewed as the most significant policy for this study. It aims to promote gender equality and to identify and prevent discrimination against women on the basis of gender and race. The Bill stresses the need for organisations to implement measures that empower women and their appointment as well as their representation in decision-making positions. Although the legislation discussed could play a significant role in the attraction, engagement and retention of women in mining, there are gaps that need to be addressed. The next section explores mining legislation that is relevant to issues revolving around women in mining.

4.4 SECTOR-SPECIFIC REGULATORY FRAMEWORKS GOVERNING THE MINING AND MINERALS INDUSTRY

The MHSA (No. 29 of 1996) and the MPRDA (No. 28 of 2002) are the primary laws that directly regulate the mining and minerals industry, including women. These laws, alongside their policies, are discussed in the subsequent sections.

4.4.1 The Mine Health and Safety Act (No. 29 of 1996)

The Occupational Health and Safety Act (No. 85 of 1993) is the most overarching legislation regulating occupational health in the workplace, except for the mining industry, which has specific legislation, namely the MHSA (No. 29 of 1996) (Hermanus, 2007; Mojapelo *et al*., 2016; Tuchten, 2011). In previous years, the 1911 Mines and Works Act No. 12 and its applicable regulations provided for the safety of South African mineworkers. The Mines and Works Act (No. 12 of 1911) was repealed by the Mines and Works Act (No. 27 of 1956) and then by the Minerals Act (No. 50 of 1991). The Minerals Act focused primarily on safety issues in the mining industry, with no emphasis on promoting the occupational health status of employees (MHSC, 2021). In June 1996, following the outcomes of the Leon Commission, the MHSA was enacted to address that gap (MHSC, 2021; RSA, 1996b). The adoption of the MHSA shifted from having a prescriptive regulation to a more risk-based mining health and safety management system that allows organisations to decide how to best manage health and safety to prevent and mitigate risks in mining (MQA, 2020a:115). Over and above the introduction of risk-based mining health and safety management, the MHSA is recognised for its role in eradicating restrictions that previously prohibited women from working in underground mining (Ranchod, 2001:22).

The objectives of the MHSA are to (RSA, 1996b):

- protect the health and safety of mining employees;
- call for employers and employees to identify hazards and to eliminate, control and minimise risks related to mining health and safety;
- put into practice the obligations of the country under public international law relating to health and safety in mines;
- ensure employee participation in health and safety matters through health and safety representatives and mining health and safety committees;
- provide for efficient monitoring of health and safety conditions at mines;
- enforce health and safety measures in mines; and
- undertake investigations and inquiries aimed at improving mining health and safety and promoting a culture of health and safety, training in health and safety as well as co-

operation and consultation between the state, employers and employees and their representatives on mining health and safety.

The following sections in the MHSA are most relevant to women in mining (RSA, 1996b):

- Section 5, which states that managers should maintain a healthy and safe mine environment without risk to the employees' health
- Section 6, which states that managers should ensure that each employee is provided with adequate health and safety facilities and equipment and, to a reasonably practical extent, keep those facilities and equipment in a serviceable hygienic condition. Managers must therefore ensure that adequate quantities of all necessary PPE are available to enable every employee who is required to use the equipment to do so.

As discussed in Chapter 3, women working in mining, particularly those working underground, face the greatest health and safety risks, as components such as PPEs, mining machinery, tools and equipment are not necessarily designed to be used by women (Botha, 2013:127). Consequently, a combination of these factors builds up the scope of occupational hazards that affect women's employment in mining. In this regard, compliance with the regulations of the MHSA is critical to improve women's health and safety and to alleviate the fears of those who aspire to get into mining or those intending to leave.

The MPRDA is another law that directly regulates the mining industry, including women. The Act is discussed in detail in the next section.

4.4.2 The Mineral and Petroleum Resources Development Act (No. 28 of 2002)

In May 2004, the MPRDA (No. 28 of 2002) came into force (Botha, 2013:122). The MPRDA repealed the Mines and Works Act (No. 12 of 1911) and replaced the Minerals Act (No. 50 of 1991) similarly to the MHSA, but it has different objectives. The Act seeks to create conditions that promote equitable access to and sustainable exploitation of the country's petroleum and mineral resources by empowering historically disadvantaged South Africans (HDSAs) with skills and participation in managerial positions (MQA, 2019a).

The objectives of the Act are to (RSA, 2002:18):

- implement the principle of the state's custody of the mineral and petroleum resources of the nation;
- promote equitable access to the country's mineral and petroleum resources to all South Africans;

- substantially and meaningfully expand opportunities for HDSAs, including women, to permeate the mineral and petroleum industries and to significantly benefit from the exploitation of the nation's mineral and petroleum resources;
- promote economic growth and development of mineral and petroleum resources in South Africa;
- promote employment and improve the social and economic well-being of all South Africans;
- ensure the security of tenure concerning prospecting, exploration, mining and production activities;
- Give effect to section 24 of the Constitution by ensuring that the mineral and petroleum resources of the nation are developed in an orderly and ecologically sustainable manner while promoting social and economic development; and
- ensure that mining and production rights holders contribute to the socio-economic development of the areas in which they operate.

The MPRDA also stipulates that mining companies must first submit a Social and Labour Plan before being granted mining or production rights. Mining companies must develop and implement comprehensive human resource development programmes, mine community development plans, housing and living conditions plans, employment equity plans and processes to retain jobs and manage downscaling and/or closure in accordance with the Social and Labour Plan. These programmes are aimed at increasing employment and improving the social and economic welfare of all South Africans, while also ensuring economic growth and socio-economic development (RSA, 2010b:4).

Furthermore, given its mandate to broaden opportunities for previously disadvantaged individuals, including women, the MPRDA is tasked with the responsibility to establish measures to enable women to fully assimilate themselves in the mining industry. The Broad-based Socio-economic Empowerment Charter for the Mining and Minerals Industry (the Mining Charter) is one of the measures set up to accelerate the transformation of the mining industry to ensure sustainable economic growth and participation of previously disadvantaged individuals such as women in the industry, to give effect to the MPRDA. In the section below, the Mining Charter is discussed in depth.

4.4.2.1 The Broad-based Socio-economic Empowerment Charter for the Mining and Minerals Industry (the Mining Charter)

Since its first introduction in 2004, there have been three different Mining Charters enacted over the past years. The first Mining Charter, introduced in 2004, was established with specific measurable targets to achieve transformation in the mining industry (RSA, 2018b:4). Its objective was to widen opportunities for HDSAs to penetrate the mining industry or benefit from the exploitation of the country's mineral resources (RSA, 2004:6). To ensure that this transformation was taking place, a comprehensive assessment of the progress made in the transformation of the industry against its objectives and agreed targets were conducted in 2009 (RSA, 2018b:5). The assessment revealed that there were several inadequacies in the implementation of various elements of the Charter, namely ownership, procurement, employment equity, beneficiation, human resource development, mine community development and housing living conditions (RSA, 2004:5). To address these shortcomings, in 2010, the Charter was revised to streamline and accelerate the accomplishment of its objectives. The revision also included the aspect of sustainable development, which aimed to improve the sustainable transformation and growth of the industry (RSA, 2018b:5).

In 2014, a second assessment of the 2010 Mining Charter was conducted. The assessment revealed the following (RSA, 2018b:5):

- There were noticeable improvements in the levels of compliance in some instances. However, the industry's overall transformation was still poor.
- Compliance was generally considered as a means of protecting the social license to operate, and despite the state being the custodian of the mineral wealth of the country on behalf of the nation, the majority of mining communities continued to live in poverty.
- The achievement of meaningful participation by HDSAs remained limited due to the following reasons:
    - The gradual flow of benefits that sought to service debt and provide cash flow directly to black economic empowerment partners was wholly inadequate.
    - As a result of inefficient administration, trusts holding the interests of mine employees and communities inhibited the flow of benefits to their intended beneficiaries.

In 2015, government carried out a further comprehensive review of the Mining Charter in light of the findings of the second assessment to reinforce the efficacy of the Mining Charter as a tool for implementing broad-based and meaningful transformation of the mining and minerals industry. The review recognised that transformation concerning competitiveness and growth were mutually reinforcing. Therefore, the reviewed Charter (the Mining Charter of 2018), which is the latest

Charter, seeks to eliminate ambiguities and create regulatory certainty by introducing new definitions, terms and targets to harmonise with other legislation. The objective of harmonising legislation is to ensure the meaningful participation of HDSAs in line with the objectives of the MPRDA. In essence, the Mining Charter intends to achieve equity in the workplace, thereby promoting equal opportunities and fair treatment in employment to eliminate unfair discrimination, implement affirmative action measures to redress disadvantages experienced by designated groups such as women and ensure their equitable representation in all occupational levels (RSA, 2018b:26).

The Mining Charter 2018 has the following elements:

- Ownership
- Procurement and enterprise development
- Mine community development
- Principles for housing and living conditions standards
- Mineral beneficiation
- Employment equity
- Human resource development.

The Charter has a scorecard with weights attached to employment equity (30%), procurement supplier and enterprise development (40%) and human resource development (30%) (RSA, 2018b:36). Mining right holders must comply with targets set out in the respective elements; failure to do so is in breach of the MPRDA and is subject to immediate corrective action, suspension or termination of operations (RSA, 2002:82, 2018b:34).

For this study, the focus was on employment equity and human resource development elements as they relate to matters concerning women in mining. Table 4.2 illustrates the components of each previously enacted Mining Charter to the latest (2018) Charter as well as their differences and their contribution towards enabling gender equality in the mining industry.

Table 4.2: A comparison of the Mining Charters: 2004, 2010 and 2018

Charter element	2004 Mining Charter	2010 Mining Charter	2018 Mining Charter
Objectives	• Promoting equitable access for all South Africans to the mineral resources of the country • Substantially and meaningfully expanding opportunities for HDSAs, including women, to enter the mining and minerals industry and to benefit from the exploitation of the nation's mineral resources • Using the existing base of skills to empower HDSAs • Expanding HDSAs' skills base to serve the community • Promoting employment and advancing the social and economic well-being of mining communities and the major labour-sending areas • Promoting the beneficiation of South Africa's mineral commodities	• Promoting equitable access for all South Africans to the mineral resources of the country • Significantly and meaningfully expanding opportunities for HDSAs, particularly women, to work in the mining industry and to benefit from the exploitation of the country's mineral resources • Utilising and expanding the existing skills base for the empowerment of HDSAs and to give back to the community • Promoting employment and advancing the social and economic well-being of mining communities and the major labour-sending areas • Encouraging South Africa's minerals to be beneficiated • Promoting sustainable development and growth of the mining industry	• Affirming the internationally recognised state sovereignty principle, its right to exercise authority and make laws within its boundaries and its country's life, including all its mineral wealth • Redressing past imbalances and injustices by deracialising ownership patterns in the mining industry • Substantially and meaningfully expanding opportunities for HDSAs, including women, to enter the mining and minerals industry and to benefit from the exploitation of the nation's mineral resources • Utilising and expanding the existing skills base for the empowerment of HDSAs • Advancing employment and diversifying employees to achieve industry competitiveness and productivity • Improving South African social and economic welfare to achieve social cohesion • Promoting the mining industry's sustainable growth and competitiveness • Promoting the growth and development of the local mining inputs by leveraging the industry's procurement spend • Promoting the beneficiation of South Africa's mineral commodities

Employment equity	Companies should publicise their employment equity plans and achievements and subscribe to the following: • Establish employment equity targets, particularly for junior and senior management positions • Agree to elucidate their plans at the management level for employment equity; stakeholders sought out to have a baseline of 40% HDSA participation in management within five years • Where possible, South African subsidiaries of multinational companies and South African companies are tasked with targeting HDSAs in their overseas placement and/or training programmes. • Identify a talent pool and fast-track it; this should involve high-quality operational exposure • Ensure higher levels of inclusiveness and the advancement of women; a baseline of 10% representation is established for a period of five years • Set and publish targets and achievements	Companies must ensure diversity in the workplace and equitable representation of HDSAs at all levels for the mining industry's social cohesion, transformation and competitiveness. To create a conducive environment to ensure diversity and participation of HDSAs at all decision-making positions and core occupational categories in the mining industry, every mining company must: • achieve a minimum of 40% HDSA demographic representation at: ○ executive management (board) level ○ senior management (Exco) level ○ core and critical skills ○ middle management level ○ junior management level; and • identify and expedite its existing talent pool to ensure high-level operational exposure of career path programmes	A mining right holder must achieve a minimum threshold of HDSAs that reflects the provincial or national right to create a diverse workplace and ensure their participation in all decision-making positions and core occupational categories in the mining industry demographics in the following manner: • Board: a minimum of 50% are HDSAs, 20% of which must be women • Executive management: a minimum of 50% are HDSAs at the executive director level, 20% of which must be women • Senior management: a minimum of 60% should be HDSAs, 25% of which must be women • Middle management: a minimum of 60% HDSAs, proportionally represented, 25% of which must be women • Junior management: a minimum of 70% HDSAs, proportionally represented, 30% of which must be women • A minimum of 1.5% employees with disabilities as a percentage of all employees, reflective of national or provincial demographics • Core and critical skills: a mining right holder must ensure that a minimum of 60% HDSAs is represented in the mining right holder's core and critical skills by diversifying its existing pools (representative of demographics); core and critical skills must include science, technology, and engineering as well as mathematical skills representation across all organisational levels • Development and implementation of a career progression plan (aligned with its Social Labour Plan) consistent with South Africa's demographics, providing for: ○ career development matrices (including minimum entry requirements and timeframes) of each discipline;

			○ individual development plans for employees; ○ a talent pool to be rapidly tracked in accordance with needs; and ○ a comprehensive plan with targets, timeframes and steps to implement the plan.
Human resource development	All stakeholders (the MQA, government, trade unions and mining companies) should commit to building a work environment that empowers HDSAs by subscribing to the following: • Through the MQA, formulate comprehensive skills development strategies that include a skills audit and provide scholarships and learnerships to promote mining-related educational advancement, particularly in the fields of mathematics and science at basic-education school level • Through the MQA, provide skills training opportunities to mining employees, including women to improve their income-earning capacity after mine closure • In the same token, government should seek to secure training opportunities for employees of HDSA companies and exchange opportunities with mining companies operating outside of South Africa: ▪ Training courses in the skills of mining entrepreneurs shall be provided through the MQA in collaboration with academic	Invest a percentage of annual payroll spent in demographic-reflective essential skills development activities (excluding mandatory skills levy), including support for South African-based research and development initiatives intended to develop mining, exploration, processing, etc. as follows: • 3% for 2010 • 3.5% for 2011 • 4% for 2012 • 4.5% for 2013 • 4% for 2014	A minimum of 5% of the leviable amount (excluding the statutory skills development levy) must be invested by mining right holders in the development of essential skills. The minimum amount of 5% must be invested in the following way: • Investment in essential skills development activities such as science, technology, engineering, mathematic skills as well as artisans, internships, learnerships, apprentices, bursaries, literacy and numeracy skills for employees and non-employees (community members), graduate training programmes, research and development of solutions in exploration, mining, processing, technology efficiency (energy and water use in mining), beneficiation, and environmental conservation and rehabilitation. ○ The investment in skills and research contemplated above must be distributed in line with national or provincial demographics. • For the purpose of human resource development, directors and executives cannot be regarded as employees.

	institutions, non-governmental organisations and the Gender Commission. ▪ In consultation with trade unions, companies should provide employees with opportunities to become literate and numerate by 2005. ▪ Companies should implement career paths to provide their HDSA employees with opportunities to advance to higher occupational levels. ▪ Companies should create systems that will enable empowered individuals to be mentored as a means of capacity building.		

Sources: Cliffe Dekker Hofmeyr (2018); RSA (2002, 2010a, 2018)

The Mining Charter is a key driver that seeks to increase the representation of women in mining. At present, no date has been set for the Mining Charter 2018 review. Although several amendments have been made to the Charter since its inception, its mandate to promote women's permeability and development remains the same. All three Charters' objectives aim at ensuring workplace diversity and equitable representation of HDSAs in the mining industry, including women. The aim has always been to significantly and meaningfully expand opportunities for women so that they can enter and benefit from the industry. Through collaborative efforts by various industry stakeholders, i.e. the MQA, government, mining companies and trade unions, opportunities for the advancement of education and skills development to better equip women in their workplace and society at large, and the requirement established to integrate women in decision-making positions, reflect strides being taken to transform the industry's male dominance.

While the Mining Charter contains positive measures to promote women's participation in mining, it remains silent in addressing challenges that they encounter in their work environments. Although the Mining Charter requires certain percentages of women in mining and in different positions, women's representation remains low. As seen in Table 4.2, the percentage targets set by the Charter have always been lower than 50%, thereby suggesting that although women are encouraged to penetrate the industry, their representation would still not be on par with their male counterparts. The low representation of women is not the only challenge, as there are other challenges that are mostly perpetuated by the industry's male dominance culture. The existence of such challenges reinforces the importance of addressing the study's purpose of investigating the attraction, engagement and retention of women in technical mining positions in South Africa. Moreover, it would be beneficial for the industry to incorporate some of the proposals made by the Women Empowerment and Gender Equality Bill, 2013, which not only seek to achieve 50% of women's representation in the workplace, but also recognises discriminatory patriarchal attitudes that need to be addressed in the workplace.

4.4.3 Overview of mining legislation

From the above section, it can be deduced that mining-related legislation such as the MHSA seeks to maintain a healthy and safe mine environment, without risking the health of employees. For women working in mining, particularly those working underground, health and safety issues remain a challenge due to aspects such as PPE, mining machinery, tools and equipment not anatomically designed to be used by them. Moreover, the MPRDA seeks to grow opportunities for previously disadvantaged individuals, including women. This is facilitated by the Mining Charter, which has established targets and measures to allow women to be fully assimilated into the mining industry. All of the legislations mentioned above have created opportunities for women to be employed in the mining industry and can be used to increase women's representation and

retention in the industry. However, the focus should not be only on achieving numerical targets, but also on other factors that affect women's integration into the industry.

4.5 CONCLUSIONS

This chapter aimed at addressing the statutory and regulatory frameworks that create enabling conditions for attracting, engaging and retaining women in the mining industry. The chapter demonstrated how the transition to democracy aided the introduction of laws and policies to redress past inequalities that prohibited women's participation in the industry. One of these laws is the Constitution, which is the country's supreme law. As the supreme law, the Constitution formed the foundation in reviewing the statutory and regulative framework pertaining to women. A discussion of labour laws followed this. The LRA (No. 66 of 1995), the BCEA (No. 75 of 1997), the EEA (No. 55 of 1998), the SDA (No. 97 of 1998) and PEPUDA 2000 were identified as critical laws governing the general promotion of women's equity and the prevention of gender discrimination in the workplace. Specific to the mining industry, the MHSA (No. 29 of 1996) and the MPRDA (No. 28 of 2002) are the principal laws regulating women's participation in the mining industry. From the MPRDA of 2002, the Mining Charter was established to address matters pertaining to transformation in mining to ensure sustainable economic growth and involvement of previously disadvantaged individuals such as women.

All of these legislation and policies reflect the government's efforts to address gender imbalances in the workplace, including the mining industry, and the measures provided for by these laws should hopefully lead to an egalitarian mining industry. The law can play a key role in driving gender equality in mining, which could ultimately lead to women's attraction, engagement, and retention. It should be noted, however, while legislative progress is being made to promote gender equality, it has also emerged that gender inequality and discrimination are prevalent in the mining industry. This indicates some gaps in the existing legislation, considering that the majority have been in place for over 20 years. Legislation literacy is also required for women, as they need to be well aware of their rights. It is imperative for women to know their rights in the workplace to stop any violations against them. This will also help them understand that they are protected and that there are laws that promote their empowerment and gender equality. The next chapter discusses the empirical results and analyses of the quantitative data.

CHAPTER 5

EMPIRICAL RESULTS AND ANALYSES OF QUANTITATIVE DATA

5.1 INTRODUCTION

The research investigated the attraction, engagement and retention of women employed in technical mining positions in South Africa**.** The second chapter provided a conceptual and theoretical framework of attraction, engagement and retention. Chapter 3 presented a general overview of women employed in the mining industry and factors affecting their attraction, engagement and retention. This was followed by Chapter 4, which addressed the statutory and regulatory frameworks governing the inclusion of women in South Africa's mining industry.

This chapter details the empirical findings of the quantitative research. The aim is to determine the extent to which the quantitative data addressed the study's objectives. The first section of the chapter presents the deployment of the research methodology, after which the empirical results are presented and discussed.

5.2 DEPLOYMENT OF THE RESEARCH METHODOLOGY: QUANTITATIVE PHASE

The research methodology used in the study has been meticulously elaborated in Chapter 1 under section 1.6. As discussed, the study adopted a convergent parallel mixed-methods approach. The sections that follow provide an overview of the quantitative methods that were used.

The quantitative results were guided by captured data from the structured questionnaire. The questionnaire consisted of four sections encompassing biographical information and information related to attraction, engagement and retention. Each section of the questionnaire was guided by existing scales (i.e. the EmpAT, UWES and RFS), informed by the literature. The different scales were described in detail in Chapter 1. A five-point Likert scale was used to assign scores of low or high values to represent the degree of importance, agreement, satisfaction, frequency and likelihood of statements presented. The frequency analysis for each section is reported as a percentage, and the scoring options showed in Table 5.1 were used.

Table 5.1: Frequency analysis criteria of attraction, engagement and retention

Questionnaire number	Section B: Attraction				
B2	1	2	3	4	5
	Not at all important	Slightly important	Neutral	Important	Extremely important
Section C: Engagement					
C1	1	2	3	4	5
	Almost never or a few times a year or less	Rarely or once a month or less	Sometimes or a few times a month	Often or once a week	Very often or a few times a week
Section D: Retention					
D1, D3 & D4	1	2	3	4	5
	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
D2	1	2	3	4	5
	Very dissatisfied	Dissatisfied	Neutral	Satisfied	Very satisfied
D5.1	1	2	3	4	5
	Not likely at all	Barely likely	Somewhat likely	Quite likely	Very likely
D5.2	1	2	3	4	5
	Will definitely leave	Chances are quite good	Situation is quite uncertain	Chances are very slight	Definitely will not leave
D5.3	1	2	3	4	5
	I intend to leave as soon as possible	I will leave if something better turns up	I will leave only if something considerably better turns up	I will leave only if something much better turns up	I intend to stay until I retire
D6	1	2	3	4	5
	Not at all important	Slightly important	No opinion	Important	Extremely important

As stated in Chapter 1, the quantitative statistical analysis was carried out with the support of North-West University's Statistical Consultation Services, which provided erudite guidance and input on the statistical tests used in the study. These are discussed in the next section.

5.2.1 Descriptive statistics

Descriptive statistics are ordinarily used during the commencement of quantitative data analysis (Islam, 2020:14). These statistics use graphical methods, numerical indices and tables to summarise and organise responses from a large number of respondents to smaller-scale statistics (Frey, 2018:2; Islam, 2020:14; Zikmund & Babin, 2010:354). The analysis derived from descriptive statistics provides preliminary insight into the nature of responses gathered, as evidenced by the distribution of the values for each variable of interest (Tustin *et al*., 2005:523).

Frequency distributions, measures of central tendency (mean, median and mode) and measures of dispersion (range, standard deviation and variance) are all examples of

commonly used descriptive statistics (Islam, 2020:14; Tustin *et al*., 2005:523). Frequency distributions provide informatively and summarised categorical information on the number of occurrences that offer greater insight into the pattern of the sample values and enable these patterns to be compared with well-understood standard distributions such as binomial (discrete) and normal (continuous) distribution (Allen, 2017:2; Islam, 2020:14). The average value of responses is represented by measures of central tendency, whereas the amount of variation in responses for a given variable is described by the measure of dispersion (Islam, 2020:14; Tustin *et al*., 2005:523).

The descriptive analysis in this study included frequency tables and graphs, arithmetic mean (mean), variance and standard deviation. The mean is the most commonly used metric for measuring central tendency (Isotalo, 2001:27). It refers to the arithmetic average of all values in a set of data (Winters *et al*., 2010:213). The mean is obtained by summing all scores and dividing them by the total number of scores (Winters *et al*., 2010:213). In essence, the mean is the balancing point of the data set and is crucial for statistical inferences (Ott & Longnecker, 2010:81).

The average squared deviation from the mean is the variance. It is a variability metric that points out how spread out scores are around the mean (Salkind, 2010:2). When data points are clustered around the mean, it indicates that the variance is small, whereas when data points are spread out, the variance is large (Malhotra, 2010:455). When the mean is used as the measure of central tendency, as it was in this study, the standard deviation is the preferred measure of variation (Isotalo, 2001:34). The standard deviation describes how far an individual value deviates from the mean or the magnitude of variation within a data set (Allen, 2017:8; Winters *et al*., 2010:214). According to Andrade (2020:409), it is imperative to report standard deviation as a measure of dispersion when using a sample. The standard deviation is calculated by firstly establishing the mean, then subtracting it from each data point and then squaring. The sum of squares is then divided by the sample size, minus 1, after which the square root of that number is computed (Allen, 2017:8). A larger or smaller standard deviation generally indicates that the data set has larger or smaller variability (Frey, 2018:3).

Descriptive statistics provided characteristics that guided the selection of appropriate additional statistical analysis in this study. These statistics are presented as supporting information to provide a general overview of the direction and meaning of significant results (Salkind, 2010:2). The additional statistics include those discussed below.

5.2.2 Validity and reliability analysis

Factor analysis is a type of multivariate statistical method that can be classified as either exploratory or confirmatory (Hooper, 2012:1). EFA does not require the specification of hypotheses, as it is exploratory in nature, allowing the researcher to determine the underlying factors that exist in a data set (Brown, 2015:10; Hooper, 2012:1). This is done by identifying the smallest number of hypothetical constructs (also referred to as factors, latent variables, synthetic variables or internal attributes) that can succinctly explain the observed covariation in a set of variables to identify common factors that explain the order and structure in the measured variables (Watkins, 2018:219–220). The observed measures are interrelated, as they share a similar cause (they are all influenced by the same underlying construct) (Brown, 2006:10). In this study, EFA was used to determine factors associated with employee attraction and retention.

EFA involves firstly reporting the extraction technique. As the analysis of data in this study was performed using SPSS, the available extraction techniques included principal component analysis (PCA), principal factors, maximum likelihood factoring, image factoring, alpha factoring and unweighted and generalised (weighted) least-squares factoring (Tabachnick & Fidell, 2013:637). The study employed the PCA extraction method. PCA and principal factors are the most widely used extraction methods of the available extraction methods (Tabachnick & Fidell, 2007:637). PCA is used to create uncorrelated linear combinations of observed variables with the purpose of extracting the maximum variance of each component from the data set (Tabachnick & Fidell, 2007:640).

After extraction, rotation is applied to improve the interpretability and scientific utility of the solution (Tabachnick & Fidell, 2013:642). Factor rotation is intended to achieve a simplified and theoretically meaningful solution by rotating axes within factor space to draw them close to the location of the variables (Watkins, 2018:231). The rotation method implemented was the oblimin with Kaiser normalisation.

Furthermore, it is critical to ensure that the measured variables are sufficiently intercorrelated to support the EFA (Watkins, 2018:226). To ensure this, Bartlett's test of sphericity is used. Bartlett's test is an objective test of the factorability of the correlation matrix that statistically tests the hypothesis that the correlation matrix contains 1's on the diagonal and 0's on the off-diagonals. Due to the sensitivity of Bartlett's test to even minor deviations from randomness, its results need to be supplemented by a measure of sampling adequacy. One measure of sampling adequacy is the Kaiser-Meyer-Olkin (KMO), which represents the extent to which correlations are a function of the variance shared across variables rather than the variance shared by particular pairs of variables. KMO values range from 00.00 to 1.00. KMO values of

more than 0.70 are desirable, and those less than 0.50 are generally deemed unacceptable, indicating that the correlation matrix is not factorable (Child, 2006; Hair *et al*., 2010; Kaiser, 1974). Kaiser (1974:35) suggest that "KMO values in the 0.90s, marvellous; in the 0.80s, meritorious; in the 0.70s, middling; in the 0.60s, mediocre; in the 0.50s, miserable and below 0.50, unacceptable".

Only factor analyses with KMO scores of more than 0.70 were retained in the study. Factors are organised in descending order based on the most variance explained. The variance explained is used to determine the number of significant factors (Hooper, 2012:13). The criterion used to decide the number of factors to retain is the Kaiser's criteria and screeplot (Yong & Pearce, 2013:85). Kaiser's criteria specify a rule that all factors with eigenvalues greater than 1 should be retained for interpretation (Hooper, 2012:13; Yong & Pearce, 2013:89–90). This method is also the default method of factor retention in SPSS. The next stage then entails the interpretation and naming of factors. There are no set rules for naming factors, except to name them in a manner that would best represent the variables within the factors (Yong & Pearce, 2013:89–91).

Cronbach's alpha coefficient was used to determine the internal consistency and reliability of the EmpAt, UWES and RFS. Reliability refers to how consistent or stable a measure is (Wilson & MacLean, 2011:69). Internal consistency is the assessment of reliability using responses at only one point in time (Wilson & MacLean, 2011:71). The common rule for describing reliability and internal consistency using Cronbach's alpha is 0 to 0.49: unacceptable, 0.50 to 0.59: poor, 0.60 to 0.69: questionable, 0.70 to 0.79: acceptable, 0.80 to 0.89: good and 0.9 to 1: excellent (Costa & Sarmento, 2019).

Furthermore, in contrast to EFA, CFA is used when there is a strong measure of assumption where the presence of a previously proven structure is investigated with a new data set (Orçan, 2018:415). CFA in this research was conducted to test the model data fit of the UWES measurement model. It was used to validate the factor structure of employee engagement and the reliability of Cronbach's alpha.

CFA employs several fit indices to assess the adequacy of the model's fit to the data (DiStefano & Hess, 2005:227; Suhr, 2006:1). Three goodness-of-model-fit indices (GFI) were used in this study, which contained the chi-square statistic divided by degrees of freedom (CMIN/DF), the Comparative Fit Index (CFI) and the root mean square error of approximation (RMSEA).

The CMIN/DF is calculated by dividing the chi-square fit index by the number of degrees of freedom (Shadfar & Malekmohammadi, 2013:585). Various statisticians have different

suggestions regarding what CMIN/DF is judged to be a good model fit. According to Carmines and McIver (1981) (cited by Shadfar & Malekmohammadi, 2013:585–586), an adequate model should have a relative chi-square in the 2:1 or 3:1 range. Ullman (2001) asserts that a value of 2 or less shows a good fit, Kline (1998) argues that a value of 3 or less is acceptable, while others, such as Schumacker and Lomax (2004), consider values as high as 5 as an adequate model-data fit (all cited by Shadfar & Malekmohammadi, 2013:585–586). Therefore, Paswan (2009) (cited by Shadfar & Malekmohammadi, 2013:585–586) contends that values less than 2 are preferable; however, those between 2 and 5 are still acceptable. A score less than 1.0, according to Shadfar and Malekmohammadi (2013:586), indicates poor model fit.

The CFI is also known as Bentler's comparative fit index (Gupta & Singh, 2015). CFI examines the disparity between the data and the proposed model while amending underlying issues related to sample size inherent in the chi-squared test and the normed fit index (the ratio of the suggested model's chi-square value to the null model's chi-square value divided by the null model's chi-square value) (Costa & Sarmento, 2019; Gupta & Singh 2015). CFI is considered very good if it is equal to or exceeds 0.95, good between 0.9 and 0.95, suffering if it falls at 0.8 and bad if it is below 0.8 (Costa & Sarmento; 2019, Portela, 2012:24).

The RMSEA is a common measure of fit, as it does not necessitate null model comparison (Shadfar & Malekmohammadi, 2013:587). There are differing accounts regarding the cut-off points for RMSEA. According to Schumacker and Lomax (cited by Shadfar & Malekmohammadi, 2013:587), an RMSEA less than or equal to 0.05 indicates good model fit, while an RMSEA less than or equal to 0.08 is considered to be an adequate fit. On the other hand, Hu and Bentler (cited by Shadfar & Malekmohammadi, 2013:587–588) propose an RMSEA less than or equal to ≤ 0.06 as the cut-off for a good model fit. According to Bakar (2013:186), Blunch (2008) and Moshoeu (2017:275), models with RMSEA values greater than 0.10 or higher should not be accepted.

Furthermore, comparison tests were conducted to assess the effect of various biographical information on the attraction, engagement and retention of women in technical mining positions.

5.2.3 Comparison tests

In addition to descriptive and validity and reliability analyses, comparative tests were conducted to assess the effects that night shift work, having children, being involved in a work committee and marital status have on the attraction, engagement and retention of women employed in technical mining positions. These were explored using the independent samples t-test and the analysis of variance (ANOVA) test.

The independent samples t-test, also referred to as the two-samples t-test, is a parametric statistical test that compares the means of two groups in an independent sample to determine whether they are significantly different (Kim, 2015:540; Nishishiba *et al*., 2014:6). The assumptions applied to the independent samples t-test are as follows (Christopher, 2017:11; Nishishiba *et al*., 2014:10):

- The variable from which the mean is calculated (dependent variable) should be a continuous measure representing either an interval or a ratio level of measurement, while the independent variable must be categorical and dichotomous.
- The dependent variable should follow a normal distribution if the sample size is small.
- Observations between the two groups must be independent of each other, i.e. the data from one group cannot depend on the data from the other group.
- The variance of scores in one group should be equal to the variance of scores in the other group. This is referred to as the assumption of homogeneity of variance. This signifies that one group should not have a higher standard deviation than the other group. When there is a departure from this assumption, the variances are considered heterogeneous (heterogeneity of variances).

Levene's test was used to determine whether the variance of each group was equal. In this study, when the p-value for Levene's test is below 0.05, the test is significant and indicates a significant difference in the variances between the two groups in the sample and the assumption of homogeneity of variance is not met. In this case, the t-value is reported from the row marked "equal variances not assumed". When the p-value (sig. [2-tailed]) of the t-test is larger than 0.05, the test is not significant and indicates no significant differences in the variance between the two groups in the population, and the assumption of homogeneity is met (Nishishiba *et al*., 2014:14).

Effect size was taken into account in addition to p-value. The effect size is the standardised difference in a dependent variable that can be drawn to the independent variable. It enables us to learn how big an impact the independent variable has on the dependent variable (Christopher, 2017:14). In this study, Cohen's d-value was used as effect size. According to Cohen (1988:82), a d-value equal to 0.2 indicates a small effect size, 0.5 a medium effect size and 0.8 a large effect size.

Moreover, the ANOVA test is similar to t-tests; however, it differs in that it compares means of more than two groups instead of two (Islam, 2020:58). The ANOVA test consists of a categorical variable with more than two levels or categories and a continuous variable (Islam, 2020:58; Seltman, 2018:171). The purpose of ANOVA is to test the probability that the results are due to change differences between groups (Blankenship, 2018:2).

The following assumptions must be met in ANOVA tests (Nashishiba *et al*., 2014:6–7):

- Independent variables must be measured on a nominal scale, with qualitative rather than quantitative variation in the variable's conditions.
- The population from which the independent variable was sampled should have equal variance (i.e. homogeneity of variance).
- Dependent variables should be quantifiable and normally distributed if the sample size is small and measured on at least an interval scale (Blankenship, 2018:2).
- Furthermore, the ANOVA test generates an F-statistic, which is used to test the overall difference between groups. The F-statistic compares the amount of variability between groups due to systematic differences to the amount of variability within each group. The comparison of each group's mean is used to determine variability. Variability within groups refers to how the scores within each group vary due to chance. When the ratio for the F-statistic is 1, it indicates that the variability due to the within-group differences and the variability due to the between-group differences are equal. As the variability between groups gets larger compared to the variability within groups, the F-statistic becomes larger. A higher F-statistic denotes that the difference between the groups is coincidental.

According to Seltman (2018:188), each F-statistic has a p-value, which is the area under the null sampling distribution of that F-statistic that is greater than the (observed) F-value. A p-value below 0.05 indicates that the test is significant and that there is a significant difference in the variances between the groups observed. A p-value above 0.05 suggests that the test is not significant, and there are no significant differences in the variance between the groups in the population (Ali & Bhaskar, 2016:665; Nishishiba *et al*., 2014:14).

Similar to the independent samples t-test, the effect size plays an imperative role in analysing ANOVA. The omega-squared effect size was used to determine the extent of the difference in the dependent variable explained by the independent variable. Cohen (1988) provides guidelines for interpreting omega-squared effect size, where 0.01 is considered as a small effect-size, 0.06 as a medium effect-size and anything greater than 0.14 as a large effect-size.

In general, the ANOVA test does not specify which group means are different. As a result, this necessitates the need to conduct additional analysis to determine which of the groups differ (Islam, 2020:60; Nashishiba *et al*., 2014:9). Post hoc tests are used to understand which groups are different (Islam, 2020:60). These types of tests are those that do not require the specification of a comparison beforehand (Belhekar, 2019:25). Post hoc tests are only conducted on ANOVA tests that are significant (when the p-value is ≤ 0.05). The study used Tukey's B post hoc test. Tukey's B is also referred to as the wholly significant difference. It makes pairwise comparisons between groups using the studentised range distribution. The critical value is the average of the corresponding value for Tukey's honestly significant difference test and the Student-Newman-Keuls (Sauder, 2017:21). Because Tukey's B is a compromise between the Student-Newman-Keuls and the honestly significant difference test, it will perform somewhere in the middle in terms of Type I error control and power when assumptions are met and will control Type I error adequately for the different groups (Petrinovich & Hardyck, cited by Sauder, 2017:21).

Correlation analysis, which is discussed in detail below, was the final statistical test used in the study, used to compare two ordinal variables.

5.2.4 Correlation

Correlation tests can establish that a relationship exists and provide a good description of the relationship (Gravetter & Forzano, 2009:345). There are different correlation statistics, which include the Pearson product-moment correlation (Pearson's r), Spearman's rank order correlation (Spearman's rho), Kendall's tau (T), point biserial correlation (!b), biserial correlation (phi) and tetrachoric correlation (Obilor & Amadi, 2018:15). The researcher employed the Pearson product-moment correlation coefficient to determine the relationship (if any) between ordinal variables (age, highest qualification, duration of employment in current positions, the organisation and the mining industry), attraction, engagement and retention.

The Pearson product-moment correlation coefficient, also known as the correlation coefficient or r, is the most widely used correlation coefficient (Gingrich, 2004:800). This type of correlation measures the degree of relationships between two continuous variables, i.e. a variable measured along a line scale (Coolidge, 2020:221). When using the Pearson

correlation coefficient, a straight line is assumed to be the best fit for the cluster of points (Coolidge, 2020:230). Pearson's correlation seeks to create a line of best fit across the data of two variables and indicates how far away all these data points are from this line of best fit (Obilor & Amadi, 2018:15). If the two variables have a positive straight-line relationship, r will be positive and significantly higher than 0. If the linear relationship is in the negative direction, meaning that increases in one variable cause a decrease in the other, then r 0 is used. The possible r-values range between -1 and +1, with values close to 0 indicating no link between the two variables (Gingrich, 2004:800). When two variables have a strong positive or negative correlation, it is often assumed that they are causally linked (Gingrich, 2004:813). The rule of thumb for interpreting correlation is as follows: 0.00–0.10 indicate a negligible correlation, 0.10–0.29 a weak or small correlation, 0.30–0.49 a moderate or medium correlation and anything above 0.50 a large or strong correlation (Eiselen & Uys, 2018:80). The conventional level of significance of p-value = 0.05 is used to confirm significance, just as it is for other statistical tests (Coolidge, 2020:226). The next section discusses the empirical results and analysis of the quantitative data.

5.3 EMPIRICAL RESULTS AND ANALYSIS OF QUANTITATIVE DATA

This section presents the results of the survey that was conducted with women in technical mining positions. Firstly, the biographical information is presented, followed by the results of the factor analyses of attraction, engagement and retention. Thereafter, the results of the independent sample t-tests, ANOVA and the Pearson product-moment correlation are presented and discussed.

5.3.1 Biographical information

This section contains the sample's biographical information. This covers the province in which the respondents were employed, the subsectors in which their organisations fell, their occupation, age, highest qualification, marital status and whether or not they had children. The duration of the respondents' employment in their current positions, organisation and mining, in general, was also included in the biographical information. The respondents were also asked to specify where they worked in mining (underground, on the surface, or both), whether they were expected to work night shifts, and whether they were members of any work committees in their organisation. Reasons for selecting a career in mining were also explored. Tables, figures and a pie-chart are used to present this information.

The structured questionnaire was completed by 282 women in technical mining positions. While 282 respondents completed the questionnaire, some respondents did not complete all

sections. Because the majority of the questionnaires were self-completed, the reasons for these incompletions could not be determined. These questionnaires were not disregarded entirely. Only sections that were satisfactory and contained valuable and useful information were retained. As a result, the quantity of responses varies between questions. Table 5.2 presents the results of some of the above-mentioned biographical information.

Table 5.2: Biographical information

Biographical information			
Item	**Category**	**N**	**%**
In which province are you currently employed?	Free State	4	1.4
	Gauteng	51	18.1
	KwaZulu-Natal	6	2.1
	Limpopo	29	10.3
	Mpumalanga	46	16.3
	North West	109	38.7
	Northern Cape	29	10.3
	Western Cape	4	1.4
In which of the following mining subsectors does the organisation for which you are currently working fall?	Cement, lime, aggregates and sand	6	2.1
	Coal mining	49	17.4
	Diamond mining	13	4.6
	Diamond processing	1	0.4
	Gold mining	23	8.2
	Jewellery manufacturing	2	0.7
	Other mining (includes the mining of iron ore, chrome, manganese, copper, phosphates and salt)	65	2.0
	Platinum group metals (PGM) mining	119	42.2
What is your age?	20–29	91	32.3
	30–39	127	45.0
	40–49	47	16.7
	50–59	14	5.0
	60 and older	1	0.4
What is your highest qualification?	No schooling	3	1.1

Biographical information			
Item	**Category**	**N**	**%**
	Less than high (secondary) school	1	0.4
	Completed some high (secondary) school	4	1.4
	Standard 10 / Grade 12, NATED 3 / NCV Level 3	48	17.0
	National / Higher Certificate	16	5.7
	Advanced Certificate	8	2.8
	Diploma	25	8.9
	Advanced diploma	46	16.3
	Bachelor's degree	32	11.3
	Honour's degree	59	20.9
	Master's degree	32	11.3
	Doctoral degree and/or postdoctoral degree	2	0.7
How long have you been in your present position?	Less than a year	43	15.2
	1–3 years	125	44.3
	4–6 years	41	14.5
	7–9 years	31	11.0
	10 years or more	37	13.1
How long have you worked for this organisation?	Less than a year	32	11.3
	1–3 years	86	30.5
	4–6 years	61	21.6
	7–9 years	28	9.9
	10 years or more	55	19.5
How long have you worked in the mining industry?	Less than a year	32	11.3
	1–3 years	86	30.5
	4–6 years	61	21.6
	7–9 years	28	9.9
	10 years or more	55	19.5
Where do you work at the mine?	Underground	54	19.1
	On the surface	154	54.6

Biographical information			
Item	**Category**	**N**	**%**
	Underground and on the surface	69	24.5
Are you required to work night shifts?	No	197	69.9
	Yes	84	29.8
What is your marital status?	Married	87	30.9
	Cohabiting/Living together	31	11.0
	Single	145	51.4
	Separated	18	6.4
Do you have children?	No	100	35.5
	Yes	181	64.2

5.3.1.1 Province currently employed

The respondents came from eight provinces of South Africa, namely the Free State, Gauteng, KwaZulu-Natal, Limpopo, Mpumalanga, North West, the Northern Cape and the Western Cape. The majority (38.7%; N = 109) of respondents were from the North West province. The Free State and Western Cape both had the least number of respondents (1.4%; N = 4) equally.

5.3.1.2 Organisation's mining subsectors

The subsectors represented were coal mining; gold mining; PGM; other mining (includes the mining of iron ore, chrome, manganese, copper, phosphates and salt); cement, lime, aggregates and sand; diamond processing; and jewellery manufacturing. PGM mining had the highest representation (42.2%; N = 119), with diamond processing having only one respondent (0.4%).

5.3.1.3 Age

The majority of respondents (45%; N = 127) fell between the age group of 30–39, followed by those in the 20–29 age group (32.3%; N = 91). Older respondents were underrepresented, with only one respondent (0.4%) reporting being 60 and older and 14 (5%) reporting to have been in the age group 50–59 years.

5.3.1.4 Highest qualification

Only a few respondents (1.1%; N = 3) stated that they had not attended school. Post-standard 10 made up 78% (N = 220) of the sample of those who had qualifications. Most of this cohort had an honour's degree (20.9%; N = 59) and an advanced diploma (16.3%; N = 46).

5.3.1.5 Marital status and existence of children

Just over half (51.4%; N = 145) of the respondents indicated that they were single. The majority (64.2%; N = 181) stated had children.

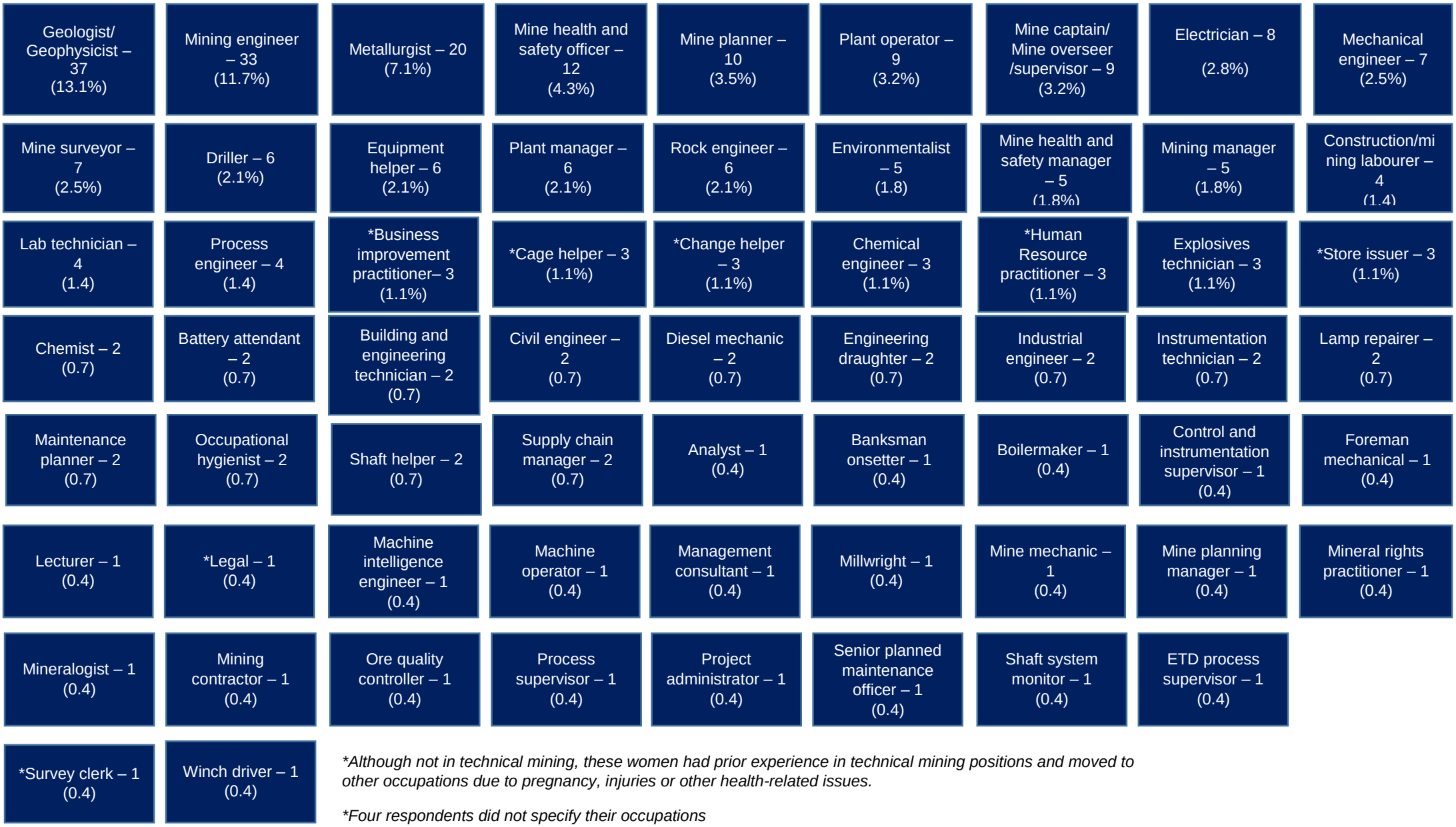
5.3.1.6 Duration of employment in the present position, organisation and mining industry

The majority of respondents (44.4%; N = 125) had been in their present positions for one to three years, and an equal proportion (30.5%; N = 86) had been employed in their organisation and the mining industry for the past one to three years.

5.3.1.7 Place of work in the mine and work shifts

The majority of respondents (54.6%; N = 154) stated that they worked on the surface and were not required to work night shifts (69.9%; N = 197).

Figure 5.1 depicts the respondents' occupations in a proportional descending order. The results are reported in the subsection below. It is evident that the respondents were employed in a wide range of occupations (64 occupations), with geologist or geophysicist (13.1%; N = 37) and mining engineer (11.7%; N = 33) being the majority. The vast majority of these occupations were core mining (technical) occupations. It should be noted that some of the respondents were not employed in technical positions, but were included in the sample, as it was raised that they had prior experience in technical occupations but were moved to less technical positions due to reasons such as pregnancy, injuries or other health-related issues. Figures 5.2 and 5.3 illustrate the respondents' involvement in organisational committees and the names of such committees, respectively.



**Although not in technical mining, these women had prior experience in technical mining positions and moved to other occupations due to pregnancy, injuries or other health-related issues.*

**Four respondents did not specify their occupations*

Figure 5.1: Current occupation

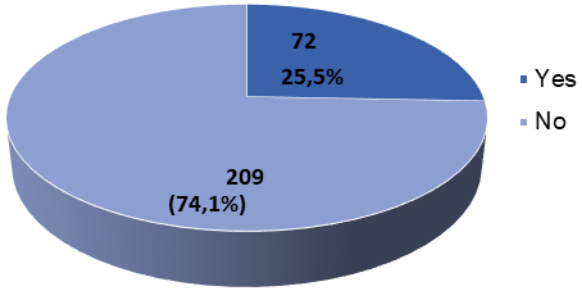


Figure 5.2: Involvement in a work committee

Women in Mining South Africa – 30 (43.5%)	Skills development committee - 6 (8.7%)	Employment Equity committee - 4 (5.7%)	Safety, Health, Environment and Quality committee - 4 (5.7%)	Women in Processing committee - 3 (4.3%)	Transformation and skills development committee - 3 (4.3%)	National Union of Mineworkers- 2 (2.9%)	BKJBK committee - 1 (1.4%)	Board - 1 (1.4%)
BW Mining forum - 1 (1.4%)	COVID committee - 1 (1.4%)	Gender-based violence committee - 1 (1.4%)	Gender, Diversity and Inclusive forum - 1 (1.4%)	Geological Society of South Africa - 1 (1.4%)	Housing committee - 1 (1.4%)	Mineralogical Association of South Africa - 1 (1.4%)	PIT mentoring committee - 1 (1.4%)	Southern African Institute of Mining and Metallurgy - 1 (1.4%)
South African Code for Reporting of Exploration Results, Mineral Resources and Mineral Reserves steering committee - 1 (1.4%)	Society of Economic Geologists- 1 (1.4%)	Social and Labour Plan committee- 1 (1.4%)	Solidarity in Women in Mining- 1 (1.4%)	Wits University Mining Engineers Association- 1 (1.4%)	Trade union (not specified)- 1 (1.4%)			

Figure 5.3: Name of the committees involved in

Figure 5.2 revealed that a quarter of the respondents (25.5%; N = 72) were members of a work committee. From those respondents who indicated that they were involved in a work committee, 43.5% (N = 30) revealed that they were part of the WiMSA Committee, as shown in Figure 5.3.

5.3.1.8 Primary reasons for selecting a career in mining

The respondents were asked about the primary reason they selected a career in mining. Table 5.3 presents the results.

Table 5.3: Reason for selecting a career in mining

Please provide the PRIMARY reason why you have selected a career in mining		
Item	**N**	**%**
Exciting work environment	52	18.4
Challenging industry	48	17.0
Unemployment	41	14.5
Bursary	34	12.1
Competitive pay and benefits	26	9.2
Opportunities for advancement	24	8.5
Difficult to get another job	19	6.7
Ability to apply skills	16	5.7
Job security	7	2.5
International work opportunities	3	1.1
No opinion	2	0.7
Challenge my ability to excel in a male-dominant environment	2	0.7
Close to home	1	0.4
Completely by mistake	1	0.4
Geology was considered a scarce skill, so I was hoping for employment.	1	0.4
I developed interest after I heard about it at a career exhibition.	1	0.4
I liked the name of the course when I was doing my university application in matric. I didn't even know what they do at that time.	1	0.4
I love the processes and love to solve challenges.	1	0.4

Please provide the PRIMARY reason why you have selected a career in mining		
Item	**N**	**%**
Opportunity for in-service training	1	0.4
It was the only work I could get at the time. I started as a survey assistant.	1	0.4

As listed in Table 5.3, there are different reasons why the respondents selected a career in mining. The most cited reasons were wanting to work in an exciting work environment (18.4%; N = 52), challenging industry (17%; N = 48), unemployment (14.5; N = 41) and having been awarded a bursary (12.1%; N = 34).

5.3.2 Descriptive statistics of attraction, engagement and retention

The descriptive statistics of attraction, engagement and retention are presented in Table 5.4. These are reported per question and statement based on the minimum and maximum value that the respondents could choose, as well as the mean and standard deviation. As previously stated, a five-point Likert scale was used to assign scores that represent the degree of importance, agreement, satisfaction, frequency and the likelihood of the statements presented. The mean value was measured against its position on the Likert scale. The closer the mean is to 5, the more positive the respondents' opinions; the closer to 1, the more negative the opinions of respondents; with 3 being a neutral point value.

Table 5.4: Descriptive statistics of attraction, engagement and retention

Descriptive statistics of attraction, engagement and retention						
No.	**Item**	**N**	**Minimum**	**Maximum**	**Mean**	**Std. deviation**
B2Q1	Working in an exciting environment	278	1	5	4.07	0.947
B2Q2	Innovative employer – new and forward-thinking work practices are continually introduced by the organisation	278	1	5	4.15	0.984
B2Q3	The organisation values and makes use of my creativity	279	1	5	4.25	0.937
B2Q4	The organisation produces high-quality products and services	276	1	5	4.25	0.918
B2Q5	The location of the workplace	277	1	5	3.62	1.221
B2Q6	A fun work environment	275	1	5	3.76	0.999
B2Q7	A happy work environment	276	1	5	4.24	0.942
B2Q8	Having a good relationship with my superiors	273	1	5	4.28	0.902

Descriptive statistics of attraction, engagement and retention						
No.	**Item**	**N**	**Minimum**	**Maximum**	**Mean**	**Std. deviation**
B2Q9	Having a good relationship with my colleagues	277	1	5	4.33	0.837
B2Q10	Supportive and encouraging colleagues	278	1	5	4.30	0.867
B2Q11	An environment that enables me to balance my work and home life easily	276	1	5	4.33	0.901
B2Q12	Acceptance and belonging	276	1	5	4.04	0.921
B2Q13	Good promotion opportunities within the organisation	277	1	5	4.32	0.994
B2Q14	Job security within the organisation	277	1	5	4.38	0.920
B2Q15	An above-average basic salary	276	1	5	4.25	0.949
B2Q16	An attractive overall compensation package, including benefits	275	1	5	4.34	0.891
B2Q17	Recognition/Appreciation from management	273	1	5	4.25	0.977
B2Q18	Feeling good about myself as a result of working for a particular organisation	276	1	5	4.16	0.930
B2Q19	Feeling more self-confident as a result of working for a particular organisation	275	1	5	4.13	0.960
B2Q20	Gaining career-enhancing experiences	275	1	5	4.44	0.823
B2Q21	A springboard for future employment	274	1	5	4.17	0.928
B2Q22	Humanitarian organisation – the organisation gives back to the community	276	1	5	4.05	0.962
B2Q23	Opportunity to apply what was learned, be it through previous training, short courses or at a tertiary institution	277	1	5	4.24	0.860
B2Q24	Opportunity to teach others what I have learned	276	1	5	4.12	0.942
B2Q25	Being hands-on (active participation) in other interdepartmental work (work outside my department)	277	1	5	4.06	0.944
C1Q1	At my work, I feel bursting with energy	277	1	5	3.60	1.190
C1Q2	I find the work that I do full of meaning and purpose	278	1	5	3.83	1.202
C1Q3	Time flies when I am working	278	1	5	3.98	1.204
C1Q4	At my job, I feel strong and vigorous (highly energetic)	277	1	5	3.65	1.181
C1Q5	I am enthusiastic about my job	276	1	5	3.91	1.159
C1Q6	When I am working, I forget everything else around me	277	1	5	3.50	1.259
C1Q7	My job inspires me	277	1	5	3.74	1.259
C1Q8	When I get up in the morning, I feel like going to work	276	1	5	3.36	1.295
C1Q9	I feel happy when I am working	276	1	5	3.67	1.186
C1Q10	I am proud of the work that I do	275	1	5	3.97	1.144
C1Q11	I am immersed (deeply involved) in my work	276	1	5	3.95	1.116

Descriptive statistics of attraction, engagement and retention						
No.	Item	N	Minimum	Maximum	Mean	Std. deviation
C1Q12	I can continue working for very long periods at a time	277	1	5	3.62	1.247
C1Q13	To me, my job is challenging	275	1	5	3.55	1.324
C1Q14	I get carried away when I am working	274	1	5	3.50	1.199
C1Q15	At my job, I am very resilient mentally	271	1	5	3.84	1.086
C1Q16	It is difficult to detach myself from my job	275	1	5	3.09	1.295
C1Q17	At my work, I always persevere, even when things do not go well	274	1	5	3.93	1.120
D1Q1	This organisation has a great deal of personal meaning for me	276	1	5	3.39	1.109
D1Q2	Right now, staying with my organisation is a matter of necessity	276	1	5	3.52	1.201
D1Q3	I owe a great deal to my organisation	276	1	5	3.18	1.141
D1Q4	It would be very hard for me to leave my organisation right now, even if I wanted to	275	1	5	3.12	1.323
D1Q5	I feel that I have too few options to consider leaving this organisation	276	1	5	3.09	1.276
D1Q6	I do not feel 'emotionally' attached to this organisation	276	1	5	3.19	1.251
D1Q7	I would feel guilty if I leave my organisation now	276	1	5	2.61	1.304
D1Q8	I really feel as if this organisation's problems are my own	276	1	5	2.72	1.179
D1Q9	One of the few negative consequences of leaving this organisation would be the scarcity of other job opportunities	275	1	5	3.57	1.249
D1Q10	I would be very happy to spend the rest of my career with this organisation	274	1	5	2.96	1.314
D1Q11	If I had not already put so much of myself into this organisation, I might consider working elsewhere	275	1	5	2.95	1.262
D2Q1	My benefits package	278	1	5	3.54	1.531
D2Q2	My current total salary package	278	1	5	3.56	1.547
D2Q3	Influence my supervisor has on my pay	278	1	5	3.05	1.269
D2Q4	The organisation's pay policies	275	1	5	3.29	1.453
D2Q5	How the organisation administers pay	275	1	5	3.63	1.455
D2Q6	How my raises are determined	277	1	5	2.98	1.433
D3Q1	The job requires me to use a number of complex or high-level skills	273	1	5	3.68	1.117
D3Q2	The job denies me any chance to use my personal initiative or judgement in carrying out the work	274	1	5	2.52	1.113
D3Q3	The job is quite simple and repetitive	275	1	5	3.01	1.199
D3Q4	The job gives me considerable opportunity for independence and freedom in how I do the work	274	1	5	3.54	1.031
D3Q5	There are enough career development opportunities for me in this organisation	273	1	5	2.98	1.361
D3Q6	I can apply the training I receive in this organisation	277	1	5	3.60	1.081
D3Q7	Sufficient money is allocated for product and solution training	272	1	5	3.06	1.150
D3Q8	My chances for being promoted are good	274	1	5	2.84	1.272
D3Q9	It would be easy to find a job in another department	275	1	5	2.75	1.223
D3Q10	An employee who applies for another job at this organisation has a better chance of getting that job than someone from outside this organisation who applies for the job	272	1	5	3.24	1.211

Descriptive statistics of attraction, engagement and retention						
No.	**Item**	**N**	**Minimum**	**Maximum**	**Mean**	**Std. deviation**
D3Q11	My supervisor looks for opportunities to praise positive employee performance, both privately and in front of others	274	1	5	3.12	1.237
D3Q12	I feel undervalued by my supervisor	272	1	5	2.68	1.288
D3Q13	My supervisor rewards a good idea by implementing it and giving the responsible employee(s) credit	273	1	5	3.14	1.175
D4Q1	I often feel like there is too much work to do	274	1	5	3.32	1.102
D4Q2	My work schedule is often in conflict with my personal life	274	1	5	2.88	1.146
D4Q3	My job affects my role as a spouse and/or a parent	275	1	5	2.82	1.179
D4Q4	My job has negative effects on my personal life	273	1	5	2.70	1.124
D5Q1	How would you rate your chances of still working at this organisation a year from now?	276	1	5	3.62	1.252
D5Q2	Do you intend to leave this organisation voluntarily in the near future?	275	1	5	3.06	1.260
D5Q3	What are your plans for staying with this organisation?	273	1	5	3.19	1.173
D6Q1	An above-average basic salary	278	1	5	4.05	0.935
D6Q2	An attractive overall compensation package, including benefits	278	1	5	4.21	0.910
D6Q3	Career development opportunities	275	1	5	4.48	0.897
D6Q4	Working in work locations close to home	275	1	5	3.76	1.178
D6Q5	Working in a gender-balanced environment	275	1	5	4.05	1.098
D6Q6	Working in an environment that prioritises my health and safety	275	1	5	4.59	0.731
D6Q7	The provision of adequate personal protective equipment	275	1	5	4.51	0.775
D6Q8	Having appropriate ablution facilities	276	1	5	4.36	0.830
D6Q9	A work environment free from gender discrimination	275	1	5	4.56	0.862
D6Q10	Having supportive management	274	1	5	4.53	0.826
D6Q11	Having supportive colleagues	277	1	5	4.42	0.806
D7	On a scale of 0 to 10, where 0 is 'not recommend at all' and 10 is 'highly recommend', how would you recommend a job in the mining industry to WOMEN who are looking for employment?	274	0	10	7.46	2.495

	Employee attraction		**Employee engagement**		**Employee retention**		**Attraction, engagement and retention of women in technical mining positions**

Table 5.4 above shows the descriptive statistics for items related to the attraction (BQ1–BQ25), engagement (C1Q1–C1Q17) and retention (D1Q1–D5Q3) scales. Descriptive statistics are also provided on items related to the attraction, engagement and retention of women in technical mining positions scale (D6Q1–D6Q11).

The Likert scale used for the EmpAt scale ranged from 1 (Not at all important) to 5 (Extremely important). The mean scores for items related to attraction derived from the EmpAt scale were all greater than 3.6, leaning towards the positive side of the scale, indicating that, on average, all of the items included in the scale were deemed important by the respondents when considering a potential employer. The standard deviation ranged between 0.999 (A fun work environment) and 1.221 (The location of the workplace). None of the items are outliers, indicating their importance in attracting potential employees.

The UWES was used to measure employee engagement, with items C1Q1, C1Q4, C1Q8, C1Q12, C1Q15 and C1Q17 measuring vigour; items C1Q2, C1Q5, C1Q7, C1Q10 and C1Q13 measuring dedication; and items C1Q3, C1Q6, C1Q9, C1Q11, C1Q14 and C1Q16 measuring absorption. The Likert scale used ranged from 1 (Almost never or a few times a year or less) to 5 (Very often or a few times a week). All the means were above 3.5, leaning towards the positive side of the scale, except for items C1Q16 (It is difficult to detach myself from my job) and C1Q8 (When I get up in the morning, I feel like going to work), which had mean scores of 3.09 and 3.36, respectively. The standard deviation of all items in the scale ranged between 1.086 (At my job, I am very resilient mentally) and 1.324 (To me, my job is challenging). None of the items can be classified as outliers. This indicates that the respondents were generally engaged in their work, although there is room for improvement.

The RFS was used to measure attraction, with items D1Q1–D1Q11 measuring organisational commitment; D3Q1–D3Q13 measuring job characteristics, training, career development as well as views regarding supervisors; and D4Q1–D4Q4 measuring work-life balance. All three scales used a Likert scale ranging from 1 (Strongly disagree) to 5 (Strongly agree). D2Q1–D2Q6 measured aspects of compensation. The Likert scale used ranged from 1 (Very dissatisfied) to 5 (Very satisfied). D5Q1–D5Q3 measured the likelihood of the respondents staying or leaving their organisation. The scale comprised three questions. D5Q1 had a Likert scale that ranged from 1 **(**Not likely at all) to 5 (Very likely), D5Q2's Likert scaled ranged from 1 (Will definitely leave) to 5 (Definitely will not leave) and D5Q3's ranged from 1 (I intend to leave as soon as possible) to 5 (I intend to stay until I retire). The means of the organisational commitment items had varying scores, but were mostly in the 3 (Neutral) range. Items D1Q9 (One of the few negative consequences of leaving this organisation would be the scarcity of other job opportunities) and D1Q2 (Right now, staying with my organisation is a matter of necessity) had the highest mean scores (M = 3.57; M = 3.52), indicating that, on average, the respondents stayed in their organisations due to a scarcity of job opportunities and as a matter of necessity. D1Q1 (This organisation has a great deal of personal meaning for me) showed a neutral stance towards positive sentiment regarding organisational commitment, while the remaining items (D1Q6, D1Q3, D1Q4, D1Q5, D1Q10, D1Q11, D1Q8 and D1Q7) obtained

neutral values. The mean scores for job characteristics, training, career development and views regarding supervisors were mostly leaning towards 3 (neutral), i.e. items D3Q2, D3Q12, D3Q9, D3Q8, D3Q5, D3Q3, D3Q7, D3Q11, D3Q13 and D3Q10. The other three items (D3Q4, D3Q6 and D3Q1) leaned towards the positive side of the scale. This indicates that most respondents held a neutral view regarding their job characteristics, the availability of career development opportunities in their organisations and supervisorial support. The mean scores for work-life balance items ranged from 2.70 (D4Q4: My job has negative effects on my personal life) to 3.32 (D4Q1: I often feel like there is too much work to do). This demonstrates that, on average, the respondents had a neutral stance towards work-life balance issues in their organisations. The mean scores for aspects of compensation are leaning towards the positive side of the scale (D2Q1, D2Q2 and D2Q5); all were above 3.5, suggesting some positivity towards compensation provided by mining companies. The rest of the items (D2Q3, D2Q4 and D2Q6) obtained neutral (3) values. The final items measuring retention were those concerning the likelihood of the respondents staying or leaving their organisation (D5Q1–D5Q3). D5Q1 (How would you rate your chances of still working at this organisation a year from now?) obtained the highest mean score (M = 3.62), indicating that on average, the likelihood of the respondents still working at their organisation a year from the time of the study was quite likely. The lowest mean score (M = 3.06) was obtained for item D5Q2 (Do you intend to leave this organisation voluntarily in the near future?), indicating that the respondents were uncertain whether they would be leaving their organisation in the near future. The standard deviation of all items related to retention in the scale ranged between 1.031 (The job gives me considerable opportunity for independence and freedom in how I do the work) and 1.547 (My current total salary package). None of the items can be classified as outliers. This indicates that the respondents' viewpoints towards various retention aspects were generally "Neutral" to "Neutrally positive".

The Likert scale used for the self-developed scale to assess the overall attraction, engagement and retention of women in technical mining positions ranged from 1 (Not at all important) to 5 (Extremely important). The means of the self-developed scale all exceeded 4, which are in the "Important" range, edging closer to 5 or "Extremely important", with the exception of item D6Q4 (Working in work locations close to home), which had a mean score of 3.76, but still indicates importance. The highest mean scores were obtained for items D6Q9 (A work environment free from gender discrimination, M = 4.56) and D6Q6 (Working in an environment that prioritises my health and safety, M = 4.59). This suggests that on average, all the items presented were considered important for attracting, engaging and retaining women in technical mining positions. The standard deviation of all items in the scale ranged between

0.731 (Working in an environment that prioritises my health and safety) and 1.178 (Working in work locations close to home). None of the items can be classified as outliers.

The final question on the questionnaire sought to ascertain whether the respondents would recommend a mining job to female job-seekers. The average score was 7.46 out of 10, indicating a high recommendation for women to participate in the mining industry. The standard deviation was 2.495, indicating that the respondents did not differ enormously in their responses to the question, signifying that the majority of respondents had similar perceptions about recommending a mining job to female job-seekers.

All scales (the EmpAt, the UWES, the FRS and the self-developed scale) were reduced to the least number of interpretable factors necessary to explain the factors affecting attraction, engagement and retention, and those specifically related to the attraction, engagement and retention of women in technical mining positions using exploratory and CFA. The sections that follow detail the statistical results of these analyses.

5.3.3 Employee attraction

An adapted version of the EmpAt scale was used to determine factors associated with employee attraction (see Chapter 1, section 1.6.8.1). Therefore, EFA was conducted on the 25 Likert-type scale items measuring employee attraction. The KMO and Bartlett's test of sphericity are explained first, then the total variance, and finally the loaded factors. The results of the KMO and Bartlett's test of sphericity are presented in Table 5.5.

Table 5.5: KMO and Bartlett's test of sphericity (employee attraction)

KMO and Bartlett's test		
KMO measure of sampling adequacy		0.930
Bartlett's test of sphericity	Approx. chi-square	4714.515
	df	300
	Sig.	0.000

Before conducting the EFA, a measure of sampling adequacy was confirmed by the KMO measure of sampling adequacy and Bartlett's test of sphericity. The KMO measured 0.930, which is higher than the recommended threshold of 0.7. As previously stated, KMO values greater than 0.70 are desirable, while values less than 0.50 are regarded as unacceptable (Child, 2006; Hair *et al*., 2010; Kaiser, 1974). KMO values in the 0.90s are considered to be excellent by Kaiser (1974:35). In light of this, the study used this criterion throughout to determine the sample's adequacy. Furthermore, the p-value for Bartlett's test of sphericity was less than 0.05, indicating statistical significance. This signalled that the correlation between statements was sufficient for EFA (Field, 2009:652).

Table 5.6 presents the total variance explained, i.e. the number of significant factors (Hooper, 2012:13). PCA was used to extract the factors that had to be retained. This extraction method was used throughout the study.

Table 5.6: Total variance explained (employee attraction)

Component	Initial eigenvalues			Extraction sums of squared loadings			Rotation sums of squared loadings[a]
	Total	% of variance	Cumulative %	Total	% of variance	Cumulative %	Total
1	11.747	46.986	46.986	11.747	46.986	46.986	8.585
2	1.577	6.309	53.296	1.577	6.309	53.296	7.024
3	1.519	6.077	59.372	1.519	6.077	59.372	5.005
4	1.402	5.610	64.982	1.402	5.610	64.982	7.621
5	0.976	3.902	68.884				
6	0.891	3.565	72.449				
7	0.798	3.191	75.640				
8	0.703	2.812	78.452				
9	0.558	2.234	80.686				
10	0.542	2.170	82.855				
11	0.492	1.970	84.825				
12	0.466	1.864	86.690				
13	0.436	1.744	88.434				
14	0.369	1.477	89.910				
15	0.354	1.415	91.326				
16	0.330	1.321	92.646				
17	0.284	1.135	93.782				
18	0.267	1.069	94.851				
19	0.229	0.917	95.768				
20	0.211	0.845	96.613				
21	0.202	0.809	97.422				
22	0.185	0.739	98.162				
23	0.172	0.686	98.848				
24	0.149	0.596	99.443				
25	0.139	0.557	100.000				

Extraction method: PCA
a. When components are correlated, sums of squared loadings cannot be added to obtain a total variance.

From Table 5.6 it is evident that a total of four factors were identified, with Factor 1 explaining 46.99% of the total variance, Factor 2 explaining 6.31%, Factor 3 explaining 6.08% and Factor 4 explaining 5.61% of the total variance. The pattern matrix shows all the rotated factor loadings and indicates the items that loaded onto the factors. The outcomes of the pattern matrix are presented in Table 5.7.

Table 5.7: Pattern matrix[a] (Employee attraction)

Employee attraction					
Question number	Item	Factor 1	Factor 2	Factor 3	Factor 4
		Application value and development value	Interest value	Economic value	Social value
B2Q24	Opportunity to teach others what I have learned	0.810			
B2Q23	Opportunity to apply what was learned, be it through previous training, short courses or at a tertiary institution	0.773			
B2Q25	Being hands-on (active participation) in other interdepartmental work (work outside my department)	0.722			
B2Q20	Gaining career-enhancing experiences	0.681			
B2Q19	Feeling more self-confident as a result of working for a particular organisation	0.643			
B2Q22	Humanitarian organisation – the organisation gives back to the community	0.589			
B2Q21	A springboard for future employment	0.571	0.264		
B2Q18	Feeling good about myself as a result of working for a particular organisation	0.523			-0.265
B2Q17	Recognition/Appreciation from management	0.452		0.301	
B2Q2	Innovative employer – new and forward-thinking work practices are continually introduced by the organisation		0.881		
B2Q3	The organisation values and makes use of my creativity		0.783		
B2Q1	Working in an exciting environment		0.776		
B2Q4	The organisation produces high-quality products and services		0.638	0.263	
B2Q16	An attractive overall compensation package, including benefits	0.320		0.706	
B2Q15	An above-average basic salary	0.349		0.663	
B2Q14	Job security within the organisation			0.630	
B2Q5	The location of the workplace	-0.341		0.607	
B2Q13	Good promotion opportunities within the organisation	0.334	0.351	0.441	

Employee attraction					
Question number	Item	Factor 1 Application value and development value	Factor 2 Interest value	Factor 3 Economic value	Factor 4 Social value
B2Q9	Having a good relationship with my colleagues				-0.877
B2Q10	Supportive and encouraging colleagues				-0.814
B2Q8	Having a good relationship with my superiors				-0.757
B2Q7	A happy work environment		0.408		-0.594
B2Q12	Acceptance and belonging				-0.563
B2Q6	A fun work environment		0.329		-0.420
B2Q11	An environment that enables me to balance my work and home life easily			0.360	-0.390
Cronbach's alpha		0.915	0.852	0.827	0.877
Factor mean		4.174	4.179	4.173	4.180
Factor standard deviation		0.723	0.793	0.789	0.719

Extraction method: PCA
a. Four components extracted

According to the pattern matrix (see Table 5.7), all of the statements loaded above 0.4 on the four identified factors. The commonly accepted factor loadings are those greater than 0.30 (Field, 2009:631). The higher the factor loading, the greater the contribution of the variable to the factor (Yong & Pearce, 2013:80–81). The factors and their loadings are discussed in greater detail below.

a) Factor 1: Application value and development value

Nine items loaded on the *Application value and development value* factor; the factor loadings ranged from 0.452 to 0.810. The following items were included in the factor:

- B2Q24: Opportunity to teach others what I have learned
- B2Q23: Opportunity to apply what was learned, be it through previous training, short courses or at a tertiary institution
- B2Q25: Being hands-on (active participation) in other interdepartmental work (work outside my department)

- B2Q20: Gaining career-enhancing experiences
- B2Q19: Feeling more self-confident as a result of working for a particular organisation
- B2Q22: Humanitarian organisation – the organisation gives back to the community
- B2Q21: A springboard for future employment
- B2Q18: Feeling good about myself as a result of working for a particular organisation
- B2Q17: Recognition/Appreciation from management.

All of the above-mentioned items are related to application value and development value. The factor's Cronbach's alpha was 0.915, which is well above the required 0.7 threshold value and demonstrates high reliability and internal consistency. The factor mean was calculated at 4.174, indicating that application value (the ability to apply what one has learned) and development value (the availability of platforms that provide recognition, self-worth and career advancement opportunities) are important in attracting women in technical mining positions. (The Likert scale used ranged from 1 [Not at all important] to 5 [Extremely important].)

b) Factor 2: Interest value

Four items loaded on the *Interest value* factor; the factor loadings ranged from 0.638 to 0.881. The following items were included in the factor:

- B2Q2: Innovative employer – new and forward-thinking work practices are continually introduced by the organisation
- B2Q3: The organisation values and makes use of my creativity
- B2Q: Working in an exciting environment
- B2Q4: The organisation produces high-quality products and services.

The above items are related to interest value, which involves an exciting work environment and unique work practices that make use of employees' creativity. The factor Cronbach's alpha was 0.852, which is higher than the required 0.7, thereby indicating good reliability and internal consistency. The factor mean was 4.179, indicating that interest value is important in attracting women to technical mining positions.

c) *Factor 3: Economic value*

Five items loaded on the *Economic value* factor and four items on the *Interest value* factor; the factor loadings ranged from 0.441 to 0.706. The following items were included in the factor: Economic value comprises a work environment that provides an above-average salary, a compensation package and job security. The items that loaded consisted of the following questions:

- B2Q16: An attractive overall compensation package, including benefits
- B2Q15: An above-average basic salary
- B2Q14: Job security within the organisation
- B2Q5: The location of the workplace
- B2Q13: Good promotion opportunities within the organisation.

The *Economic value* factor had good reliability and internal consistency, as its Cronbach's alpha was 0.827. The factor mean was 4.173, indicating that economic value is also important in women's attraction to technical mining positions.

d) Factor 4: Social value

Seven items loaded on the *Social value* factor and four items loaded on the *Interest value* factor; the factor loadings ranged from -0.390 to -0.877. Social value includes a work environment that is fun and happy with good collegial relationships and a team atmosphere. The following items were included in the factor:

- B2Q9: Having a good relationship with my colleagues
- B2Q10: Supportive and encouraging colleagues
- B2Q8: Having a good relationship with my superiors
- B2Q7: A happy work environment
- B2Q12: Acceptance and belonging
- B2Q6: A fun work environment
- B2Q11: An environment that enables me to balance my work and home life easily.

Similar to interest and economic value, social value demonstrated good reliability and internal consistency, with a Cronbach's alpha of 0.877. The factor mean was 4.180, indicating that social value is important in attracting women to technical mining positions.

From the mean scores, it is evident that application value and development value, interest value, economic value and social value are all important factors in attracting women to

technical positions in mining. The next session presents and discusses factors affecting employee engagement.

5.3.4 Employee engagement

The original UWES was used to examine employee engagement and is generally used in the South African context (Boikanyo, 2012; Bosman, 2005; Rathbone, 2006; Vosloo, 2015). The UWES consists of 17 Likert-type scale items: six measuring vigour, five measuring dedication and six measuring absorption. CFA was conducted to test the structure and relations between the latent variables that underlay the data.

The results for the measurement model with standardised regression weights and correlations are depicted in Figure 5.4. The CFA revealed that the UWES's three-factor structure fit the sample's data adequately.

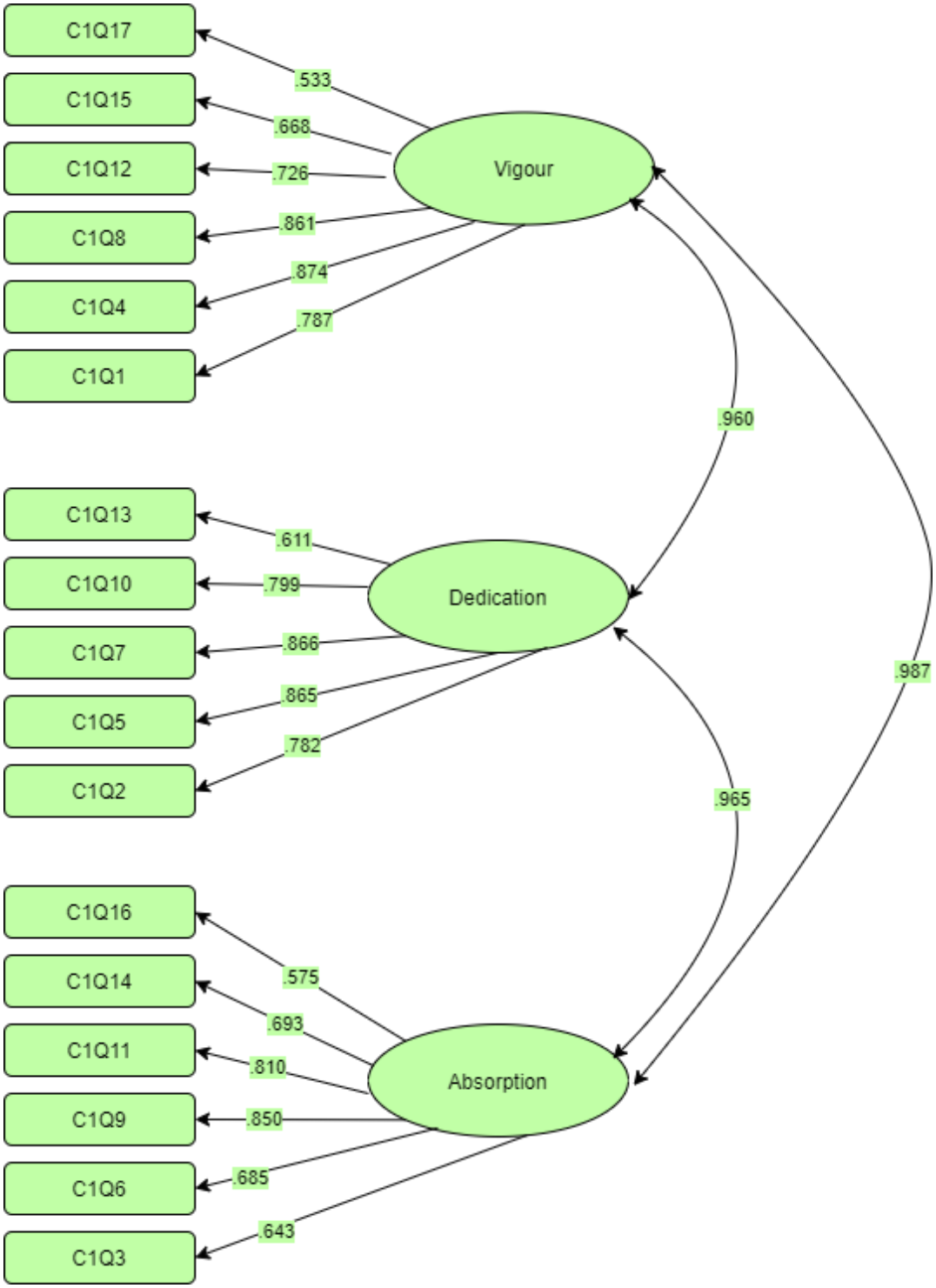


Figure 5.4: CFA results for the measurement model with standardised regression weights and correlations

The results depicted in Figure 5.4 satisfactorily support the measurement of vigour by six items, dedication by five items and absorption by six items. All factor loadings were statistically significant at the 0.05 level. The factor loadings for vigour ranged from 0.533 to 0.874, for dedication from 0.611 to 0.866 and for absorption from 0.575 to 0.850. A factor loading measures how much a variable contributes to a factor (Yong & Pearce, 2013:80–81). The commonly accepted factor loadings are those greater than 0.30 (Field, 2009:631). The higher the factor loading, the greater the contribution of the variable to the factor (Yong & Pearce, 2013:80–81). Table 5.8 shows the GFIs. The goodness-of-fit is a metric that measures how well a model fits the data that were generated (Field, 2009:786). The study used three GFIs, namely CMIN/DF, CFI and RMSEA.

Table 5.8: Goodness-of-model-fit indices

Index	Decision rule	Source	Model score	Outcome
CMIN/DF	Close to 1; 2–5 still satisfactory	Carmines and McIver (cited by Shadfar & Malekmohammadi, 2013:585–586)	3.610	Still satisfactory fit
CFI	≥ 0.9 (good fit)	Paswan (cited by Shadfar & Malekmohammadi, 2013:585)	0.910	Good fit
RMSEA	0.01 (excellent); 0.05 (good) 0.08 (mediocre)	Blunch (2008)	0.096 [0.087; 0.106]	Acceptable fit

As discussed in section 5.2.2, a model is considered fit if the CMIN/DF value is between 2 and 5, the CFI is larger than 0.9 and the RMSEA is less than or equal to 0.10 (Bakar, 2013:186; Blunch, 2008; Moshoeu, 2017:275; Portela, 2012:24; Shadfar & Malekmohammadi, 2013:585–586). The CMIN/DF of the study was 3.610, which is still satisfactory. The CFI was 0.910, indicating a good fit. The RMSEA value was 0.906 with a 90% confidence interval of 0.087 (low) and 0.106 (high), showing an acceptable fit. Therefore, all three of the GFIs showed an acceptable fit. The reliability statistics of employee engagement are shown in Table 5.9.

Table 5.9: Reliability statistics of employee engagement

Reliability statistics			
Factor	**Cronbach's alpha**	**Cronbach's alpha based on standardised Items**	**Number of items**
Vigour	0.865	0.881	6
Dedication	0.884	0.887	5
Absorption	0.858	0.860	6

The Cronbach's alpha values for vigour, dedication and absorption were 0.881, 0.887 and 0.860, respectively. Because Cronbach's alpha is greater than the recommended threshold of 0.70, this indicates good reliability and internal consistency (Child, 2006; Hair *et al*., 2010; Kaiser, 1974).

The descriptive statistics of employee engagement are presented in Table 5.10. Response categories consisted of the following: 1= almost never or a few times a year or less, 2 = rarely or once a month or less, 3 = sometimes or a few times a month, 4 = often or once a week and 5 = very often or a few times a week. The results are discussed below.

Table 5.10: Descriptive statistics of employee engagement

Descriptive statistics					
	N	**Minimum**	**Maximum**	**Mean**	**Std. deviation**
Vigour	278	1.00	5.00	3.6605	0.5091
Dedication	278	1.00	5.00	3.7935	1.01791
Absorption	278	1.00	5.00	3.6116	0.93487

All three factors obtained mean scores of more than 3.6. Dedication obtained the highest mean score (3.79), followed by vigour (3.66) and absorption (3.61). This indicates that the respondents showed relatively high levels of engagement (feelings of dedication, vigour and absorption); however, there is still room for improvement. The following section presents the results of the EFA of employee retention.

5.3.5 Employee retention

This section presents the results of the EFA of employee retention. An adapted version of the RFS was used to determine factors associated with employee retention (see Chapter 1, section 1.6.8.1). Therefore, EFA was conducted on the Likert-type scale items measuring organisational commitment; compensation and benefits; career development, training and job characteristics; work-life balance; and intention to stay (employee retention).

5.3.5.1 Organisational commitment

EFA was conducted on the 11 Likert-type scale items measuring organisational commitment. According to Döckel (2003:11), organisational commitment is one of the factors that contribute to retention and benefits the organisation in terms of improved job performance, intention to stay, attendance, loyalty, reduced turnover, increased creativity, increased collaboration (particularly across discipline specialities), increased volunteerism and time devoted to productive work. The results of the KMO and Bartlett's test of sphericity are presented in Table 5.11.

Table 5.11: KMO and Bartlett's test of sphericity (organisational commitment)

KMO and Bartlett's test		
KMO measure of sampling adequacy		0.850
Bartlett's test of sphericity	Approx. chi-square	872.136
	df	55
	Sig.	0.000

The KMO measured 0.850, indicating that the sample size was appropriate for EFA. The p-value of Bartlett's test of sphericity was 0.000, which is smaller than 0.05. This suggests that the correlation between statements was sufficient for factor analysis (Field, 2009:652). The total variance explained is presented in Table 5.12.

Table 5.12: Total variance explained (organisational commitment)

Component	Initial eigenvalues			Extraction sums of squared loadings			Rotation sums of squared loadings[a]
	Total	% of variance	Cumulative %	Total	% of variance	Cumulative %	Total
1	4.026	36.597	36.597	4.026	36.597	36.597	3.616
2	1.559	14.176	50.773	1.559	14.176	50.773	2.447
3	0.976	8.871	59.644				
4	0.844	7.671	67.315				
5	0.773	7.029	74.343				
6	0.595	5.408	79.751				
7	0.564	5.127	84.878				
8	0.520	4.728	89.606				
9	0.410	3.732	93.338				
10	0.380	3.451	96.789				
11	0.353	3.211	100.000				

Extraction method: PCA
a. When components are correlated, sums of squared loadings cannot be added to obtain a total variance.

Table 5.12 above presents the total variance explained, i.e. the number of significant factors (see Hooper, 2012:13). Two factors were retained; Factor 1 explained 36.60% and Factor 2 14.18% of the total variance. Only factors with an eigenvalue above 1 were retained. The results of the pattern matrix are reported in Table 5.13.

Table 5.13: Pattern matrix[a] (organisational commitment)

Employee retention: organisational commitment			
Question number	Item	Factor 1	Factor 2
		Affective commitment	Normative commitment
D1Q1	This organisation has a great deal of personal meaning for me	0.809	
D1Q10	I would be very happy to spend the rest of my career with this organisation	0.806	
D1Q3	I owe a great deal to my organisation	0.703	
D1Q8	I really feel as if this organisation's problems are my own	0.648	
D1Q7	I would feel guilty if I leave my organisation now	0.593	
D1Q4	It would be very hard for me to leave my organisation right now. even if I wanted to	0.565	0.401
D1Q6	I do not feel 'emotionally' attached to this organisation	-0.553*	0.493
D1Q5	I feel that I have too few options to consider leaving this organisation		0.665
D1Q9	One of the few negative consequences of leaving this		0.651

Employee retention: organisational commitment			
Question number	Item	Factor 1 Affective commitment	Factor 2 Normative commitment
	organisation would be the scarcity of other job opportunities		
D1Q11	If I had not already put so much of myself into this organisation, I might consider working elsewhere		0.588
D1Q2	Right now, staying with my organisation is a matter of necessity		0.562
Cronbach's alpha		0.806	0.619
Factor mean		3.093	3.326
Factor standard deviation		0.784	0.823

Extraction method: PCA
Rotation method: Oblimin with Kaiser normalisation
*Reverse wording was used for the statement and the statement was also reversed when reliability and factor scores were calculated.

According to the pattern matrix, all of the statements loaded above 0.4 on the four identified factors. The factors were extracted using PCA, and the rotation method oblimin with Kaiser normalisation was used. The results are discussed in greater depth below.

a) Affective commitment (emotional commitment)

Seven items loaded on the *Affective commitment* factor; the factor loadings ranged from -0.553 to 0.809. Affective commitment occurs when an individual is emotionally attached to his/her organisation to the point where he/she is strongly committed to it, involved and enjoy being a part of it (Allen & Meyer, 1990:2). The following items were included in the factor:

- D1Q1: This organisation has a great deal of personal meaning for me
- D1Q10: I would be very happy to spend the rest of my career with this organisation
- D1Q3: I owe a great deal to my organisation
- D1Q8: I really feel as if this organisation's problems are my own
- D1Q7: I would feel guilty if I leave my organisation now
- D1Q4: It would be very hard for me to leave my organisation right now, even if I wanted to
- D1Q6: I do not feel 'emotionally' attached to this organisation.

The factor Cronbach's alpha measured 0.806, indicating good reliability and internal consistency. The factor mean was calculated at 3.093, suggesting that on average, women were neutral regarding their emotional commitment to their organisations. (The Likert scale used ranged from 1 [Strongly disagree] to 5 [Strongly agree].)

b) Normative commitment (obligation commitment)

Four items loaded on the *Normative commitment* factor; the factor loadings ranged from 0.562 to 0.665. Normative commitment refers to an individual's belief in his/her responsibility to the organisation, i.e. the perceived obligation to remain in the organisation (Allen & Meyer, 1990:3; Meyer *et al.*, 2002:21). The factor comprising the following items:

- D1Q5: I feel that I have too few options to consider leaving this organisation
- D1Q9: One of the few negative consequences of leaving this organisation would be the scarcity of other job opportunities
- D1Q11: If I had not already put so much of myself into this organisation, I might consider working elsewhere
- D1Q2: Right now, staying with my organisation is a matter of necessity.

The Cronbach's alpha measured 0.619, suggesting moderate reliability and internal consistency. Clark and Watson (1995:8) suggest that the inter-item correlations should measure between 0.15 and 0.55 to be considered as an indicator for an acceptable level of consistency. The mean inter-item correlation for *Normative commitment* measured 0.289, indicating an acceptable level of consistency. The factor mean measured 3.326, indicating that the respondents' responses regarding normative commitment were generally towards positive. (The Likert scale used ranged from 1 [Strongly disagree] to 5 [Strongly agree].)

5.3.5.2 Compensation and benefits

EFA was conducted on the six Likert-type scale items measuring compensation and benefits. The results of the KMO and Bartlett's test of sphericity are presented in Table 5.14.

Table 5.14: KMO and Bartlett's test of sphericity (compensation and benefits)

KMO and Bartlett's test		
KMO measure of sampling adequacy		0.868
Bartlett's test of sphericity	Approx. chi-square	817.755
	df	15
	Sig.	0.000

The KMO measured 0.868, indicating that the sample size was appropriate for EFA. The p-value of Bartlett's test of sphericity was less than 0.05, indicating significance. This suggests that the correlation between statements was sufficient for factor analysis (see Field, 2009:652). The total variance explained is presented in Table 5.15.

Table 5.15: Total variance explained (compensation and benefits)

Component	Initial eigenvalues			Extraction sums of squared loadings		
	Total	% of variance	Cumulative %	Total	% of variance	Cumulative %
1	3.811	63.519	63.519	3.811	63.519	63.519
2	0.582	9.697	73.216			
3	0.560	9.326	82.542			
4	0.452	7.527	90.069			
5	0.355	5.914	95.982			
6	0.241	4.018	100.000			

Extraction method: PCA

Table 5.15 shows that only one factor had an eigenvalue greater than one. As a result, one factor was retained, accounting for 63.52% of the total variance. Table 5.16 presents the component matrix of *Compensation and benefits*.

Table 5.16: Component matrix[a]

Employee retention: compensation and benefits		
Question number	Item	Factor 1
		Compensation and benefits
D2Q4	The organisation's pay policies	0.831
D2Q1	My benefits package	0.825
D2Q2	My current total salary package	0.822
D2Q5	How the organisation administers pay	0.806
D2Q6	How my raises are determined	0.763
D2Q3	Influence my supervisor has on my pay	0.730
Cronbach's alpha		0.885
Factor mean		3.338
Factor standard deviation		1.164

Extraction method: PCA

Four items loaded on the *Compensation and benefits* factor; the factor loadings ranged from 0.730 to 0.831. The following items were included in the factor:

- D2Q4: The organisation's pay policies
- D2Q1: My benefits package
- D2Q2: My current total salary package
- D2Q5: How the organisation administers pay
- D2Q6: How my raises are determined

- D2Q3: Influence my supervisor has on my pay.

The factor obtained a Cronbach's alpha of 0.885, indicating good reliability and internal consistency. The mean score was computed at 3.338, indicating that on average, the respondents' sentiments regarding their compensation and benefits were leaning towards positive. (The Likert scale used ranged from 1 [Very dissatisfied] to 5 [Very satisfied].)

5.3.5.3 Career development, training and job characteristics

EFA was conducted on the 13 Likert-type scale items measuring *Career development, training and job characteristics*. The results of the KMO and Bartlett's test of sphericity are presented in Table 5.17.

Table 5.17: KMO and Bartlett's test of sphericity (career development, training and job characteristics)

KMO and Bartlett's test		
KMO measure of sampling adequacy		0.860
Bartlett's test of sphericity	Approx. chi-square	1288.979
	df	78
	Sig.	0.000

The KMO measured 0.860, indicating that the sample size was sufficient for EFA, as it exceeded the recommended threshold of 0.7. The p-value for Bartlett's test of sphericity was 0.000, indicating significance. This implies that the correlation between statements was adequate for factor analysis (see Field, 2009:652). Table 5.18 summarises the total variance explained.

Table 5.18: Total variance explained

Component	Initial eigenvalues			Extraction sums of squared loadings			Rotation sums of squared loadings[a]
	Total	% of variance	Cumulative %	Total	% of variance	Cumulative %	Total
1	4.934	37.952	37.952	4.934	37.952	37.952	4,849
2	1.675	12.883	50.835	1.675	12.883	50.835	2.170
3	1.069	8.222	59.057				
4	0.859	6.610	65.666				
5	0.779	5.991	71.657				
6	0.698	5.368	77.025				
7	0.651	5.011	82.037				

8	0.515	3.960	85.997				
9	0.493	3.794	89.791				
10	0.426	3.273	93.064				
11	0.350	2.689	95.753				
12	0.332	2.555	98.307				
13	0.220	1.693	100.000				

Extraction method: PCA

Table 5.18 shows that two factors were retained, with Factor 1 explaining 37.95% and Factor 2 12.88% of the total variance. Table 5.19 presents the pattern matrix of *Career development, training and job characteristics*.

Table 5.19: Pattern matrix[a] (career development, training and job characteristics)

Employee retention: career development and training and job characteristics			
Question number	**Item**	**Factor 1**	**Factor 2**
		Career development and training	**Job characteristics**
D3Q5	There are enough career development opportunities for me in this organisation	0.855	
D3Q8	My chances for being promoted are good	0.809	
D3Q7	Sufficient money is allocated for product and solution training	0.762	
D3Q9	It would be easy to find a job in another department	0.723	
D3Q11	My supervisor looks for opportunities to praise positive employee performance, both privately and in front of others	0.694	
D3Q13	My supervisor rewards a good idea by implementing it and giving the responsible employee(s) credit	0.688	
D3Q6	I can apply the training I receive in this organisation	0.669	
D3Q10	An employee who applies for another job at this organisation has a better chance of getting that job than someone from outside this organisation who applies for the job	0.640	
D3Q4	The job gives me considerable opportunity for independence and freedom in how I do the work	0.545	
D3Q3	The job is quite simple and repetitive		0.825
D3Q2	The job denies me any chance to use my personal initiative or judgement in carrying out the work		0.679
D3Q1	The job requires me to use a number of complex or high-level skills		-0.612
D3Q12	I feel undervalued by my supervisor		0.497
Cronbach's alpha		0.882	0.591
Factor mean		3.142	3.379
Factor standard deviation		0.886	0.851

Extraction method: PCA

Of the two identified factors, all of the statements loaded higher than 0.4. These are discussed further below.

a) Career development and training

Nine items loaded on the *Career development and training* factor; the factor loadings ranged from 0.545 to 0.855. The following items were included in the factor:

- D3Q5: There are enough career development opportunities for me in this organisation
- D3Q8: My chances for being promoted are good
- D3Q7: Sufficient money is allocated for product and solution training
- D3Q9: It would be easy to find a job in another department
- D3Q11: My supervisor looks for opportunities to praise positive employee performance, both privately and in front of others
- D3Q13: My supervisor rewards a good idea by implementing it and giving the responsible employee(s) credit
- D3Q6: I can apply the training I receive in this organisation
- D3Q10: An employee who applies for another job at this organisation has a better chance of getting that job than someone from outside this organisation who applies for the job
- D3Q4: The job gives me considerable opportunity for independence and freedom in how I do the work.

The factor obtained a Cronbach's alpha factor of 0.882, which is greater than the required 0.7 and indicates high reliability and internal consistency. The factor mean was calculated at 3.142, indicating a neutral stance (3) towards positive sentiment towards mining companies' efforts in providing training and development opportunities for women in technical mining positions. (The Likert scale used ranged from 1 [Strongly disagree] to 5 [Strongly agree].)

b) Job characteristics

Four items loaded on the *Job characteristics* factor; the factor loadings ranged from 0.497 to 0.825. The following items were included in the factor:

- D3Q3: The job is quite simple and repetitive
- D3Q2: The job denies me any chance to use my personal initiative or judgement in carrying out the work
- D3Q1: The job requires me to use a number of complex or high-level skills
- D3Q12: I feel undervalued by my supervisor.

The factor obtained a Cronbach's alpha factor of 0.591, indicating moderate reliability and internal consistency. The mean inter-item correlation for *Job characteristics* measured 0.269, which is sufficient according to Clark and Watson (1995:8). The factor mean was calculated to be 3.379, indicating a positive sentiment towards the characteristics/nature of their job. (The Likert scale used ranged from 1 [Strongly disagree] to 5 [Strongly agree].)

5.3.5.4 Work-life balance

EFA was conducted on the four Likert-type scale items measuring *Work-life balance*. Table 5.20 displays the results of the KMO and Bartlett's test of sphericity.

Table 5.20: KMO and Bartlett's test of sphericity (work-life balance)

KMO and Bartlett's test		
KMO measure of sampling adequacy		0.791
Bartlett's test of sphericity	Approx. chi-square	513.057
	df	6
	Sig.	0.000

The KMO measured 0.791, well within the recommended threshold of 0.7. The p-value for Bartlett's test of sphericity was 0.000, indicating that it was statistically significant. This implies that the correlation between statements was strong enough to support factor analysis (see Field, 2009:652). The total variance explained is summarised in Table 5.21.

Table 5.21: Total variance explained (work-life balance)

Component	Initial eigenvalues			Extraction sums of squared loadings		
	Total	% of variance	Cumulative %	Total	% of variance	Cumulative %
1	2.785	69.621	69.621	2.785	69.621	69.621
2	0.610	15.254	84.875			
3	0.363	9.064	93.939			
4	0.242	6.061	100.000			

Extraction method: PCA

Table 5.21 indicates that only one factor had an eigenvalue greater than one and was therefore retained. This factor accounted for 69.62% of the total variance. Table 5.22 presents the component matrix of *Work-life balance*.

Table 5.22: Component matrix[a] (work-life balance)

Employee retention: work-life balance		
Question number	**Item**	**Factor 1**
		Work-life balance
D4Q3	My job affects my role as a spouse and/or a parent	0.894
D4Q4	My job has negative effects on my personal life	0.857
D4Q2	My work schedule is often in conflict with my personal life	0.856
D4Q1	I often feel like there is too much work to do	0.720
Cronbach's alpha		0.853
Factor mean		2.925
Factor standard deviation		0.953

Extraction method: PCA
a. One component extracted

Four items loaded on the *Work-life balance* factor; the factor loadings ranged from 0.720 to 0.894. The factor comprised the following items:

- D4Q3: My job affects my role as a spouse and or a parent
- D4Q4: My job has negative effects on my personal life
- D4Q2: My work schedule is often in conflict with my personal life
- D4Q1: I often feel like there is too much work to do.

The factors showed high reliability and internal consistency, as the Cronbach's alpha yielded a value of 0.853. The factor mean was calculated to be 2.925. This indicates that there was a negative inclination towards the respondents' experience of work-life balance. (The Likert scale used ranged from 1 [Strongly disagree] to 5 [Strongly agree].)

5.3.5.5 Intention to stay

EFA was conducted on the three Likert-type scale items measuring *Intention to stay*. Table 5.23 demonstrates the results of the KMO and Bartlett's test of sphericity.

Table 5.23: KMO and Bartlett's test of sphericity (intention to stay)

KMO and Bartlett's test		
KMO measure of sampling adequacy		0.699
Bartlett's test of sphericity	Approx. chi-square	320.631
	df	3
	Sig.	0.000

Table 5.23 shows that the KMO was 0.699, which is acceptable, as it equals the 0.7 threshold when rounded off. The appropriateness of the factor analysis was supported by the significance of the Bartlett's test of sphericity, which had a p-value less than 0.05. Table 5.24 presents the total variance explained.

Table 5.24: Total variance explained (intention to stay)

Component	Initial eigenvalues			Extraction sums of squared loadings		
	Total	% of variance	Cumulative %	Total	% of variance	Cumulative %
1	2.237	74.557	74.557	2.237	74.557	74.557
2	0.478	15.919	90.476			
3	0.286	9.524	100.000			

Extraction method: PCA

Table 5.24 indicates that only one factor was retained, explaining 74.56% of the total variance. Table 5.25 presents the component matrix of *Intention to stay*.

Table 5.25: Component matrix[a]

Employee retention: intention to stay		
Question number	Item	Factor 1
		Intention to stay
D5Q2	Do you intend to leave this organisation voluntarily in the near future?*	0.896
D5Q3	What are your plans for staying with this organisation?	0.875
D5Q1	How would you rate your chances of still working at this organisation a year from now?	0.818
Cronbach's alpha		0.827
Factor mean		3.290
Factor standard deviation		1.062

Extraction method: PCA

a. One component extracted

* Reverse wording was used for the question and the question was also reversed when reliability and factor scores were calculated

Three items loaded on the *Intention to stay* factor; the factor loadings ranged from 0.818 to 0.896. The factor comprised the following items:

D5Q2: Do you intend to leave this organisation voluntarily in the near future?

D5Q3: What are your plans for staying with this organisation?

D5Q1: How would you rate your chances of still working at this organisation a year from now?

The Cronbach's alpha reliability coefficient for the factor was 0.827, indicating good reliability and internal consistency. The factor mean was 3.290. This indicates that the respondents' position regarding their intention to stay leaned towards the positive and they would only consider leaving their organisations if something considerably better turns up. (The Likert scale used ranged from 1 [Not likely at all/Will definitely leave/I intend to leave as soon as possible] to 5 [Very likely/Definitely will not leave/I intend to stay until I retire].)

Based on the range of mean scores (M = 2.925 to M = 3.379) presented and discussed in the tables above, it seems that there may be a link between employee retention and aspects of organisational commitment, compensation and benefits, career development and training and job characteristics, work-life balance and intention to stay, as approximately two-thirds of the respondents responded positively to the items of the employee retention factors. The relationship between these factors is examined in section 5.3.8. The next section presents the results of factors influencing the attraction, engagement and retention of women in technical mining positions.

5.3.6 Factors influencing the attraction, engagement and retention of women in technical mining

As previously mentioned, in addition to the existing scales that were used to assess attraction, engagement and retention, the researcher developed her own scale based on the literature discussed in Chapter 3 to ascertain what would specifically attract, engage and retain women in technical mining positions. EFA was conducted on the factors influencing the attraction, engagement and retention of women in technical mining. Its KMO and Bartlett's test of sphericity results is presented in Table 5.26.

Table 5.26: KMO and Bartlett's test of sphericity (factors influencing the attraction, engagement and retention of women in technical mining)

KMO and Bartlett's test		
KMO measure of sampling adequacy.		0.879
Bartlett's test of sphericity	Approx. chi-square	1983.586
	df	55
	Sig.	0.000

The KMO value was 0.879, indicating that the sample size was good for EFA. The p-value of Bartlett's test of sphericity was 0.000, which suggests statistical significance. The total variance explained is presented in Table 5.27.

Table 5.27: Total variance explained (factors influencing the attraction, engagement and retention of women in technical mining)

Component	Initial eigenvalues			Extraction sums of squared loadings			Rotation sums of squared loadings[a]
	Total	% of variance	Cumulative %	Total	% of variance	Cumulative %	Total
1	5.968	54.256	54.256	5.968	54.256	54.256	5,664
2	1.185	10.776	65.031	1.185	10.776	65.031	3,924
3	0.962	8.749	73.781				
4	0.660	6.000	79.781				
5	0.625	5.682	85.462				
6	0.470	4.270	89.733				
7	0.343	3.117	92.850				
8	0.282	2.565	95.415				
9	0.192	1.748	97.163				
10	0.178	1.619	98.782				
11	0.134	1.218	100.000				

Extraction method: PCA

Table 5.27 shows that two factors were retained. The first factor explained 54.26% of the total variance and the second 10.78% of the total variance. These factors are presented in Table 5.28.

Table 5.28: Pattern matrix[a] (factors influencing the attraction, engagement and retention of women in technical mining)

Factors influencing the attraction, engagement and retention of women in technical mining positions			
Question number	Item	Factor 1	Factor 2
		Conducive work environment	Work benefits and career development
D6Q9	A work environment free from gender discrimination	0.890	
D6Q10	Having supportive management	0.868	
D6Q6	Working in an environment that prioritises my health and safety	0.842	
D6Q7	The provision of adequate personal protective equipment	0.840	
D6Q8	Having appropriate ablution facilities	0.813	
D6Q11	Having supportive colleagues	0.805	
D6Q5	Working in a gender-balanced environment	0.542	
D6Q1	An above-average basic salary		0.935
D6Q2	An attractive overall compensation package, including benefits		0.928
D6Q3	Career development opportunities	0.435	0.485
D6Q4	Working in work locations close to home		0.452

Factors influencing the attraction, engagement and retention of women in technical mining positions		
Cronbach's alpha	0.900	0.747
Factor mean	4.428	4.116
Factor standard deviation	0.680	0.765

a) Conducive work environment

Seven items loaded on the *Conducive work environment* factor; the factor loadings ranged from 0.542 to 0.890. The following items were included in the factor:

- D6Q9: A work environment free from gender discrimination
- D6Q10: Having supportive management
- D6Q6: Working in an environment that prioritises my health and safety
- D6Q7: The provision of adequate personal protective equipment
- D6Q8: Having appropriate ablution facilities
- D6Q11: Having supportive colleagues
- D6Q5: Working in a gender-balanced environment.

The factor showed excellent reliability and internal consistency, as Cronbach's alpha factor was 0.900. The mean of the factor was calculated to be 4.428. This suggests that a conducive work environment is important in attracting, engaging and retaining women in technical mining positions. (The Likert scale used ranged from 1 [Not at all important] to 5 [Extremely important].)

b) Work benefits and career development

Four items loaded on the *Work benefits and career development* factor; the factor loadings ranged from 0.452 to 0.935. The following items were included in the factor:

- D6Q1: An above-average basic salary
- D6Q2: An attractive overall compensation package, including benefits
- D6Q3: Career development opportunities
- D6Q4: Working in work locations close to home.

Cronbach's alpha was 0.747, indicating that the factor's reliability and internal consistency were acceptable. The factor mean was 4.116. Therefore, work benefits and career development opportunities are important for attracting, engaging and retaining women in

technical mining positions. (The Likert scale used ranged from 1 [Not at all important] to 5 [Extremely important].)

The results above indicate that having a conducive work environment, accompanied by work benefits and career development opportunities, equally influences women's attraction, engagement and retention in technical mining positions. The following sections provide the results of the effect of certain biographical variables on attraction, engagement and retention.

5.3.7 Effect of nominal biographical variables on attraction, engagement and retention

Independent samples t-tests were conducted on various nominal biographical variables to determine whether there was an effect between these variables and the factors of employee attraction, engagement and retention. The test results are presented below.

5.3.7.1 Effect of night shift work on attraction, engagement and retention

Table 5.29 shows the results of the independent samples t-test for the effect of shift work on attraction, engagement and retention.

Table 5.29: Effect of shift work on attraction, engagement and retention

Group statistics					Independent samples test	Effect size
Requirement to work night shifts		**N**	**Mean**	**Standard deviation**	**P-value**	
Application value and development value	Yes	81	4.07	0.82	0.17	0.20
	No	197	4.22	0.67		
Interest value	Yes	82	3.98	0.99	**0.02**	**0.36**
	No	197	4.26	0.68		
Economic value	Yes	81	4.09	0.91	0.33	0.14
	No	197	4.21	0.73		
Social value	Yes	81	3.93	0.85	**0.00**	**0.50**
	No	197	4.28	0.63		
Vigour	Yes	83	3.54	0.97	0.17	0.18
	No	195	3.71	0.94		
Dedication	Yes	83	3.63	1.09	0.09	0.23
	No	195	3.86	0.98		
Absorption	Yes	83	3.54	0.99	0.39	0.11
	No	195	3.64	0.91		
Affective commitment	Yes	84	3.11	0.92	0.78	0.04
	No	194	3.08	0.72		
Normative commitment	Yes	84	3.37	0.91	0.53	0.08

Group statistics					Independent samples test	Effect size
Requirement to work night shifts		**N**	**Mean**	**Standard deviation**	**P-value**	
	No	195	3.31	0.78		
Compensation and benefits	Yes	84	3.25	1.14	0.43	0.10
	No	195	3.37	1.17		
Work-life balance	Yes	83	3.02	0.95	0.29	0.14
	No	192	2.89	0.95		
Intent to leave	Yes	83	3.37	1.08	0.44	0.10
	No	193	3.26	1.05		
Job characteristics	Yes	82	3.10	0.80	**0.00**	**0.49**
	No	194	3.48	0.78		
Career development and training	Yes	84	3.13	1.01	0.94	0.01
	No	194	3.14	0.81		
Conductive work environment	Yes	83	4.30	0.79	0.07	0.26
	No	194	4.48	0.62		
Work benefits and career development	Yes	84	4.04	0.88	0.31	0.13
	No	194	4.15	0.71		
***Likelihood to recommend a job in the mining industry to women**	Yes	83	6.49	3.04	**0.00**	**0.57**
	No	191	7.87	2.09		

Cohen's d-values: small effect: d = 0.2; medium effect: d = 0.5; large effect: d = 0.8

*One item measured on a 10-point scale.

	Employee attraction		**Employee engagement**		**Employee retention**		**Attraction, engagement and retention of women in technical mining positions**

The results in Table 5.29 show that from the employee attraction factors, two factors (*Interest value* and *Social value*) indicated statistically significant differences ($p < 0.05$) for the requirement to work night shifts. On average, respondents who were not required to work night shifts (M = 4.26) scored higher on interest value than respondents who were required to work night shifts (M = 3.98); the effect size (d = 0.36) showed a small effect. Similarly, respondents who were not required to work night shifts (M = 4.28) scored higher on social value compared to those respondents required to work night shifts (M = 3.93); the effect size (d=0.50), showed a medium effect. Therefore, respondents who were not required to work night shifts recognised interest value (an exciting and unique work environment) and social value (a fun and happy work environment with good collegial relationships and a team atmosphere) as important factors influencing employee attraction, more than respondents who were required to work night shifts.

A statistically significant difference ($p < 0.05$) was observed for the requirement to work night shifts for *Job characteristics* (a dimension measuring employee retention) and *Likelihood to recommend a job in the mining industry to women.* On average, respondents who did not work night shifts (M = 3.48) scored higher on job characteristics than respondents who worked night shifts (M = 3.10); the effect size (d = 0.49) showed a medium effect. Similarly, respondents who did not work night shifts (M = 3.94) scored higher on the likelihood to recommend a job in the mining industry to women than those who worked night shifts (M = 3.25); the effect size (d = 0.57) showed a medium effect. This indicates that, to some extent, respondents who were not required to work night shifts recognised job characteristics as an important factor that can impact employee retention, more than those respondents who worked night shifts. These respondents were also more likely than those who worked night shifts to recommend a job in the mining industry to women. The subsequent section examines how having children affects employee attraction, engagement and retention.

5.3.7.2 Effect of having children on attraction, engagement and retention

An independent samples t-test was performed to assess the effect of having children on attraction, engagement and retention. The results of the t-test are reported in Table 5.30.

Table 5.30: Effect of having children on attraction, engagement and retention

Group statistics					Independent samples test	Effect size
Do you have children?		**N**	**Mean**	**Standard deviation**	**P-value**	
Application value and development value	Yes	179	4.15	0.73	0.47	0.09
	No	99	4.22	0.70		
Interest value	**Yes**	**179**	**4.09**	**0.85**	**0.01**	**0.32**
	No	**100**	**4.34**	**0.66**		
Economic value	Yes	179	4.15	0.85	0.55	0.07
	No	99	4.21	0.66		
Social value	Yes	179	4.15	0.73	0.31	0.13
	No	99	4.24	0.70		
Vigour	Yes	178	3.72	0.97	0.20	0.16
	No	100	3.56	0.92		
Dedication	Yes	178	3.84	0.99	0.35	0.12
	No	100	3.72	1.06		
Absorption	**Yes**	**178**	**3.72**	**0.90**	**0.01**	**0.31**
	No	**100**	**3.43**	**0.98**		
Affective commitment	Yes	178	3.12	0.78	0.51	0.08
	No	100	3.05	0.79		

Group statistics					Independent samples test	Effect size
Do you have children?		**N**	**Mean**	**Standard deviation**	**P-value**	
Normative commitment	Yes	179	3.38	0.84	0.17	0.17
	No	100	3.24	0.80		
Compensation and benefits	Yes	179	3.29	1.15	0.38	0.11
	No	100	3.42	1.19		
Work-life balance	Yes	176	2.93	0.94	0.86	0.02
	No	99	2.91	0.97		
Intention to stay	**Yes**	**177**	**3.40**	**1.08**	**0.02**	**0.29**
	No	99	3.09	0.99		
Job characteristics	Yes	176	3.33	0.74	0.46	0.10
	No	100	3.41	0.89		
Career development and training	Yes	178	3.13	0.83	0.80	0.03
	No	100	3.16	0.94		
Conductive work	**Yes**	**177**	**4.36**	**0.71**	**0.02**	**0.29**
	No	100	4.55	0.60		
Work benefits and career development	Yes	178	4.09	0.82	0.38	0.11
	No	100	4.17	0.66		
*Likelihood to recommend a job in the mining industry to women	Yes	174	7.50	2.39	0.70	0.05
	No	100	7.38	2.68		

Cohen's d-values: small effect: d = 0.2; medium effect: d = 0.5; large effect: d = 0.8

*One item measured on a 10-point scale.

The results in Table 5.30 show that four factors (*Interest value, Absorption, Intention to stay* and *A conducive work environment*) indicated statistically significant differences ($p < 0.05$) between the mean scores for respondents who had children and those who did not. Respondents who did not have children (M = 4.34) scored slightly higher on interest value than those with children (M = 4.09); the effect size (d = 0.32) showed a small effect. This indicates that although both groups (those with children and without) scored above 4, those who did not have children regarded interest value (an exciting and unique work environment) as an important factor for attracting employees in the workplace, more than those with children.

Respondents with children (M = 3.72) scored slightly higher on *Absorption* than respondents who did not have children (M = 3.43); the effect size (d = 0.31) showed a small to medium

effect. Therefore, respondents who had children appeared to recognise absorption (a pleasant state of association with one's work in the workplace more as a factor that affects employee engagement than respondents who did not have children.

Furthermore, respondents who had children (M = 3.40) scored slightly higher on *Intention to stay* than those without children (M = 3.09); the effect size (d=0.29) showed a small to medium effect. This indicates that respondents with children were slightly more likely than those without children to remain with their organisations. On average, respondents without children (M = 4.55) scored slightly higher on conducive work environment than respondents with children (M = 4.36), the effect size (d = 0.29) showed a small to medium effect. Although both categories of respondents scored high on conducive work environment, respondents without children regarded a conducive work environment as an important factor affecting employee attraction, engagement and retention, more than respondents with children. The next section discusses the effect of respondents' involvement in work committees on attraction, engagement and retention.

5.3.7.3 Effect of work committee involvement on attraction, engagement and retention

The respondents were asked to state whether they were involved in any committees within their organisations. This section presents the results of the independent samples t-test that was performed to assess the effect of being part of a work committee on attraction, engagement and retention. The results are illustrated in Table 5.31.

Table 5.31: Effect of work committee involvement on attraction, engagement and retention

Group statistics					Independent samples test	Effect size
Work committee membership		**N**	**Mean**	**Standard deviation**	**P-value**	
Application value and development value	Yes	72	4.11	0.75	0.36	0.13
	No	206	4.20	0.71		
Interest value	Yes	72	4.14	0.80	0.62	0.07
	No	207	4.19	0.79		
Economic value	Yes	72	4.09	0.84	0.28	0.15
	No	206	4.20	0.77		
Social value	Yes	72	4.16	0.72	0.74	0.05
	No	206	4.19	0.72		
Vigour	Yes	72	3.79	0.98	0.18	0.19
	No	206	3.61	0.94		
Dedication	**Yes**	**72**	**4.03**	**0.95**	**0.02**	**0.32**
	No	206	3.71	1.03		

Group statistics					Independent samples test	Effect size
Absorption	Yes	72	3.74	0.94	0.17	0.19
	No	206	3.57	0.93		
Affective commitment	Yes	71	3.20	0.84	0.18	0.19
	No	207	3.06	0.76		
Normative commitment	Yes	71	3.20	0.85	0.13	0.21
	No	208	3.37	0.81		
Compensation and benefits	Yes	71	3.43	1.26	0.42	0.11
	No	208	3.30	1.13		
Work-life balance	Yes	71	2.87	1.00	0.54	0.08
	No	204	2.95	0.94		
Intent to leave	Yes	71	3.15	1.07	0.21	0.17
	No	205	3.34	1.06		
Job characteristics	**Yes**	**70**	**3.54**	**0.83**	**0.03**	**0.31**
	No	206	3.30	0.78		
Career development and training	**Yes**	**71**	**3.32**	**0.89**	**0.05**	**0.27**
	No	207	3.08	0.86		
Conductive work environment	Yes	69	4.53	0.62	0.16	0.19
	No	208	4.40	0.70		
Work benefits and career development	Yes	70	4.15	0.77	0.71	0.05
	No	208	4.11	0.77		
*Likelihood to recommend a job in the mining industry to women	Yes	68	7.78	2.15	0.22	0.17
	No	206	7.35	2.60		

Cohen's d-values: small effect: d = 0.2; medium effect: d = 0.5; large effect: d = 0.8
*One item measured on a 10-point scale.

	Employee attraction		**Employee engagement**		**Employee retention**		**Attraction, engagement and retention of women in technical mining positions**

Table 5.31 shows that three factors (*Dedicatio*n, *Job characteristics* and *Career development and training*) indicated statistically significant differences ($p < 0.05$) for the involvement of work committees. On average, respondents who were involved in a work committee (M = 4.03) scored higher on dedication compared to those who were not (M = 3.71); the effect size (d = 0.32) showed a small to medium effect. This implies that respondents who were involved in a work committee were more likely to show traits of dedication (having a sense of significance, enthusiasm, inspiration and pride in working for a particular organisation) than those who were not part of a work committee.

Respondents who were part of a work committee (M = 3.54) scored slightly higher on *Job characteristics* than those who were not involved in a work committee (M = 3.30); the effect size (d = 0.31) showed a small to medium effect. To some extent, respondents who were part

of a work committee agreed slightly more than those who were not part of a work committee that job characteristics played a role in their retention. Moreover, those in a work committee (M = 3.32) scored slightly higher on *Career development and training* than those who were not involved in a work committee (M = 3.08); the effect (d = 0.27) showed small to medium effect. This indicates that respondents who were involved in a work committee compared to those who were not, to some extent, placed a higher value on career development and training to retain employees. The next section presents the results and discussion of the effect of marital status on attraction, engagement and retention.

5.3.7.4 Effect of marital status on attraction, engagement and retention

A one-way ANOVA test was conducted to explore the effects of marital status on attraction, engagement and retention. Marital status comprised four groups: married, cohabiting/living together, single and separated. The results of the analysis are presented in Table 5.32.

Table 5.32: Effect of marital status on attraction, engagement and retention

Group statistics					ANOVA	Omega-squared effect size
Marital status		N	Mean	Standard deviation	P-value	
Application value and development value	Married	86	4.10	0.64	**0.02**	**0.02**
	Cohabiting/Living together	31	3.93	1.03		
	Single	143	4.29	0.69		
	Separated	18	4.00	0.57		
	Total	278	4.17	0.72		
Interest value	Married	87	3.96	0.91	**0.01**	**0.03**
	Cohabiting/Living together	31	4.13	0.84		
	Single	143	4.33	0.70		
	Separated	18	4.08	0.60		
	Total	279	4.18	0.79		
Economic value	Married	87	4.06	0.88	0.08	0.01
	Cohabiting/Living together	31	4.10	0.96		
	Single	142	4.29	0.66		
	Separated	18	3.93	0.84		
	Total	278	4.17	0.79		
Social value	Married	87	4.12	0.80	0.06	0.02

Group statistics					ANOVA	Omega-squared effect size
Marital status		N	Mean	Standard deviation	P-value	
	Cohabiting/Living together	31	3.97	0.96		
	Single	142	4.28	0.59		
	Separated	18	3.99	0.69		
	Total	278	4.18	0.72		
Vigour	Married	86	3.65	0.91	0.53	0.00
	Cohabiting/Living together	31	3.72	0.93		
	Single	144	3.62	0.98		
	Separated	17	3.97	0.90		
	Total	278	3.66	0.95		
Dedication	Married	86	3.81	0.94	0.90	0.01
	Cohabiting/Living together	31	3.84	0.96		
	Single	144	3.76	1.07		
	Separated	17	3.93	1.13		
	Total	278	3.79	1.02		
Absorption	Married	86	3.63	0.89	0.36	0.00
	Cohabiting/Living together	31	3.60	0.97		
	Single	144	3.56	0.96		
	Separated	17	3.99	0.81		
	Total	278	3.61	0.93		
Affective commitment	Married	86	3.14	0.65	0.65	0.00
	Cohabiting/Living together	31	3.05	0.83		
	Single	143	3.05	0.86		
	Separated	18	3.25	0.70		
	Total	278	3.09	0.78		
Normative commitment	Married	86	3.35	0.71	0.98	0.01
	Cohabiting/Living together	31	3.27	0.94		
	Single	144	3.32	0.86		
	Separated	18	3.36	0.91		
	Total	279	3.33	0.82		
Compensation and benefits	Married	86	3.57	1.07	0.09	0.01
	Cohabiting/living together	31	3.43	1.14		

Group statistics					ANOVA	Omega-squared effect size
Marital status		N	Mean	Standard deviation	P-value	
	Single	144	3.17	1.17		
	Separated	18	3.39	1.45		
	Total	279	3.34	1.16		
Work-life balance	Married	84	3.12	0.99	0.06	0.02
	Cohabiting/Living together	31	3.03	0.96		
	Single	142	2.78	0.91		
	Separated	18	3.03	0.93		
	Total	275	2.93	0.95		
Intention to stay	Married	85	3.26	1.03	0.45	0.00
	Cohabiting/Living together	31	3.26	1.07		
	Single	142	3.26	1.10		
	Separated	18	3.69	0.91		
	Total	276	3.29	1.06		
Job characteristics	Married	85	3.41	0.70	0.16	0.01
	Cohabiting/Living together	30	3.39	0.84		
	Single	143	3.29	0.83		
	Separated	18	3.71	0.88		
	Total	276	3.36	0.80		
Career development and training	Married	85	3.08	0.73	0.54	0.00
	Cohabiting/Living together	31	2.99	0.90		
	Single	144	3.21	0.92		
	Separated	18	3.17	1.01		
	Total	278	3.14	0.87		
Conductive work environment	Married	86	4.38	0.63	0.43	0.00
	Cohabiting/Living together	30	4.38	0.71		
	Single	143	4.49	0.68		
	Separated	18	4.27	0.85		
	Total	277	4.43	0.68		
Work benefits and career development	Married	86	4.08	0.67	0.92	0.01
	Cohabiting/Living together	31	4.09	0.85		
	Single	143	4.14	0.79		
	Separated	18	4.18	0.89		

Group statistics					ANOVA	Omega-squared effect size
Marital status		N	Mean	Standard deviation	P-value	
	Total	278	4.12	0.77		
*Likelihood to recommend a job in the mining industry to women	Married	83	7.59	2.17	0.82	0.01
	Cohabiting/Living together	31	7.10	3.02		
	Single	142	7.44	2.53		
	Separated	18	7.56	2.81		
	Total	274	7.46	2.50		

Omega-squared values: 0.01 = small effect; 0.06 = medium effect; 0.14 = large effect
*One item measured on a 10-point scale.

	Employee attraction		**Employee engagement**		**Employee retention**		**Attraction, engagement and retention of women in technical mining positions**

According to Table 5.32, it is evident that the ANOVA test yielded statistically significant results for application value and development value (p-value = 0.02) as well as interest value (p-value = 0.01). As mentioned in section 5.2.3, the ANOVA results necessitate the need to conduct further analysis to determine which group means are significantly different. In light of this, a post hoc test (Tukey B) was conducted. The results of the post hoc test are presented in Table 5.33.

Table 5.33: Post hoc tests: homogeneous subsets

Application value and development value		
Tukey B[a,b]		
What is your marital status?	**N**	**Subset for alpha = 0.05**
		1
Cohabiting/Living together	31	3.93
Separated	18	4.00
Married	86	4.10
Single	143	4.29
Interest value		
Tukey B[a,b]		
What is your marital status?	**N**	**Subset for alpha = 0.05**
		1

Married	87	3.96
Separated	18	4.08
Cohabiting/Living together	31	4.13
Single	143	4.33

b. The group sizes are unequal. The harmonic mean of the group sizes was used. Type I error levels are not guaranteed.

The post hoc test using Tukey B revealed that none of the mean scores of the marital status groups was statistically significant. Therefore, according to these results, employees' marital status did not affect their attraction when considering a potential employer. All of the omega-squared effect sizes were small.

In addition to the independent samples t-test and ANOVA, a correlation analysis was conducted to investigate the relationship between various biographical data and attraction, engagement and retention.

5.3.8 Correlations between age, highest qualification and length of employment in mining and attraction, engagement and retention

As stated in section 5.2.4, a Pearson product-moment correlation coefficient was used to determine linear association (if any) between attraction, engagement and retention. This section provides the correlation analysis results between different biographical information (age, highest qualification, duration of employment in respondents' current positions, their organisations and mining in general) with attraction, engagement and retention. These are provided in Table 5.34.

Table 5.34: Correlations between age, highest qualification and length of employment in mining and attraction, engagement and retention

		Age	Highest qualification	Duration of employment in current position	Duration of employment in the organisation	Duration of employment in the mining industry
Application value and development value	Pearson correlation	-0.053	**0.143***	-0.04	**-0.183****	-0.121
	Sig. (2-tailed)	0.379	**0.018**	0.519	**0.003**	0.051
	N	277	273.00	274.00	259	261
Interest value	Pearson correlation	**-0.149***	**0.251****	-0.11	**-0.195****	-0.098
	Sig. (2-tailed)	0.013	**0.000**	0.058	**0.002**	0.112
	N	278	274.00	275.00	261	263
Economic value	Pearson correlation	-0.046	**0.139***	-0.06	**-0.138***	-0.044
	Sig. (2-tailed)	0.446	**0.021**	0.316	**0.026**	0.474
	N	277	273.00	274.00	260	262
Social value	Pearson correlation	-0.060	0.11	0.01	-0.107	-0.031
	Sig. (2-tailed)	0.316	0.059	0.810	0.085	0.617
	N	277	273.00	274.00	260	262
Vigour	Pearson correlation	0.020	-0.01	0.00	-0.074	0.038
	Sig. (2-tailed)	0.739	0.827	0.977	0.236	0.538
	N	277	273.00	274.00	259	261
Dedication	Pearson correlation	0.015	0.01	-0.09	**-0.163****	-0.019
	Sig. (2-tailed)	0.806	0.899	0.128	**0.008**	0.763
	N	277	273.00	274.00	259	261
Absorption	Pearson correlation	0.108	-0.04	0.01	-0.060	0.104
	Sig. (2-tailed)	0.074	0.490	0.894	0.334	0.094
	N	277	273.00	274.00	259	261
Affective commitment	Pearson correlation	0.050	-0.08	-0.06	-0.092	-0.040
	Sig. (2-tailed)	0.404	0.166	0.354	0.140	0.521
	N	277	273.00	275.00	261	262
Normative commitment	Pearson correlation	0.049	**-0.149***	0.08	**0.137***	0.048
	Sig. (2-tailed)	0.415	**0.013**	0.189	**0.027**	0.440
	N	278	274.00	275.00	261	263
Compensation and benefits	Pearson correlation	**0.150***	0.04	-0.01	0.020	0.102
	Sig. (2-tailed)	**0.012**	0.504	0.807	0.742	0.098
	N	278	274.00	275.00	261	263

		Age	Highest qualification	Duration of employment in current position	Duration of employment in the organisation	Duration of employment in the mining industry
Work-life balance	Pearson correlation	-0.030	0.206**	-0.03	-0.083	0.003
	Sig. (2-tailed)	0.626	**0.001**	0.568	0.183	0.961
	N	274	270.00	271.00	259	261
Intention to stay	Pearson correlation	0.246**	-0.330**	0.198**	0.246**	0.265**
	Sig. (2-tailed)	**0.000**	**0.000**	**0.001**	**0.000**	**0.000**
	N	275	271.00	272.00	260	262
Job characteristics	Pearson correlation	0.043	0.296**	-0.177**	-0.142*	0.026
	Sig. (2-tailed)	0.483	**0.000**	**0.003**	**0.023**	0.675
	N	275	271.00	272.00	258	260
Career development and training	Pearson correlation	-0.047	0.00	-0.204**	-0.251**	-0.145*
	Sig. (2-tailed)	0.436	0.991	**0.001**	**0.000**	**0.019**
	N	277	273.00	274.00	260	262
Conductive work environment	Pearson correlation	-0.055	0.141*	-0.05	-0.161**	-0.128*
	Sig. (2-tailed)	0.363	**0.020**	0.395	**0.009**	**0.039**
	N	276	272.00	273.00	259	261
Work benefits and career development	Pearson correlation	0.038	0.153*	0.01	-0.078	0.009
	Sig. (2-tailed)	0.524	**0.011**	0.875	0.212	0.885
	N	277	273.00	274.00	260	262
*Likelihood to recommend a job in the mining industry to women	Pearson correlation	-0.011	0.00	-0.03	-0.066	0.030
	Sig. (2-tailed)	0.850	0.975	0.629	0.291	0.634
	N	273	269.00	270.00	258	260

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

(a) small effect: r = 0.1, (b) medium effect: r = 0.3 and (c) large effect: r > 0.5

*One item measured on a 10-point scale.

	Employee attraction		Employee engagement		Employee retention		Attraction, engagement and retention of women in technical mining positions

5.3.8.1 Age

A small negative correlation existed between age and *Interest value* (p-value = 0.013; r = -0.149). This indicates that younger respondents placed a higher value on interest value than older respondents.

There was a small positive correlation between age and *Intention to stay* (p-value = 0.00; r = 0.246) and a small correlation between age and *Compensation and benefits* (p-value = 0.012; r = 0.150). Therefore, the older the respondents, the more likely they were to be retained by compensation and benefits in an organisation.

5.3.8.2 Highest qualification

There were small positive correlations between highest qualification and *Application value and development value* (p-value = 0.02; r = 0.143), highest qualification and *Economic value* (p-value = 0.02; r = 139) and highest qualification and *Interest value* (p-value = 0.00; r = 0.251). Therefore, the higher the respondents' qualifications, the more emphasis they placed on application value and development value, economic value and interest value as critical factors for employee attraction.

A small negative correlation was found between highest qualification and *Normative commitment* (p-value = 0.01; r = -0.149) and a medium negative correlation between highest qualification and *Intention to stay* (p-value = 0.00; r = -0.330). This shows that respondents with lower qualifications tended to feel obligated to remain in their organisations and were less likely to leave.

Small positive correlations were found between highest qualification and *Work-life balance* (p-value = 0.00; r = 0.206) and highest qualification and *Job characteristics* (p-value = 0.00; r = 0.296). This shows that those with higher qualifications regarded work-life balance and job characteristics as critical factors for retaining individuals in the workplace.

Small positive correlations were found between highest level of qualification and *Conducive work environment* (p-value = 0.02; r = 0.141) as well as highest level of qualification and *Work benefits and career development* (p-value = 0.01; r = 0.153). This suggests that the more qualified the respondents were, the more they viewed a conducive work environment and work benefits and career development as important factors for attracting, engaging and retaining women in technical mining positions.

5.3.8.3 Duration of employment in current position

A small positive correlation was found between the duration of the respondents' employment in their current position and *Intention to stay* (p-value = 0.00; r = 0.198). The results show that respondents who had worked in a specific role for a longer period were more likely to stay within their organisations.

Small negative correlations were found between the duration of the respondents' employment in their current position and *Job characteristics* (p-value = 0.00; r = -0.177), as well as *Career development and training* (p-value = 0.00; r = -0.204). This suggests that respondents with more years of service at a particular position were less positive about the support they received from the organisation in terms of factors related to career development and training, as well as their job characteristics.

5.3.8.4 Duration of employment in the organisation

There were small negative correlations between the duration of employment in an employee's organisation and *Application value and development value* (p-value = 0.003; r = -0.183), *Interest value* (p-value = 0.002; r = -0.195), *Economic value* (p-value = 0.026; r = -0.138), and *Dedication* (p-value = 0.008; r = -0.163). The more years respondents had been employed in a specific organisation, the less likely they were to view application and development value as a factor enticing them to a specific occupation. Interest and economic value were less appealing to these same respondents. These respondents were also more likely to be less dedicated to their organisations.

On the other hand, small positive correlations were found between the duration of employment in an employee's organisation and *Normative commitment* (p-value = 0.027; r = 0.137) and *Intention to stay* (p-value = 0.000; r = 0.246). This indicates that respondents who had worked for a particular organisation for a long period were more likely to feel obligated to remain within it and had no plans to leave.

Small negative correlations were found between the duration of employment in an employee's organisation and *Job characteristics* (p-value = 0.023; r = -0.142) and *Career development and training* (p-value = 0.000; r = -0.251). This indicates that the longer the respondents worked at their organisation, the less they regarded job characteristics and career development and training as important factors to be retained in an organisation.

A small negative correlation was also found between the duration of employment in an employee's organisation and a *Conducive work environment* (p-value = 0.009; r = -0.161). This implies that respondents with more years of service at a specific organisation were less

positive about the importance of a conducive work environment as a factor that would attract, engage and retain women in technical mining positions.

5.3.8.5 Duration of employment in the mining industry

A small positive correlation was found between the duration of employment in the mining industry and *Intention to stay* (p-value = 0.000; r = 0.265). The results show that those respondents who had worked in the mining industry for a long time were more likely to remain employed and not leave.

Small negative correlations were found between the duration of employment in the mining industry and a *Conducive work environment* (p-value = 0.039; r = -0.128) as well as *Career development and training* (p-value = 0.019; r = -0.145). This suggests that respondents with more years of service in the mining industry regarded a conducive work environment as well as career development and training as less important factors to attract, engage and retain women in technical mining positions. The following section presents the results of the correlation between factors of attraction, engagement and retention.

5.3.9 Correlations between factors of attraction, engagement and retention

Earlier results indicated that there may be a link between factors of attraction, engagement and retention (see section 5.3.5). A Pearson product-moment correlation test was used to determine the relationship between attraction factors (*Application value and development value, Interest value, Economic value* and *Social value*), engagement factors (*Vigour, Dedication* and *Absorption*) and retention factors (*Affective commitment, Normative commitment, Compensation and benefits, Job characteristics, Career development and training, Work-life balance* and *Intention to stay*) as well as attraction, engagement and retention factors (*Conductive work environment* and *Work benefits*). Table 5.35 presents the results of the Pearson correlation test between factors of attraction, engagement and retention.

Table 5.35: Correlations between attraction, engagement and retention

		Application value and development value	Interest value	Economic value	Social value	Vigour	Dedication	Absorption	Affective commitment	Normative commitment	Compensation and benefits	Job characteristics	Career development and training	Work-life balance	Intention to stay	Conducive work environment	Work benefits and career development
Application value and development value	Pearson correlation	1	0.633**	0.646**	0.719**	0.220**	0.229**	0.247**	0.046	0.061	-0.047	0.065	0.082	0.103	0.005	0.402**	0.450**
	Sig. (2-tailed)		0.000	0.000	0.000	0.000	0.000	0.000	0.443	0.310	0.440	0.286	0.174	0.090	0.931	0.000	0.000
	N	278	277	277	277	275	275	275	275	276	276	273	275	272	273	274	275
Interest value	Pearson correlation	0.633**	1	0.559**	0.639**	0.236**	0.233**	0.246**	0.040	-0.027	0.033	0.118	0.103	0.061	0.021	0.256**	0.309**
	Sig. (2-tailed)	0.000		0.000	0.000	0.000	0.000	0.000	0.509	0.657	0.581	0.050	0.086	0.317	0.724	0.000	0.000
	N	277	279	278	278	276	276	276	276	277	277	274	276	273	274	275	276
Economic value	Pearson correlation	0.646**	0.559**	1	0.664**	0.114	0.154*	0.156**	0.009	-0.008	0.005	0.078	0.024	0.132*	0.002	0.340**	0.576**
	Sig. (2-tailed)	0.000	0.000		0.000	0.060	0.011	0.010	0.876	0.894	0.939	0.202	0.687	0.029	0.977	0.000	0.000
	N	277	278	278	278	275	275	275	275	276	276	273	275	272	273	274	275
Social value	Pearson correlation	0.719**	0.639**	0.664**	1	0.240**	0.237**	0.249**	0.108	0.132*	0.082	0.084	0.123*	0.056	0.104	0.338**	0.366**
	Sig. (2-tailed)	0.000	0.000	0.000		0.000	0.000	0.000	0.075	0.028	0.173	0.164	0.041	0.356	0.087	0.000	0.000
	N	277	278	278	278	275	275	275	275	276	276	273	275	272	273	274	275
Vigour	Pearson correlation	0.220**	0.236**	0.114	0.240**	1	0.839**	0.876**	0.447**	0.227**	0.269**	0.246**	0.447**	0.059	0.411**	0.209**	0.249**
	Sig. (2-tailed)	0.000	0.000	0.060	0.000		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.335	0.000	0.000	0.000
	N	275	276	275	275	278	278	278	276	277	277	274	276	273	274	275	276

		Application value and development value	Interest value	Economic value	Social value	Vigour	Dedication	Absorption	Affective commitment	Normative commitment	Compensation and benefits	Job characteristics	Career development and training	Work-life balance	Intention to stay	Conducive work environment	Work benefits and career development
Dedication	Pearson correlation	0.229**	0.233**	0.154*	0.237**	0.839**	1	0.849**	0.444**	0.168**	0.230**	0.393**	0.456**	0.042	0.360**	0.167**	0.253**
	Sig. (2-tailed)	0.000	0.000	0.011	0.000	0.000		0.000	0.000	0.005	0.000	0.000	0.000	0.494	0.000	0.006	0.000
	N	275	276	275	275	278	278	278	276	277	277	274	276	273	274	275	276
Absorption	Pearson correlation	0.247**	0.246**	0.156**	0.249**	0.876**	0.849**	1	0.412**	0.223**	0.218**	0.284**	0.387**	0.125*	0.381**	0.140*	0.266**
	Sig. (2-tailed)	0.000	0.000	0.010	0.000	0.000	0.000		0.000	0.000	0.000	0.000	0.000	0.039	0.000	0.020	0.000
	N	275	276	275	275	278	278	278	276	277	277	274	276	273	274	275	276
Affective commitment	Pearson correlation	0.046	0.040	0.009	0.108	0.447**	0.444**	0.412**	1	0.493**	0.512**	0.240**	0.818**	-0.089	0.552**	0.073	0.139*
	Sig. (2-tailed)	0.443	0.509	0.876	0.075	0.000	0.000	0.000		0.000	0.000	0.000	0.000	0.141	0.000	0.227	0.020
	N	275	276	275	275	276	276	276	278	278	278	275	277	274	275	276	277
Normative commitment	Pearson correlation	0.061	-0.027	-0.008	0.132*	0.227**	0.168**	0.223**	0.493**	1	0.291**	-0.046	0.453**	-0.060	0.365**	0.114	0.149*
	Sig. (2-tailed)	0.310	0.657	0.894	0.028	0.000	0.005	0.000	0.000		0.000	0.444	0.000	0.325	0.000	0.059	0.013
	N	276	277	276	276	277	277	277	278	279	279	276	278	275	276	277	278
Compensation and training	Pearson correlation	-0.047	0.033	0.005	0.082	0.269**	0.230**	0.218**	0.512**	0.291**	1	0.180**	0.527**	-0.037	0.397**	0.004	0.028
	Sig. (2-tailed)	0.440	0.581	0.939	0.173	0.000	0.000	0.000	0.000	0.000		0.003	0.000	0.542	0.000	0.945	0.646
	N	276	277	276	276	277	277	277	278	279	279	276	278	275	276	277	278
	Pearson correlation	0.065	0.118	0.078	0.084	0.246**	0.393**	0.284**	0.240**	-0.046	0.180**	1	0.256**	0.160**	0.146*	0.102	0.149*

		Application value and development value	Interest value	Economic value	Social value	Vigour	Dedication	Absorption	Affective commitment	Normative commitment	Compensation and benefits	Job characteristics	Career development and training	Work-life balance	Intention to stay	Conducive work environment	Work benefits and career development
Job characteristics	Sig. (2-tailed)	0.286	0.050	0.202	0.164	0.000	0.000	0.000	0.000	0.444	0.003		0.000	0.008	0.016	0.092	0.013
	N	273	274	273	273	274	274	274	275	276	276	276	276	273	273	275	275
Career development and befits	Pearson correlation	0.082	0.103	0.024	0.123*	0.447**	0.456**	0.387**	0.818**	0.453**	0.527**	0.256**	1	-0.134*	0.447**	0.092	0.108
	Sig. (2-tailed)	0.174	0.086	0.687	0.041	0.000	0.000	0.000	0.000	0.000	0.000	0.000		0.027	0.000	0.127	0.072
	N	275	276	275	275	276	276	276	277	278	278	276	278	275	275	276	277
Work-life balance	Pearson correlation	0.103	0.061	0.132*	0.056	0.059	0.042	0.125*	-0.089	-0.060	-0.037	0.160**	-0.134*	1	-0.198**	0.027	0.167**
	Sig. (2-tailed)	0.090	0.317	0.029	0.356	0.335	0.494	0.039	0.141	0.325	0.542	0.008	0.027		0.001	0.652	0.005
	N	272	273	272	272	273	273	273	274	275	275	273	275	275	275	273	274
Intention to stay	Pearson correlation	0.005	0.021	0.002	0.104	0.411**	0.360**	0.381**	0.552**	0.365**	0.397**	0.146*	0.447**	-0.198**	1	0.061	0.061
	Sig. (2-tailed)	0.931	0.724	0.977	0.087	0.000	0.000	0.000	0.000	0.000	0.000	0.016	0.000	0.001		0.311	0.311
	N	273	274	273	273	274	274	274	275	276	276	273	275	275	276	274	275
Conductive work environment	Pearson correlation	0.402**	0.256**	0.340**	0.338**	0.209**	0.167**	0.140*	0.073	0.114	0.004	0.102	0.092	0.027	0.061	1	0.630**
	Sig. (2-tailed)	0.000	0.000	0.000	0.000	0.000	0.006	0.020	0.227	0.059	0.945	0.092	0.127	0.652	0.311		0.000
	N	274	275	274	274	275	275	275	276	277	277	275	276	273	274	277	277
Work benefits and career development	Pearson correlation	0.450**	0.309**	0.576**	0.366**	0.249**	0.253**	0.266**	0.139*	0.149*	0.028	0.149*	0.108	0.167**	0.061	0.630**	1
	Sig. (2-tailed)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.020	0.013	0.646	0.013	0.072	0.005	0.311	0.000	

		Application value and development value	Interest value	Economic value	Social value	Vigour	Dedication	Absorption	Affective commitment	Normative commitment	Compensation and benefits	Job characteristics	Career development and training	Work-life balance	Intention to stay	Conducive work environment	Work benefits and career development
	N	275	276	275	275	276	276	276	277	278	278	275	277	274	275	277	278

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

(a) small effect: r = 0.1, (b) medium effect: r = 0.3, (c) large effect: r > 0.5

	Employee attraction		Employee engagement		Employee retention		Attraction, engagement and retention of women in technical mining positions

From Table 5.35, it is evident that large positive correlations between 0.559 and 0.719 were found between the four attraction factors. All the p-values measured 0.000. This suggests that the more importance respondents placed on application value and development value, the greater they regarded interest, economic and social value as important. Large positive correlations between 0.839 and 0.876 were also found between the three factors of engagement. All p-values measured 0.000. This indicates that the higher the respondents' vigour, the higher their dedication and the more they demonstrated traits of absorption in their work.

Small to large positive correlations (ranging from 0.146 to 0.818) and small negative correlations (ranging from -0.134 to -0.198) were found between the seven factors of retention. The p-values measured between 0.000 and 0.027*. Intention to stay* positively correlated with all factors of retention. Similarly, with the exception of one negative correlation (work-life balance), *Career development and training* also positively correlated with all retention factors. This indicates that all the factors of retention influenced the respondents' intention to stay. Views regarding career development and training were positively influenced by the respondents' affective and normative commitment, compensation and benefits, and job characteristics and determined their intention to stay. However, respondents who believed that they had not been provided with career development and training opportunities also faced work-life balance challenges. In addition, *Affective commitment* and *Compensation and benefits* positively correlated with all factors of retention, except work-life balance. This implies that all retention factors, with the exception of work-life balance, had an effect on the respondents' affective commitment and level of satisfaction with their compensation and benefits. *Job characteristics* positively correlated with all factors of retention, except normative commitment. This indicates that respondents who were satisfied with their job characteristics were also satisfied with their compensation and benefits, work-life balance, agreed that their organisations provide career development and training opportunities, demonstrated affective commitment and were more likely to stay within their organisations. *Normative commitment* positively correlated with affective commitment, compensation and benefits as well as career development and training. This suggests that respondents who demonstrated normative commitment were more likely to demonstrate affective commitment, were influenced by compensation and benefits, and had intentions to stay. Work-life balance positively correlated with job characteristics and negatively correlated with intention to stay. Respondents who were satisfied with their job characteristics were likely to have a work-life balance. However, those who were not satisfied with their work-life balance were likely to leave.

Furthermore, a large positive ($r = 0.630$) correlation was found between the two factors of attraction, engagement and retention of women in technical mining positions. The p-values were all 0.000. A large positive correlation was found between *Conducive work environment* (p-value = 0.000; $r = 0.630$) and *Work benefits and career development.* This implies that a conducive

work environment and work benefits and career development were considered important factors for attracting, engaging and retaining women in technical mining positions. The section below discusses the results of the Pearson product-moment correlation test between factors of attraction, engagement and retention.

5.3.9.1 Correlations of factors of attraction with factors of engagement and retention, as well as with factors of attraction, engagement and retention of women in technical mining positions

In assessing the relationship between factors of attraction with those of engagement, small positive correlations were found between three factors of attraction (*Application value and development value*: p-value = 0.000; r = 0.220, *Interest value*: p-value = 0.000; r = 0.236, *Social value*: p-value = 0.000; r = 0.240) and *Vigour.* Small positive correlations were found between all factors of attraction (*Application value and development value:* p-value = 0.000; r = 0.229, *Interest value:* p-value = 0.000; r = 0.233, *Economic value:* p-value = 0.011; r = 0.154, *Social value:* p-value = 0.000; r = 0.237) and *Dedication.* Small positive correlations were found between all factors of attraction (*Application value and development value:* p-value = 0.000; r = 0.247, *Interest value:* p-value = 0.000; r = 0.246, *Economic value:* p-value = 0.010; r = 0.156, *Social value:* p-value = 0.000; r = 0.249) and *Absorption.* This implies that application value and development value, interest value as well as social value were important in igniting employees with vigour, except for economic value. In addition, all factors of attraction were important in promoting dedication and absorption.

In terms of correlations between attraction factors with retention factors, there was a relationship between two factors of attraction (*Economic value* and *Social value)* and three factors of retention (*Work-life balance, Normative commitment* and *Career development and training*). A small positive correlation was found between *Economic value* and *Work-life balance* (p-value = 0.029; r = 0.132). Furthermore, small positive correlations were found between *Social value* and *Normative commitment* (p-value = 0.028; r = 0.132) as well as *Career development and training* (p-value = 0.041; r = 0.123). This indicates that respondents who considered economic value as an important attraction factor were more likely to view work-life balance as a key retention factor. Furthermore, respondents who regarded social value as an important attraction factor tended to view career development and training as a key retention factor and were most likely to demonstrate normative commitment. No relationships were found between factors of attraction with affective commitment, compensation and benefits, job characteristics and intention to stay.

Small to large positive correlations, ranging between 0.256 to 0.576, were found between all factors of attraction and all factors of the attraction, engagement and retention of women in

technical mining positions. All the p-values measured 0.00. This indicates that the more important respondents perceived application value and development value, interest value, economic value and social value, the more important they regarded a conducive work environment and work benefits and career development as important factors for attracting, engaging and retaining women in technical mining positions

5.3.9.2 Correlations of factors of engagement with factors of retention, as well as with factors of attraction, engagement and retention of women in technical mining positions

Small to large positive correlations, ranging from 0.227 to 0.447, were found between *Vigour* and all factors of retention, except *Work-life balance.* The p-values all measured 0.000. Small to large positive correlations, ranging from 0.168 to 0.456, were found between *Dedication* and all factors of retention, and also except *Work-life balance.* The p-values measured between 0.000 and 0.005. This suggests that vigour and dedication were positively influenced by compensation and benefits, career development and training and an employee's job characteristics. These factors also positively affected their affective and normative commitment to an organisation and their intention to stay within it.

Absorption was the only factor that positively correlated with all factors of retention. The correlations ranged between 0.125 and 0.412 (small to medium). The p-values measured between 0.000 and 0.039. This indicates that respondents who scored high on absorption were positively influenced by compensation and benefits, career development and training, job characteristics and work-life balance. Absorption also had a positive correlation with affective and normative commitment as well as their intention to stay within the organisation.

There were small positive correlations between the engagement factors and all factors of the attraction, engagement and retention of women in technical mining positions. The correlations ranged between 0.140 and 0.266. The p-values measured between 0.000 and 0.020. This suggests that the more traits of vigour, dedication and absorption respondents displayed, the more they valued a conducive work environment as well as work benefits and career development as important factors for attracting, engaging and retaining women in technical mining positions.

5.3.9.3 Correlations of factors of retention with factors of attraction, engagement and retention of women in technical mining positions

No relationship was found between a *Conducive work environment* and factors of retention. *Work benefits and career development* positively correlated with four factors of retention (affective and normative commitment, job characteristics and work-life balance), except for compensation and benefits, career development and training, and intention to stay. This suggests that respondents who considered work benefits as important factors for attracting, engaging and retaining women in technical mining positions also placed importance on job characteristics and work-life balance. In addition, the same cohort is most likely to demonstrate both affective and normative commitment towards their organisations. It should be noted, however, that the factor already incorporated elements of compensation and benefits and career development and training.

The above section demonstrated that views regarding the importance of the different attraction factors positively influenced respondents' engagement and retention in organisations. The importance of various attraction factors influenced the vigour, dedication and absorption of the respondents. These factors were also influenced by compensation and benefits, job characteristics, career development and training, work-life balance, having a conducive work environment, and work benefits and career development, which influenced the respondents' commitment to an organisation and their intention to stay within it.

5.4 CONCLUSIONS

The section above presented and discussed the quantitative research results. The sample consisted of 282 women employed in technical mining positions across South Africa. These women were employed in different mining subsectors and occupations. Their biographical data captured information regarding their highest qualification, marital status, whether they had children and the duration of their employment in their current positions, in their organisations and in mining in general.

Exploratory factor analyses were conducted to explore factors of attraction and retention. For attraction, four factors (application value and development value, interest, economic and social value) were yielded from the adapted EmpAt scale. For retention, the EFA yielded seven factors, namely affective commitment, normative commitment, compensation and benefits, job characteristics, career development and training, work-life balance and intention to stay. The factor on the attraction, engagement and retention of women in technical mining positions derived from the self-developed scale yielded two factors (conducive work environment, and work benefits and career development). On the other hand, CFA was conducted using the UWES to examine

factors of employee engagement. The results confirmed the UWES factors of vigour, dedication and absorption.

Furthermore, results of the independent t-test showed the effect that night shift work, having children and being involved in a work committee has on attraction, engagement and retention. The ANOVA results showed the effect that marital status has on the attraction, engagement and retention of women in technical mining positions.

The last statistical analysis was the Pearson product-moment correlation test, which provided results on the correlations between various biographical information and attraction, engagement and retention. The Pearson product-moment correlation test also tested the correlation between factors of attraction, engagement, retention and those related to the attraction, engagement and retention of women in technical mining positions. All the above-mentioned research results are discussed in detail in the succeeding chapter.

CHAPTER 6

EMPIRICAL FINDINGS AND ANALYSES OF QUALITATIVE DATA AND DISCUSSION AND INTERPRETATION OF QUANTITATIVE RESULTS AND QUALITATIVE FINDINGS

6.1 INTRODUCTION

The previous chapter presented the quantitative analysis and its results. This chapter presents the analysis of the qualitative data. The first section discusses the deployment of the research methodology, then the demographic information of the research participants, followed by major themes and sub-themes and finally a discussion of the research findings. The chapter also provides the interpretation of the results (quantitative) and findings (qualitative) against the literature review findings.

6.2 DEPLOYMENT OF THE RESEARCH METHODOLOGY: QUALITATIVE PHASE

The qualitative findings were attained from the semi-structured interviews, which are presented in themes derived from transcripts. The aim of the qualitative research was to provide detailed information on factors that affect the attraction, engagement and retention of women in technical mining positions from the perspective of employers. The detailed research methodology is presented in Chapter 1 under section 1.6. The research findings were organised into major themes alongside sub-themes identified using thematic analysis and are related to the study's objectives.

6.3 DEMOGRAPHIC INFORMATION OF RESEARCH PARTICIPANTS

The demographic information of the research participants is shown in Table 6.1. This information contains the subsectors in which they work and their occupation.

Table 6.1: Research participant profile

Research participant	Subsector representing	Occupation
Participant 1	PGM	HR manager, senior accountant
Participant 2	PGM	HR assistant, Covid clerk
Participant 3	Other mining and coal	Rock engineer superintendent
Participant 4	PGM	HR manager
Participant 5	Other mining	HR officer
Participant 6	Gold	HR assistant
Participant 7	PGM	HR assistant
Participant 8	PGM	HR assistant
Participant 9	PGM	HR assistant
Participant 10	PGM	HR assistant
Participant 11	Other mining	HR officer

As shown in Table 5.34, a total of 11 semi-structured interviews were conducted. The majority of research participants (10) were human resource personnel, except for one, who was a rock engineer superintendent. The participants were mostly from the PGM subsector, followed by other mining (mining of iron ore, chrome, manganese, copper, phosphates and salt) and coal mining. The next section discusses the major themes and sub-themes that were identified during the analysis.

6.4 THEMES AND SUB-THEMES

The research findings are centred on five major themes related to the attraction, engagement and retention of women in technical mining positions. An outline of the major themes and sub-themes are illustrated in Table 6.2.

Table 6.2: Summary of major themes and sub-themes

Major theme	Sub-theme
1. Gender representation of employees in technical mining positions	
2. Reasons for the underrepresentation of women in technical mining positions	• Historical practices • Heavy manual labour • Gender stereotypes
Major theme	**Sub-theme**
3. The attraction of women to technical mining positions	• Barriers to attraction • Measures implemented by mining organisations to ensure gender equality • Recommendations to attract women to technical positions
4. The engagement of women in technical mining positions	• Understanding of employee engagement • Factors affecting engagement • Measures implemented by mining organisations to keep women engaged
5. The retention of women in technical mining positions	• Average tenure of women in technical mining positions • Factors influencing the retention of women in technical mining positions • Measures implemented to retain women in technical mining positions
6. Recommendation for women to pursue careers in technical mining positions	

The next section discusses the research findings that arose from the above-mentioned themes. Verbatim quotations from the participants are used to substantiate the findings. For ethical reasons, the participants are reported as participant (P), followed by a numerical value and the subsector they represented, for example (P1, PGM).

6.4.1 Gender representation of employees in technical mining positions

Prior to determining factors affecting the attraction, engagement and retention of women in technical mining positions, the researcher explored whether women were underrepresented in technical mining positions in the respective mining organisations involved in this study. This question was critical for the researcher to determine the relevance of the research problem to the mines that formed part of the qualitative research. All research participants concurred that men outnumber women in technical positions in their organisations. Some examples of this viewpoint can be found in the following quotes:

> *There are way more males than females, roughly 10% females. (P1, PGM)*
>
> *More men than women. (P5, Other mining)*
>
> *More males than woman. (P10, PGM)*

6.4.2 Reasons for the underrepresentation of women in technical mining positions

The majority of participants (P1, P3, P4, P7, P8, P9 and P10) described the mining industry to have always been male-dominated, resulting in women's underrepresentation. In light of this view, one participant asserted that women were only introduced to mining in later years, with only a few employed in technical positions. As a result, the industry is bearing the brunt of the consequences of historical events. The following points illustrate some of the participants' views on the mining industry being historically male-dominated:

> *The mining industry was historically dominated by males. (P3, Other mining and coal)*
>
> *There are more males due to sins of the past. You do not fix sins of the past in 1 week, 1 month or even a year. Mining was historically a male-dominated environment and even today we still pay the price of that perception. (P1, PGM)*
>
> *This is due to the mining historical background which is known for being male-dominated. Women were only introduced to mining in the later years and only as*

administrative staff. Women started working in technical position in small numbers. (P4, PGM)

In addition, P2 and P5 stated that the reason for the underrepresentation of women in technical mining positions was due to the physically intensive nature of mine work due to the heavy manual labour involved. The equipment or machines used for mine work were described as too heavy for women to handle. In view of this, these types of jobs were perceived to be difficult to perform for women. The following comments demonstrate these points:

Some of these jobs depend on heavy manual labour … so as a company, it's sometimes advisable to get men for manual labour because with my experience I've seen that women … it becomes very difficult to put women in that space. (P2, PGM)

There are more men due to the fact that mining jobs are too heavy for women. (P5, Other mining)

One participant (P11) attributed gender stereotypes as a cause of women's underrepresentation in technical positions. These stereotypes included views that a women's place is in the kitchen and not in the mine. The participant attributed mining as an industry previously thought to be masculine and associated with men. Women, in turn, were known to work in light duties such as administration, clerical work, human resources, finance and not in core-mining positions such as mining, rock-drilling, etc. His views are expressed below:

I think it goes way back in society, we always thought that mining is for men, not women. We always known women working in light duties. Women were considered to be in the kitchen and not in the mining industry. Mining is seen as a masculine industry whereby men are well suited. (P11, Other mining)

6.4.3 The attraction of women to technical mining positions

Chapter 3 revealed that various factors affect the attraction of women to mining. The major theme on the attraction of women in technical mining positions includes three sub-themes, namely barriers to attraction, measures implemented by mining organisations to ensure gender equality and recommendations to attract women to technical mining positions. Barriers to attraction identified factors that participants believed could hinder women from permeating the industry, specifically technical positions. The latter themes are centred on the role that mining companies are playing to ensure gender equality and measures taken to attract women to the industry. These sub-themes have been explored to contextualise the factors influencing the attraction of women to technical mining positions.

6.4.3.1 Barriers to attraction

According to the majority of participants (P2, P4, P5, P7, P8, P10 and P11), the lack of career awareness of mining-related qualifications was the main barrier to attracting women to technical mining positions. According to the research participants, there were insufficient career exhibitions at the basic education level to teach learners about careers in mining and encourage girls to understand mining professions. The following comments illustrate these points:

> *There is a lack of knowledge at school level regarding mining occupations. (P2, PGM)*

> *… high school level, there is not enough exposure to career exhibitions. Back in my days when I did high school, I had one career exhibition. Our government schools do not do career exhibitions and maybe they are not the only ones to be blamed. In the Northern Cape, for example, people don't even know that there are platinum mines in the North West. I learnt to know that there are platinum mines in Rustenburg when I went to Potch University. The way I found out was through sports. I met people that played sports in Potch that were working in Rustenburg. (P1, PGM)*

> *Not sufficient mining career expos that will encourage girls to understand mining. (P4, PGM)*

Another barrier to attraction is the perception of mine work as physically demanding. P4, P5 and P11 asserted that women fear being involved in hard labour. For those on the outside, the image of the mining environment, the equipment used and the tasks involved in carrying out work may cause them to be sceptical about pursuing a career in the industry. These jobs are classified as 'dirty jobs for women'. In addition, underground working conditions are described as generally unfavourable. The participants asserted that underground working conditions are not conducive to everyone; however, it is even more challenging for women who are not accustomed to such conditions. These conditions include being transported in crowded cages where they get pushed, sometimes deliberately and other times unintentionally. These views are expressed by the following quotations:

> *Underground conditions which are not conducive for all, but women find them difficult as they are not used to such environment. (P4, PGM)*

> *Women are scared of hard labour. So when they look at mining they see machinery, lifting, underground, this and that. So it's kind of like, you can say a dirty job for a woman. So probably they are sceptical because of such things. (P11, Other mining)*

… or the job at the mine is too heavy for them. Normally they use a cage to go underground. There are some people that push, whatsoever. Those are the challenges. Some of that people do that intentionally. Some of them do that because there is pressure in the cage. Not intentionally. (P5, Other mining)

Work-life balance is another barrier to attraction. P1 and P3 stated that mining organisations operate 24 hours a day, and therefore have different work shifts. Despite having full-time employment, women still have to fulfil marital responsibilities, as they have to look after their families in addition to their work obligations. This may cause some women to reconsider working in mining, as they would have to balance work and home responsibilities. These sentiments are expressed below:

The different shifts … because we are a 24/7 operation, it's something that can make a female employee to think twice before she can take up employment at the mine. (P1, PGM)

Marital responsibilities. I have to often choose between career and my family. (P3, Other mining)

Two participants (P2 and P4) said male employees are resistant to accommodating women. Men are said to lack confidence in women's ability to perform adequately at work. Men prefer to assist women to ensure that their work is not jeopardised as a result of their lack of confidence in women. These points are illustrated by the following comments:

Resistance of men to accommodate women. (P4, PGM)

There's a stigma that women cannot do this job. If a lady decided to go do some jobs for that workplace, a guy would rather say that let me come and assist you. They are already afraid that she is not going to deliver. That's the stigma. Men don't have confidence in women to carry out work activities allocated to them. (P2, PGM)

Certain jobs, particularly those that are underground, require employees to be medically fit. Some mining positions necessitate medical tests for employees to be able to perform them. These can only be carried out if the medical tests are passed. This is a barrier to entry, as some women fail medical tests. These points were expressed by P1 and P4 as illustrated below:

Certain positions, for example, you need to be medically fit to work in the mine, especially if you are going to work underground. For an example, a senior rock engineer is a person that is going to work underground and women, for example, are child-bearers, due to their DNA after giving birth, it becomes difficult for women

to pass a medical test. That's a critical occupation, a senior rock engineer. She started, she did her first medical in January this year. She gave it second try now a day before yesterday [02/03/2021], she made it, but there are certain tests that she must be done. So it took me almost two months and it is going for the third month now to get that person just to pass a medical. (P1, PGM)

Medical fitness. (P4, PGM)

6.4.3.2 Measures implemented by mining organisations to ensure gender equality

P1, P2, P4 and P11 said they had a WIM or Gender Equality Forum in place. These forums are said to provide a platform for women to discuss gender-related issues, which are then brought to management's attention. Although in existence, one participant (P2) expressed concern regarding how the forums are being administered. The forums were criticised for not being widely visible and meetings are not held as frequently. However, one participant said that the different work shifts affect the frequency with which meetings are held. Because most meetings are held in the morning, those who work night shifts are unable to attend. Despite these challenges, the participants believed that employees should devise solutions to these issues. The following comments demonstrate these points:

You know there's a higher-level Women in Mining Forum that is regional and national. It should, however, be taken into consideration that when the Women in Mining Forum wants to conduct a meeting, it must not be counterproductive, as this is a shift cycle. We've got morning afternoon and night shift. So sometimes the night shift women cannot be in the meeting because the meeting happens in the morning shift. But still, I would expect that there should be a representation from that shift so that they can take the feedback back to the underground. (P1, PGM)

There is a Women in Mining Forum. But their presence is not seen frequently. I haven't seen a meeting of a Women in Mining Forum in a very long time. The people that are supposed to be custodians of Women in Mining, I think they are not driving it correctly. There should be at least workshops for making sure that these group leaders for Women in Mining know what they are supposed to do. (P2, PGM)

We have a gender equality forum where all the gender-related issues are discussed and addressed for management recommendation. (P4, PGM)

Over and above the Women in Mining Forum, P1 and P5 said gender equality is promoted through gender-inclusive recruitment processes. Recruitment strategies are tailored to entice more women into mining and encourage them to apply for advertised positions. The quotes below illustrate how recruitment processes are used to ensure gender equality:

> *Our recruitment strategy is tweaked to provide for us to bring in more females. So for example, if I need to go and recruit a 100 equipping helpers, we make a rule to say 50% of them must be women. There is no negotiation about it. We need to go and get 50% equipping helpers which are women. (P1, PGM)*

> *We encourage women to apply for jobs that we advertise. (P5, Other mining)*

6.4.3.3 Recommendations to attract women to technical positions

Most participants (P2, P4, P5, P7, P8, P10 and P11) recommended that more career awareness programmes should be held at schools to expose learners to careers in mining. The participants explained that girls are less exposed to mining careers at the basic education level and they are unaware of the opportunities available to them in the industry. More focus was said to be placed on careers such as being a doctor, nurse, lawyer, etc. Therefore, to attract more women to technical positions, learners should be introduced to mining-related careers at an early stage. It should be noted that career awareness was mentioned by the participants as a barrier to attraction, hence the recommendation. These suggestions are expressed below:

> *They need to provide more career awareness initiatives at basic education level so that learners can have more options to choose from other than the conventional occupations that they are exposed to. I think in basic education, mining should be introduced. We learn a lot about doctors, nurses, lawyers. They touch little base on mining and every time they touch mining it will be like engineering. They need to explore more careers, there are onsetters, blacksmiths. You can do this and that. (P11, Other mining)*

> *Mining should be introduced at primary levels to have information about the industry. (P9, PGM)*

> *School programmes which put emphasis on mining careers, especially from the local communities, should be in place so as to introduce mining careers to female learners. (P11, PGM)*

Another suggestion made by participants (P1, P2 and P5) was to support women's career advancement by providing career development and growth opportunities within the organisation, which they believe will encourage more women to pursue careers in technical fields. According

to the participants, prospects for advancement should be provided when women enter the industry. The following are some quotes that support these ideas:

> *Support women's career development and growth. (P1, PGM)*

> *We should ensure that even when they come in, they must be promoted into bigger positions. (P2, PGM)*

P1 also referred to the importance of providing attractive remuneration packages, implementing job requirements that are non-gender discriminatory and mandating the recruitment of women in the industry. Mining companies should review their recruitment policies to ensure that they do not discriminate against women and that they are aligned in a manner that will attract more women. Women's recruitment should be measured as one of the organisation's key performance indicators. The opinions that supported these recommendations are illustrated below:

> *You need to look at your inherent job requirements, are they not maybe discriminating against gender. (P1, PGM)*

> *… your remuneration structure as well, you need to align into such a way that will allow you to bring women. (P1, PGM)*

> *You need to make the recruitment of women in mining a KPI at executive level, of a mine manager, of an HOD. That must be a KPI and must be measured every year. (P1, PGM)*

The preceding section presented the research findings of various factors that impede the attraction of women to technical mining positions. Not only were those factors identified, but recommendations for mitigating them were also provided. The position of mining organisations on measures taken to attract women was also discussed. This provided a picture of organisations' attempts to attract women to the industry. The following section presents the research findings of factors influencing women's engagement in the workplace.

6.4.4 The engagement of women in technical mining positions

This theme consists of research findings on the engagement of women in technical mining positions. The major theme has three sub-themes: understanding of employee engagement, factors affecting employee engagement and measures implemented by mining organisations to keep women engaged. These are discussed in the next section.

6.4.4.1 Understanding of employee engagement

Prior to asking the participants questions about factors influencing employee engagement, the researcher inquired about their understanding of the term 'employee engagement'. The question aimed to establish how organisations view employee engagement. P1, P2, P5 and P11 asserted that employee engagement is related to communicating with employees. The quotations below demonstrate participants' understanding of employee engagement:

> *It has to do a lot with your communication with your workforce. (P1, PGM)*

> *A close communication with employees. Proper communication. (P2, PGM)*

> *Isn't more like interacting with each other? (P11, PGM)*

Employee engagement was defined by P7, P8, P9 and P10 as organisations ensuring that employees have the necessary qualifications and skills. P3 defined employee engagement as the 'conditions of employment'. The following are some quotes of definitions provided.

> *Employees are employed by their qualifications and skills. (P7, PGM)*

> *Employee employed according to their qualification. (P10, PGM)*

Only one participant's perception of employee engagement was linked to that of human resources (P4). In this study, the term 'employee engagement' is defined as an employee's state of having a continual, positive and effective motivational state of fulfilment that is characterised by vigour, dedication and absorption (Schaufeli & Bakker, 2004:295). The quote below reflects how this participant defined employee engagement.

> *The extent to which employees are aware of their internal and external environments, understand their careers paths, are passionate about jobs and are willing make a success out of it. (P4, PGM)*

After gauging the participants' understanding of employee engagement, the researcher read out the study's definition of the term to channel responses contextualised within the study's conceptualisation of the term.

6.4.4.2 Factors affecting employee engagement

The main factor affecting employee engagement is the lack of career development. Participants (P1, P2 and P4) mentioned that there are few career development opportunities such as being

promoted to higher positions. They asserted that women have to work twice as hard as men to be considered for promotions. These points are illustrated by the following comments:

> *Growth opportunities within the company. But for a female, for a mother, it's a bit difficult. That person will have to almost work twice as hard as the male to get to be seen to be considered for the next level. (P1, PGM)*

> *Having few career development opportunities affects women's drive in the workplace. Career development becomes an issue. (P2, PGM)*

> *Their career growth takes longer than that of men. (P4, PGM)*

Other factors that were mentioned were unfavourable working conditions, work-life balance and workplace culture (P1, P4 and P5). Similar to barriers to attraction, women in mining face unfavourable working conditions, which impacts their engagement. Women must balance household responsibilities with work duties, and at times, they do not even have time for themselves. In addition, the male-dominated work culture has been described as intimidating, and women must adapt and adjust to it. Some of these sentiments were expressed as follows:

> *Unfavourable working conditions. (P4, PGM)*

> *The mining environment is not easy for a woman. She is a mother, she's a breadwinner, and she needs to take care of the kids and the husband. They have responsibilities at home. That's demotivating in the sense that there is so much that they need to compromise for them to be able to work here and be a mother at home and to take care of responsibilities there, to the extent where you don't even have time for yourself. (P1, PGM)*

> *Male domination, the work culture of mining affects women's engagement. (P5, Other mining)*

> *I think it is quite intimidating … and say you need to adapt… and you need to adjust to the way things are being done and the culture around here. (P1, PGM)*

6.4.4.3 Measures implemented by mining organisations to keep women engaged

P1, P4 and P5 said that their organisations provided platforms for women to express their concerns and challenges. Women use these platforms to communicate concerns they are facing at work and to raise issues that need to be addressed to create a more suitable work environment for women. The availability of such platforms is thought to create a safe haven for women and make them feel valued. The following quotes indicate some of the participants' assertions of measures implemented by mining organisations to keep women engaged:

First of all, you need to recognise that you have women in the workplace. You need to give them a voice. By giving them a voice, they feel appreciated. (P1, PGM)

We have created platforms where women can feel safe to talk when encountering challenges. (P4, PGM)

The mine has an open platform where women can talk about issues that affect them whilst working here. (P5, Other mining)

Furthermore, women were said to be protected from any form of sexual harassment (P1 and P5). Sexual harassment is not tolerated under any circumstances, and those who are found guilty of it are dismissed. The following comments demonstrate these points:

Company is going an extra mile to protect the women. In this company, for example, we recently had a sexual harassment incident from a manager's level. That person is no longer working here. We do not protect perpetrators in this environment. (P1, PGM)

They are also taking legal actions against men that contravene these policies. You can even lose your job because of that. If you are a man and harassing women. (P5, Other mining).

There were also initiatives in place aimed at getting women into leadership roles (P1, P3, P4, P5, P6, P8 and P11). These were implemented through programmes that encouraged employees to study further to enhance their skills. In addition, one participant (P1) stated that they discouraged managers from assigning women to night shifts to allow for work-life balance and to ensure that women were safe at work. The following assertions demonstrate these points:

Because this is a 24/7 operation, we discourage managers to put our women on night shift because of safety reasons and because we understand that they've got responsibilities at home. (P1, PGM)

Women are progressing in technical management positions. (P4, PGM)

There are programmes and learnerships offered in the company and skills development. (P8, PGM)

The findings above indicate that participants had a rudimentary understanding of what employee engagement entails. Because employee engagement is primarily viewed through the lens of communication, the programmes identified as aimed at keeping women engaged may not have been specifically designed to address employee engagement. The findings also revealed that

employee engagement correlated with factors that are similar to employee attraction, such as a lack of career advancement, work-life balance and unfavourable working conditions. The findings of factors influencing women's retention in technical mining positions are discussed in the following section.

6.4.5 The retention of women in technical mining positions

This theme examined the retention of women in technical mining positions. To determine the factors influencing the retention of women, the following sub-themes were explored*:* average tenure of women in technical mining positions, factors influencing the retention of women in technical mining positions and measures implemented to retain women in technical mining positions.

6.4.5.1 Average tenure of women in technical mining positions

The researcher first inquired about the average tenure of women in the participants' organisations before asking about factors that influenced women's retention in technical positions. Employee tenure refers to the number of years of service an individual spends at their respective organisations (Raghavan & Janardhanan, 2019:525). The purpose of learning about women's tenure was to provide the researcher with a picture of retention issues in the mining industry. The findings revealed that although the literature review suggests that women in technical mining positions face challenges related to retention, most participants (P1, P2, P3, P4, P5 and P11) claimed that this was not the case within their organisations. Participants stated that women rarely resigned from their positions. In the rare case when they would, it would be those in management or highly skilled employees. This is because there is a paucity of such skills and there is competition among mining organisations for women with these talents. The following comments illustrate participants' opinions regarding the average tenure of women in technical mining positions:

> *There is no high turnover on females. If they are here, they stay here. In the last year or so, between these three shafts, I lost about three or four females. The risk is only when it is top management or highly skilled employees. … but big companies are all fighting for the same thing. So if there is a skilled woman, they are fighting for that woman. I'll give you an example: Recently we had a mine manager that managed to get a mine manager certificate, as she was able to prove that she was worthy of being a mine manager, because you must remember, calling yourself a mine manager means way more than just calling yourself a manager. That person is responsible … the person is legally appointed underground in mining. So to get women ready for that position is not easy. It's difficult. So we've developed a mine manager, the moment she got appointed,*

one of the other big companies made an offer we couldn't. She left. It's maybe easier to skill them and make them ready, but once they are ready, they become marketable and since we are all looking for women in higher-level positions, they become vulnerable to be in bigger offers. Thus, it is not easy to obtain and retain skilled employees. (P1, PGM)

The tenure is great. I stayed for 10 years in my previous company and here there are females who are doing more than 15 years. (P3, Other mining and coal)

Honestly they do stay. Ever since I've been here, I haven't seen women leave, but I've seen men leave. Anyway, there are lots more of males than females. But so far I haven't seen any female resigning or going for an incapacity leave because they are sick. (P11, Other mining)

Because most of the participants stated that they did not face challenges related to retaining women in technical mining positions, rather than asking them about their experiences with retention factors, they were asked to provide factors that they believed should be implemented to retain women. These aspects are discussed in the following section.

6.4.5.2 Factors influencing the retention of women in technical mining positions

The main factor that would retain women is the provision of career growth opportunities (P1, P2, P4, P5 and P6). Participants were of the view that career growth opportunities, that is, the provision of promotion opportunities, can contribute to the retention of women in technical mining positions. According to the participants, women who do not receive these opportunities tend to leave. Opportunities like these can be aided by providing financial assistance for further education. Below are some of the views expressed by participants:

Offer them an opportunity for growth. Women leave for growth opportunities. (P1, PGM)

An aggressive development programme (fast-tracking). (P4, PGM)

Women should be encouraged to study to empower themselves. (P6, PGM)

Encouraging active participation in Women in Mining forums is another factor that could help retain women (P1 and P2). Women in Mining forums are important for promoting gender equality and providing a platform for women to share their work experiences and challenges. However, in order for these forums to be successful, they must remain active on a regular basis, as noted in the comment of P2 below:

Keep Women in Mining forums very active on a monthly scale. (P2, PGM)

This is accompanied by the promotion of a work-life balanced work environment (P1). Women leave the industry due to the demanding nature of mine work, which interferes with the time they spend with their families. In addition, because mines are located in remote areas far from their families, some leave to be closer to their families. The following quote demonstrates this view:

> *They leave because they want to be closer to home, to be with their kids, family. (P1, PGM)*

6.4.5.3 Measures implemented to retain women in technical mining positions

Previous findings revealed that based on the observations of study participants, women employed in their organisations rarely leave their jobs. This sub-theme discusses the various measures implemented by mining organisations to ensure this. The measures implemented vary from one organisation to the next. The majority of participants (P1, P3, P4, P5, P7, P9 and P11) stated that employees were often offered training and given opportunities to register for courses. In addition to training, P1 said their organisation had a remuneration-based incentive scheme. Below are some examples provided by participants:

> *There are courses that the company offers to equip them. (P7, PGM)*

> *So there are career development opportunities in terms of training and school. School is in the form of bursaries. (P11, Other mining)*

> *Long-term incentive schemes that are remuneration-based and it worked up until last year. (P1, PGM)*

There were also a few participants (P1 and P5) who indicated that they did not have any retention initiatives in place. The following statements highlight their assertions:

> *No retention initiatives aimed at retaining women. (P2, PGM)*

> *Currently, we don't have a retention programme to retain women. (P5, Other mining)*

The findings above show that, despite the low turnover experienced by participants' organisations, there is a notion that promoting career development in the workplace is critical to retaining women in technical mining positions. In addition, Women in Mining forums are viewed as important entities to drive retention; however, they need to be more active. To determine the organisation's stance in having women in mining, the participants were asked if they would encourage women to pursue careers in technical mining positions. The findings are presented below.

6.4.5.4 Recommendation for women to pursue careers in technical mining positions

The participants were unanimous in their encouragement of women to pursue technical mining positions. They asserted that this would benefit the industry by increasing diversity, changing the workplace culture and empowering women. The industry was also commended for being one of the highest-paying industries. The following comments illustrate these points:

> *Yes, this will add more value in changing the mining culture and how people are being treated. (P4, PGM)*
>
> *It is to have a balanced and diverse environment. It is very important. (P2, PGM)*
>
> *To boost their self-worth and gain power in man's world. (P8, PGM)*
>
> *A salary of the lowest-paid entry-level position in the mine is around R22 000 cost to company, including all the benefits. So the lowest paid person here takes home around R12 500. An employee in another industry is not getting the same salary. (P1, PGM)*
>
> *Yes. Money is adequate to maintain your family. (P7, PGM)*

6.5 CONCLUSIONS

This section provided the findings of the qualitative research. From the research findings, it is evident that mining is still male-dominated and because of this, men mostly outnumber women in technical positions. The lack of career awareness initiatives at the basic education level is the key issue affecting attraction. The idea that mining jobs are physically demanding is an additional barrier to attraction, as is the workplace culture, which is perceived as unwelcoming to women. Work-life balance is another impediment, as is a requirement to be medically fit. The main factor affecting employee engagement is the lack of career development. Similar to attraction, unfavourable working conditions, work-life balance and workplace culture emerged as factors affecting employee engagement. The retention of women in technical mining positions is not seen as a challenge, as the turnover tends to be low. Career growth opportunities and encouraging active participation in Women in Mining forums are regarded as imperative measures for retaining women in the industry. It has been discovered that mining organisations also play a role in the attraction, engagement and retention of women. In the majority of cases, the initiatives implemented are designed to address the issues women face when it comes to attraction, engagement and retention. The recommendations provided are aimed at addressing these challenges as well. The next section provides the discussion and interpretations of the research results and findings in relation to the literature reviewed.

6.6 DISCUSSION AND INTERPRETATION OF QUANTITATIVE RESULTS AND QUALITATIVE FINDINGS

The quantitative phase of the study aimed to ascertain factors that facilitate, inhibit and influence the attraction, engagement and retention of women employed in technical mining positions in South Africa. The qualitative phase of the study aimed to provide detailed information of factors that affect the attraction, engagement and retention of women in technical mining positions from the perspective of employer representatives.

Chapter 5 presented and discussed the quantitative research results. It presented respondents' biographical data, followed by factor analyses of attraction, retention and engagement and factors attracting, engaging and retaining women in technical mining positions. Further statistics (t-tests, ANOVAs and Pearson product-moment correlations) were presented and discussed to understand the effect of various biographical variables on these factors.

Along with the quantitative results, qualitative findings from semi-structured interviews were presented and discussed to provide in-depth information about factors affecting women's attraction, engagement and retention in technical mining positions from the perspective of employer representatives. It became apparent from the research results and findings that various factors are influencing the attraction, engagement and retention of women in technical mining positions. These factors are discussed in detail in the sections below.

6.6.1 Biographical information

The majority of respondents came from the North West province and the PGM subsector. This is consistent with South Africa's employment distribution for mining employees, with the majority based in the North West province due to the presence of the majority of platinum mines (MQA, 2019b:12). This was expected, given that the study's respondent target group was individuals in technical mining positions, defined as those held by employees with a tertiary education who perform frontline tasks such as exploration, quantification, development, extraction and processing of mineral resources (Terrill, 2016:16). The majority of respondents were single, had been in their current positions for one to three years, and had worked in their organisation and the mining industry for the same period. The majority of respondents work on the surface and were not required to work night shifts. The three primary reasons for selecting a mining occupation were the desire to work in an exciting work environment, the desire to work in a challenging industry and reasons due to unemployment.

In terms of qualitative findings, all research participants were human resource personnel, with the exception of one, who was a rock engineer superintendent. Nevertheless, because the participant

was a superintendent (a senior position), she was still eligible to provide perspectives on attraction, engagement and retention from an employer's perspective. The PGM subsector accounted for the majority of participants, followed by other mining (iron ore, chrome, manganese, copper, phosphates and salt) and coal mining. The following section discusses and interprets the results and findings of factors influencing the attraction, engagement and retention of women in technical mining positions.

6.6.2 Attraction

In this study, attraction is defined as an organisation's ability to positively lure individuals into viewing the organisation and its work as desirable and suitable for accommodating their envisioned benefits with which to initiate or resume an employment relationship (Berthon *et al.*, 2005:156; Rynes & Barber, 1989:3). Employee attraction was investigated using Berthon *et al*.'s (2005) employer attractiveness theory.

In pursuit of investigating the attraction of women to technical mining positions, the researcher sought to establish empirically, in the qualitative phase of the study, the stance of women in the industry and reasons for their underrepresentation. The research findings indicated that the research participants viewed the mining industry as male-dominated. Participants believed that this is mainly due to historical practices that barred women from participating in certain occupations. As discussed in Chapter 4, the prohibition of women in mining was legislated in 1911 by the Mines and Works Act (No. 12), and the South African Minerals Act of 1991 also banned women from working underground (Simango, 2006:15), until 1994, when a democratic government repealed previous discriminatory laws. An additional reason for women's underrepresentation has been attributed to the labour-intensive nature of mine work. Mining equipment and machinery were portrayed as too heavy for women to operate, implying that it would be difficult to handle. These perspectives present a particular image of the industry to those outside it and according to participants, they affect attraction. Participants mentioned that there was a lack of career awareness initiatives related to mining-related qualifications. They mentioned that there were few career exhibitions at the basic education level to educate learners about mining careers and encourage girls to pursue them.

To establish what would attract other women to technical mining positions, the quantitative investigation involved women who were already in the industry to determine factors affecting employee attraction. Using the EmpAt scale, four factors emerged from EFA of the scale items measuring employee attraction: *Application value and development value, Interest value, Economic value* and *Social value*. These are similar to the attraction dimensions found by Berthon *et al*. (2005). In their theory, Berthon *et al*. (2005) found five dimensions related to employee

attraction: interest value, economic value, social value, development value and application value. These five dimensions represent anticipated benefits that potential employees may seek in a company (Meehan, 2019:6). In this study, however, application value and development value served as one factor. The Cronbach's alpha coefficients showed high reliability and internal consistency for all factors.

The factor mean scores were all above 4, indicating that on average, *Application* (the ability to apply what one has learned) and *Development value* (the availability of platforms that provide recognition, self-worth and career advancement opportunities), *Interest value* (which involves an exciting work environment and unique work practices that make use of employees' creativity), *Economic value* (the degree to which an individual is attracted to an employer who offers a higher-than-average salary, a compensation package, job security and advancement opportunities) and *Social value* (an organisation that provides a fun and happy work environment with good collegial relationships and a team atmosphere) were all regarded as important factors for attracting women to technical mining positions. This is consistent with Nyabeze ***et al.'s*** (2010:6) research results, which found that attractive salaries and benefits are among the primary reasons why women in the mining industry choose to work in the industry. According to the literature, development values and career advancement opportunities are viewed as critical factors in determining an employer's attractiveness (Aguenza & Som, 2012:90; Khabir, 2014:135; MQA, 2020a:74). The MQA's women in mining study (2020:74) revealed that the primary reason why women chose careers in mining was the prospect of acquiring new skills and opportunities for development once employed. Other studies (AusIMM, 2009; CSRM, 2006; Gibson & Scoble, 2004; Guest, 2014; Khabir, 2014; Ledwaba, 2017; Nyabeze *et al*., 2010) indicated that career development opportunities for women in mining are a critical factor in attracting them to the industry.

The importance of *Development value* and *Economic value* was also highlighted in the qualitative findings. Participants recommended that mining companies should offer attractive compensation packages to attract women to technical mining positions. Supporting women's career advancement within the organisation by providing career development and growth opportunities is believed to encourage more women to pursue careers in technical fields.

From the t-tests and effect sizes, it was evident that respondents who were not required to work night shifts regarded *Interest value* and *Social value* as important employee attraction factors, more than respondents who were required to work night shifts. Nyabeze's previous research (2010:4) discovered that for some women, the variety of work schedules available in mines can be appealing. In addition, a higher priority is placed on interesting work, recognition and praise for work done and a sense of belongingness and involvement (Carvalho, 2018:9). This was also confirmed by Eger *et al*. (2019:531, 537), who state that women place a higher premium on

attractiveness than they do on interest and social value. Furthermore, the tests revealed that respondents who did not have children were more in favour of *Interest value* as an attraction factor than respondents who had children. The t-tests and ANOVAs revealed no significant or practical differences in the mean scores of those respondents involved/not involved in a work committee as well as for the marital status categories for the different attraction factors.

The Pearson product-moment correlation results revealed that a small negative correlation existed between age and *Interest value.* This indicates that younger respondents placed a higher value on *Interest value* than older respondents. This is in contrast to Reis and Braga's (2016:107) research results, which showed a positive relationship between age and *Interest value*, suggesting that the older the respondent, the more importance placed on *Interest value*.

Those with higher qualifications placed more emphasis on *Application and development value*, therefore seeing it as important for attracting women to technical mining positions. In addition, the same cohort viewed *Economic value* as a critical factor in employee attraction. This contradicts Carvalho's (2018:29) results that showed that the more qualified individuals, the greater emphasis is placed on the importance of working in an innovative environment that encourages creativity expression (*Interest value)*. However, Carvalho's (2018:23) research results that corroborate with this study's results indicate that individuals with higher education will prioritise factors such as good pay and development opportunities (*Application value and development value* and *Economic value*) when considering a potential employer, although they do mention the importance of interest value*.* Moreover, the longer respondents had worked for a particular organisation, the less likely they were to view *Application value and development value* as a factor in their decision to pursue a particular occupation. These same respondents found *Interest value* and *Economic value* less appealing.

The Pearson product-moment correlation results between factors of attraction indicated that the more importance respondents placed on *Application value and development value*, the greater they regarded *Interest value*, *Social value* and *Economic value* as important. The greater the respondents' belief in the importance of *Interest value*, the greater their belief in the importance of *Economic value* and *Social value*.

According to the qualitative findings, other factors affecting attractiveness included male employees' reluctance to accommodate women. Men tend to assist women with their work when working with them to guarantee that their work is not jeopardised to accomplish targets. Given the male dominance of the mining industry, there is a notion that men are superior miners and that women lack the capacity and strength to undertake mining professions (Kilu, 2017:11). A

male-dominated workplace culture generates prejudices in attracting women to the industry and leads to various forms of discrimination against their employment (Ozkan & Beckton, 2012:25).

Work-life balance was pointed out as another barrier to attraction. Women are considered to be affected by shift work, as they must balance their marital commitments with their employment obligations. Some women may be hesitant to work in mining because they would have to balance job and family duties. According to Botha (2017:26), the work-life balance of women in mining is mostly influenced by unfavourable work schedules. Mine labour has an impact on women's family life, as they work longer hours than men due to the additional obligations of managing their families and caring for their children. Unfavourable work shifts, along with the expectation of overtime work, make it challenging for women to establish a healthy work-life balance (Lord & Eastham, 2011:20; Miningdotcom, 2014; Nyabeze *et al*.; 2010:4). This then affects attraction.

It was encouraging to learn that organisations are taking steps to attract more women to technical mining positions. Participants mentioned that their organisations had Women in Mining or Gender Equality forums, which provide a platform for women to discuss gender-related issues that arise in their work. These issues are then brought to management's attention for resolution. However, these forums should be improved, as there were concerns that they are not well publicised and meetings are not held as frequently as they should be. In addition, gender-inclusive recruitment processes have been implemented, with recruitment strategies designed to attract more women to mining and to encourage them to apply for advertised positions.

6.6.3 Engagement

The study defined 'engagement' as a continual, positive and effective motivational state of fulfilment that is characterised by vigour, dedication and absorption (Schaufeli & Bakker, 2004:5). Employee engagement was investigated using Schaufeli *et al*.'s three-factor (vigour, dedication and absorption) engagement model. CFA was used to test the structure and relations between the latent variables underlying the employee engagement data. The results showed that the three-factor structure (vigour, dedication and absorption) of the UWES fit the sample data reasonably well. Cronbach's alpha coefficients indicated good reliability and internal consistency for the three factors. Two GFIs (CMIN/DF and CFI) were used indicated a good fit, while the RMSEA indicated an acceptable fit. The mean scores of all three factors were greater than 3.6, indicating relatively high levels of engagement (feelings of dedication, vigour and absorption); however, there is still room for improvement.

The t-test and ANOVA revealed no significant differences between the mean scores of the different categories (Yes/No) for the requirement to work night shifts and for marital status for the engagement factors. However, the results of the t-test and effect size revealed that respondents

with children were more absorbed in their work (i.e. they had a pleasant state of association with their work in the workplace) than respondents without children. Furthermore, the t-test and effect size showed that respondents who were involved in a work committee were more likely to exhibit traits of dedication (having a sense of significance, enthusiasm, inspiration and pride in working for a particular organisation) (Schaufeli & Bakker, 2004:5) than those who were not part of a work committee.

The results of the Pearson product-moment correlation revealed a small negative correlation between the duration of employment in an employee's organisation and *Dedication.* This indicates that the more years respondents had been employed in a specific organisation, the less dedicated they were to their organisations. This confirms Bakar's (2013:206) results that employees who had worked in an organisation for a shorter period tend to be more engaged than those who have worked for a longer period. According to Bakar (2013:206), individuals may be more excited about their work in the first few years at a company, which will result in higher engagement levels than those who have been in the organisation longer. These results are also in line with Boikanyo's (2012:73) results that found that employees with zero to two years' experience were the most engaged compared to those who had been employed for a longer period.

Large positive correlations were found between *Vigour* and *Dedication* as well as *Dedication* and *Absorption,* indicating that the higher the respondents' vigour, the higher their dedication and the more they were absorbed in their work. It also implies that the more dedication they demonstrated, the higher their absorption.

The qualitative research also aimed to ascertain factors that affect the engagement of women in technical mining positions. Prior to establishing these factors, participants were requested to provide their understanding of the term 'employee engagement' to establish how organisations view engagement. From the perspective of employers, the findings revealed that there appeared to be a lack of clear understanding of the concept of employee engagement. The concept of employee engagement was understood by some from the perspective of communication, stating that it requires maintaining ongoing communication and proper interaction with employees. The term was also understood by some to mean ensuring that personnel who are employed by an organisation had the requisite qualifications and skills. Out of all the participants, only one linked it to the concept to human resources, stating that it is "the extent to which employees are aware of their internal and external environments, understand their careers paths, are passionate about jobs and are willing make a success out of it". This indicates the need for organisations to reassess their human resource activities and channel them towards incorporating engagement.

To ensure that participants' understanding of engagement was consistent with the study's definition, the study's definition of engagement was then presented to participants to elicit their opinions on potential factors affecting employee engagement in their organisations and the measures being implemented to maintain employee engagement. The dearth of career development opportunities for women, such as promotion opportunities, is the most major factor affecting employee engagement. Women are said to have to work twice as hard as men to be considered for promotions, according to participants. There is a considerable relationship between career development and employee engagement, as evidenced by the literature (Guest, 2014:146). Hlapho (2015:71) discovered that employee engagement is influenced by practices such as training and development and career advancement possibilities. Therefore, a lack of career development may result in disengaged employees (Van der Walt, 2008:40).

Other factors affecting engagement according to the participants included unfavourable working conditions, such as being required to work in hazardous or labour-intensive conditions. Botha, (2014:439) and Simha *et al.* (2015:5) emphasise that if employees do not feel secure or safe at work, their engagement levels will suffer. Yuan *et al*. (2015:169) support this assertion, stating that a positive perception of safety practices (an organisation's commitment to safety) is one of the factors that can contribute to high levels of workplace engagement.

Another issue affecting employee engagement is work-life balance, in which participants indicated that women are expected to balance household responsibilities with work obligations, leaving little time for themselves at times. According to Lockwood (2007:4), work-life balance is critical for employee engagement. Employees are more likely to be engaged and attached to their employers if they understand that their employers value their family life (Simha *et al*., 2015:6). Previous research on women in mining in South Africa (Botha, 2014; Van der Walt, 2008) identified a lack of work-life balance as a factor contributing to disengaged employees. The lack of engagement may result in women leaving the mining industry for industries that provide more family-friendly work environments and arrangements that provide them with less physically demanding jobs (Botha, 2014:200).

In addition, the male-dominated work culture, to which women must adapt, affects women's engagement in technical mining positions. Women in mining are reported to be disengaged and alienated in large part due to unequal workplace culture, men's low perceived value of women and a perceived lack of respect for them (AWRA, 2014). As a result, overt bias, discrimination and resistance against women in mining may affect women's engagement, resulting in disengaged employees.

Considering the above engagement challenges, the participants highlighted that there were initiatives in place to keep women in technical mining positions engaged. Among these were platforms for them to express their concerns and challenges, including those related to sexual harassment. In addition, there were initiatives aimed at advancing women into leadership positions. Women were encouraged to further their education and develop their skills through these programmes. One participant even stated that managers were discouraged from assigning women to night shifts to allow for work-life balance and to ensure women's safety on the job.

6.6.4 Retention

From an employee point of view, retention is viewed as the act to which an employee continues to undertake work-related exchange with a particular organisation on a prolonged basis (Sinha & Sinha, 2012:146; Zineldin, 2000). For employees, retention suggests a state in which employees willingly decide to work and remain within a particular organisation (Osaro, 2016:77). The Herzberg two-factor theory was used to investigate employee retention.

It was interesting to discover that most of those who participated in the semi-structured interviews stated they did not experience challenges related to retaining women in technical mining jobs. Women in these positions rarely resign, they claimed. Those who did were mostly in management and highly skilled occupations, where other mining organisations would headhunt them. This contradicts previous research, suggesting that women working in technical mining positions face a retention challenge (Ledwaba, 2017:17; Letlape, 2014:108; Masvaure *et al*., 2014:488; Nyabeze *et al*., 2010:4; Mangaroo-Pillay, 2018:93; WIMC, 2010:20).

The EFA conducted on the scale items measuring employee retention showed seven factors: *Affective commitment* (when an individual is emotionally attached to his/her organisation to the point where he/she is strongly committed to it, involved and enjoy being a part of it [Allen & Meyer, 1990:2]), *Normative commitment* (the perceived obligation to remain in the organisation [Allen & Meyer, 1990:3; Meyer et al., 2002:21]), *Compensation and benefits, Career development and training, Job characteristics, Work-life balance* and *Intention to stay.*

The Cronbach's alpha coefficient for *Affective commitment* factor showed good reliability and internal consistency, while the value for *Normative commitment* showed moderate reliability and internal consistency. The mean scores were 3.093 for *Affective commitment* and 3.326 for *Normative commitment*. This indicates that on average, the respondents held a neutral position regarding affective commitment and were neutral to positive when it came to normative commitment.

The results of the exploratory factor analyses further showed one factor each for *Compensation and benefits*, *Work-life balance* and *Intention to stay*. The Cronbach's alpha for all these factors showed good reliability and internal consistency. The mean score for *Compensation and benefits* was 3.338, 2.925 for *Work-life balance* and 3.290 for *Intention to stay*. This indicates that on average, the respondents' sentiments regarding their compensation and benefits were leaning towards positive. The respondents showed a negative inclination towards their experience of work-life balance.

Furthermore, the EFA showed two factors on career development, training and job characteristics, namely *Career development and training* and *Job characteristics*. The Cronbach's alpha coefficient for the *Career development and training* factor showed good reliability and internal consistency, while the value for *Job characteristics* showed moderate reliability and internal consistency. The mean scores were 3.142 for *Career development and training* and 3.379 for *Job characteristics*. This indicates that on average, the respondents held neutral to positive sentiments regarding their organisations' provision of career development and training as well as positive sentiments towards the characteristics of their job. These factors are what Herzberg (1987:9) refers to as 'motivators'. Motivator factors include achievement, recognition, the work itself, responsibilities, advancement and growth (Herzberg, 1987:9). Employees frequently have a desire to achieve and experience growth within their organisation, which results in their success and retention within organisations (Herzberg, 1987:9).

The t-tests and effect sizes revealed that the respondents who were not required to work night shifts recognised job characteristics as an important factor that can impact employee retention more than those respondents who worked night shifts. In addition, to some extent, respondents who were part of a work committee placed a slightly higher value on job characteristics and career development than those who were not part of a work committee. According to the qualitative findings, encouraging active participation in committees such as Women in Mining forums may contribute to the retention of women in technical mining positions. In addition, these committees were deemed critical for promoting gender equality and providing a platform for women to discuss their work experiences and challenges. Furthermore, the t-test and effect size showed that respondents with children were slightly more likely than those without children to stay within their organisations. However, the results of the t-test and effect size revealed no statistical significance between factors of retention and marital status.

The Pearson product-moment correlation results revealed that the older the respondents, the more likely they were to stay in an organisation and to be retained by compensation and benefits. Compensation and benefits are related to hygiene factors (Herzberg, 1987:9). Hygiene factors are extrinsic factors that emanate from non-job-related factors such as salaries, working

conditions, security, etc. (Herzberg, 1987:9). Improving hygiene factors will not satisfy employees, but will prevent them from being dissatisfied (Armstrong, 2014:173; French *et al*., 2011:169).

The Pearson product-moment correlation results further showed that those with higher qualifications consider work-life balance and job characteristics to be critical factors in retaining employees. Respondents with lower qualifications tended to feel obligated to remain in their organisations and were less likely to leave. In addition, respondents with a long history of employment in a specific organisation and the mining industry, in general, tended to be committed and more likely to remain employed and not leave. Moreover, respondents with more years of service in a specific position, in an organisation and in the mining industry as a whole, were less positive about the organisation's and the mining industry's support for career development and job characteristics. The literature reveals that Herzberg believes that employees become truly motivated and find their work enriching when offered opportunities for achievement and recognition, stimulation, responsibility and advancement (Ramlall, 2004:57). Employees will therefore remain loyal to an organisation that prioritises the provision of motivators such as career development and are willing to leave if these factors are jeopardised (Henha, 2019:36).

All the factors of retention (affective commitment, normative commitment, compensation and benefits, job characteristics, career development and training and work-life balance) influenced respondents' intention to stay. Career development and training influenced the respondents' affective and normative commitment, compensation and benefits, job characteristics, and intention to stay. Respondents who believed they had been denied career development and training opportunities, on the other hand, faced work-life balance challenges. Career development opportunities may help retain women in technical mining positions, according to the qualitative findings. Women who are denied these opportunities tend to leave their organisations. Literature shows that unavailability and inaccessibility of career development opportunities are major reasons for employees' intention to leave organisations (Coetzee & Stoltz, 2015:89; Ibidunni *et al.,* 2016:7). Botha (2017:24) reported that women in core mining positions voiced concerns about the unequal distribution of development opportunities in the industry, as skills and career development opportunities favoured male employees over female employees. The law also requires mining organisations to incorporate a component of career development for women in the industry. For example, the Women Empowerment and Gender Equality Bill, 2013, could be viewed as a useful tool for ensuring women's equality in mining, given its advocacy for mining organisations to implement measures to ensure progressive recognition of at least 50% of women and their representation in decision-making structures, including boards of designated public corporations. Similarly, the 2018 Mining Charter requires mining organisations to significantly and meaningfully increase opportunities for women by achieving a minimum level of female representation that reflects the provincial or national right to a diverse workplace and ensures

their participation in all decision-making positions and core occupational categories within the mining industry. At least 20% of women should be on boards of directors, 20% in executive management, 25% in senior and middle management, and 30% in junior management.

The correlation analysis further revealed that except for work-life balance, all retention factors are correlated with affective commitment and level of satisfaction with their compensation and benefits. In addition, respondents who were satisfied with their job characteristics were also satisfied with their compensation and benefits, work-life balance, agreed that their organisations provided opportunities for career development and training, exhibited affective commitment and were more likely to stay within their organisations. According to Chiboiwa *et al*. (2010), the reasons for employees' urge to leave or remain within an organisation can be classified as intrinsic or extrinsic factors, which include unequal compensation systems, management style, a lack of recognition and advancement opportunities, unpleasant working conditions, and insufficient training and development opportunities. Therefore, the objective is to increase motivator factors such as creating an interesting work environment, providing opportunities for advancement, maximising competencies, involving employees in tasks that involve increased responsibilities and new challenges, and providing them with recognition when necessary (Nguyen, 2017:23). Moreover, respondents who demonstrated normative commitment were more likely to demonstrate affective commitment, were influenced by compensation and benefits and had intentions to stay.

Respondents who were satisfied with their job characteristics were likely to have a work-life balance. However, those who were dissatisfied with their work-life balance were more likely to leave. Work-life balance is one of the factors that may affect retention, according to the qualitative research findings. Women were thought to leave the industry due to the demanding nature of mine work, which interferes with family time. Furthermore, because mines are located in remote areas, some miners leave to be closer to their families. Women in mining, in particular, are more likely to seek employment outside of the industry that provides more work-balanced working conditions (Botha, 2014:200). In addition, the mean score of *Intention to stay* indicated that respondents' position regarding their intention to stay was towards positive and that they would only leave if something considerably better arose.

The majority of employer representatives from the qualitative findings stated that to retain women in technical mining positions, employees were frequently offered training and opportunities to enrol in courses. One participant said that their organisation had a remuneration-based incentive programme designed to keep women in the industry. The provision of training opportunities is encouraging, especially in light of the concerns raised regarding the provision of career development opportunities in the industry.

In light of all of the correlation analyses for attraction, engagement and retention, the analyses also demonstrated the relationship of each of these factors to one another. The correlations between factors of attraction and engagement indicated that, except for economic value, application value and development value, interest value and social value all played a role in igniting employees' vigour. In addition, all attraction factors played a role in promoting dedication and absorption. Respondents who placed a high value on economic and social value were more likely to view work-life balance and career development as critical retention factors and tended to demonstrate normative commitment. There were no associations discovered between attraction factors and affective commitment, compensation and benefits, job characteristics and intention to stay. Correlations between factors of engagement and retention showed that vigour and dedication were positively influenced by compensation, career development and an employee's job characteristics. These factors also positively affected their affective and normative commitment to their organisation and their intention to stay within it. Absorption was influenced by the same factors, including work-life balance.

6.6.5 Attraction, engagement and retention of women in technical mining positions

Apart from examining attraction, engagement and retention separately, a self-constructed scale for women in technical mining positions was developed specifically for them. The scale was developed to ascertain the factors deemed critical for collectively attracting, engaging and retaining women in technical mining positions. The EFA conducted on the scale items revealed two factors, namely *Conducive work environment* and *Work benefits and career development*. The Cronbach's alpha coefficient for *Conducive work environment* indicated excellent reliability and internal consistency, while the value for *Work benefits and career development* showed acceptable reliability and internal consistency. The mean scores of both factors were above 4, indicating that a conducive work environment, work benefits and career development are important factors for attracting, engaging and retaining women in technical mining positions.

From the t-tests and effect sizes, it was evident that respondents who were not required to work night shifts regarded *Interest value* and *Social value* as important employee attraction factors, more than respondents who were required to work a night

The t-test and effect sizes revealed that to some extent, respondents who were not required to work night shifts were most likely than those who did not work night shifts to recommend a job in the mining industry to women. The test and effect sizes further showed that respondents without children regarded a conducive work environment as an important factor for attracting, engaging and retaining women in technical mining positions, more than respondents with children. The t-

test and ANOVA revealed no significant or practical differences in the mean scores of those respondents involved/not involved in a work committee as well as for the marital status categories for factors related to the attraction, engagement and retention of women in technical mining positions.

The Pearson product-moment correlation analysis revealed that the more qualified respondents were, the more they valued a conducive work environment, work benefits and career development as critical factors in attracting, engaging and retaining women in technical mining positions. Respondents who had worked for a specific organisation and in the mining industry for long were less positive about the importance of a conducive work environment as a factor that would attract, engage and retain women in technical mining positions.

Overall, respondents who considered a conducive work environment as an important factor for attracting, engaging and retaining women in technical mining positions viewed work benefits and career development as important as well. The more important respondents regarded application value and development value, interest value, economic value and social value, the more important they perceived a conducive work environment as well as work benefits and career development to attract, engage and retain women in technical mining positions. The more respondents regarded a conducive work environment as well as work benefits and career development as important, the more they demonstrated traits of vigour, dedication and absorption. Work benefits and career development are important factors correlating with affective commitment and normative commitment. The emphasis is once again placed on career development, highlighting the importance of providing support for motivators such as career development. These results are consistent with those of Döckel (2003:22, 90), who found a strong significant relationship between compensation (a component of work benefits) and career development with affective and normative commitment. In addition, individuals who valued work benefits and career development expressed positive feelings about their job characteristics and work-life balance. This corroborates Herzberg's assertion that organisations should consider the positive value of intrinsic motivating factors when developing retention reward systems, while also taking into account financial and non-financial factors (Armstrong, 2014:173). Employer attractiveness theory reinforces this notion, with findings from Eger *et al*. (2019:535–537) indicating that some of the factors women prioritised for attraction included economic value, development value and application value. The qualitative findings revealed that a lack of career development affects engagement, emphasising the need to support the career development of women in technical mining positions. Employees may become disengaged as a result of a lack of career development opportunities (Hlapho, 2015:71; Van der Walt, 2008:40). This is also accompanied by the need to create work-life balanced work environments, as employees are more likely to be engaged to their

organisations that support and recognise their duties outside work (Botha, 2014; Simha *et al*., 2015; Van der Walt, 2008).

The research results above demonstrate unequivocally that establishing a conducive work environment and providing work benefits and opportunities for career development are critical for attracting, engaging and retaining women in technical mining positions. The results of the study are largely consistent with Herzberg's two-factor theory, which emphasises the importance of taking both hygiene and motivational factors into account when developing measures to attract, engage and retain women in technical mining positions. The implications of this theory are evident, as it points out that motivation can be improved by making fundamental changes to an employee's job, viz. job enrichment (Steers, 1991). In this case, a conducive work environment (one that is free from gender discrimination, has supportive management, offers an environment that prioritises health and safety, provides adequate PPE, has adequate ablution facilities, has supportive colleagues and is gender-balanced) can be considered a hygiene factor. Improving hygiene factors will alleviate women's dissatisfaction in the workplace (French *et al*., 2011:169). Work benefits and career development include both hygiene factors (work benefits) and motivators (career development). In this context, an employee will be attracted to, engaged in and retained by not only hygiene factors (that may contribute to dissatisfaction if not integrated), but also due to motivation factors that contribute to job satisfaction (Henha, 2019:36). The importance of focusing on growth factors (motivators) has emerged as a theme from the literature, the qualitative research findings and the quantitative research results.

6.7 CONCLUSIONS

This chapter provided the findings of the qualitative research. The discussion of the qualitative empirical findings was followed by a discussion and interpretation of the quantitative results and qualitative findings. From the research findings, it is evident that mining is male-dominated and because of this, men mostly outnumber women in technical positions. Application value and development value, interest value, social value and economic value all play a significant role in employee attraction. These results have been substantiated by the literature and findings from qualitative research. While each of these factors is critical, it appears as though application value and development value, as well as interest value and economic value, are the primary drivers of attraction. This was demonstrated by the effect that these factors have on working nights shifts, whether they had children, their age, educational level and length of employment with a particular organisation. The Pearson product-moment correlation results supported this, as it revealed that the more importance respondents placed on application value and development value, the greater they regarded interest value and economic value. The lack of career awareness initiatives at the basic education level was the key issue affecting attraction. In addition, male employees' disinclination to accommodate female employees, a male-dominated workplace culture and a lack of work-life balance were identified as barriers to attracting women to technical mining positions.

The dimensions of the three-factor engagement model were confirmed, as the structure of the UWES fit the sample data fairly well. It was discovered that respondents, on average, displayed fairly high levels of engagement (feelings of dedication, vigour and absorption); nonetheless, there is still room for improvement. Similar to the factors affecting attraction, participants asserted that the lack of career development opportunities, unfavourable conditions, gender stereotypes, work-life balance and mining's male-dominated work culture all affected engagement. These factors corresponded to those identified in the literature.

It was surprising to learn that the majority of those who participated in semi-structured interviews stated that they did not face difficulties retaining women in technical mining positions. On average, respondents were undecided about leaving their organisations and would leave only if something significantly better became available. Respondents who demonstrated affective commitment to their organisations were also more likely to demonstrate normative commitment and an intention to remain within their organisation. These factors have been identified as factors correlated with retention in the literature and qualitative research. In conclusion, a conducive work environment, as well as work benefits and career development, correlate with attraction, engagement and retention of women in technical mining positions. The next chapter presents the study's conclusions and recommendations.

CHAPTER 7

CORE SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

7.1 INTRODUCTION

Chapter 1 introduced the research and outlined the study's objectives and significance. Chapters 2 to 4 summarised the literature by outlining the study's theoretical framework, global and national trends and perspectives on women in mining, as well as the legislative and regulatory frameworks governing women's inclusion in South African mines. Chapter 5 presented and discussed the quantitative empirical results. Chapter 6 presented and discussed the qualitative empirical findings and interpreted the empirical results and findings in relation to the literature review findings. This chapter concludes the study and is presented as follows. The first section contains a recapitulation of the research problem and objectives. The second section provides the conclusions regarding the research methodology and the study's objectives. This section also includes practical recommendations. The third section discusses the limitations of the research. The fourth section outlines recommendations for further research. The final section of this chapter summarises the study.

7.2 RESEARCH PROBLEM AND OBJECTIVES

Since 1994, South Africa has enacted and implemented socio-democratic legislation and policies to redress historical injustices and foster social cohesion (Commission for Gender Equality, 2017:18). However, women continue to be underrepresented in the mining industry. Currently, women make up 17% of the mining workforce, with the majority working in clerical or support roles (67%) (MQA, 2021:18). In view of this, the study's problem statement was, first, that the mining industry is experiencing difficulties redressing historical inequities in gender representation, which has resulted in the industry being viewed as unattractive to women. Second, while some women are employed in the industry, some leave due to factors such as workplace culture, extreme working conditions and a lack of career advancement opportunities (see Hewlett *et al*., 2008:23). Third, a lack of employee engagement, that is, employees' perceived contribution to the organisation's success and attachment to it, is another factor contributing to women's low representation (see Ledwaba, 2017:17; Masvaure *et al*., 2014:488). According to Toohey *et al*. (2014:7) and AHRC (2013:35), increasing women's representation in traditionally male-dominated industries such as mining would result in significant economic benefits as well as gender diversity in society. Consequently, the industry gains a positive image and becomes more appealing to women interested in mining careers. On the other hand, retaining

and engaging employees are critical to an organisation's long-term viability, as it leads to improved organisational performance and productivity (AHRC, 2013:35).

In light of this background, the study aimed to contribute to the body of knowledge on factors influencing the attraction, engagement and retention of women in technical mining positions to promote women's successful participation in the South African mining industry. The following sections discuss the conclusions and recommendations of the research.

7.3 RESEARCH METHODOLOGY

This study was conducted using a convergent parallel mixed-methods research design; quantitative and qualitative approaches were adopted. It included a review of the literature and empirical investigation guided by a pragmatic research paradigm. The research methodology used in this study was deemed appropriate, as evidenced by the following conclusions.

Conclusion 1

The literature review provided a conceptual and theoretical framework for understanding attraction, engagement and retention by drawing on existing research and debates on these topics. Through the literature review, suitable theories were selected to investigate the attraction, engagement and retention of women in technical mining positions.

Conclusion 2

The literature review served as the foundation for the development of the research instruments (questionnaire and interview schedule). It provided direction on statements and questions that needed to be incorporated into the questionnaire and interview schedule, demonstrating its importance in the development and construction of the research instruments used.

Conclusion 3

The literature review further informed the study's research design (convergent parallel mixed-methods research design). A mixed-methods research design was selected due to its advantages. Using qualitative or quantitative research approaches in isolation could not have adequately addressed the research problem and questions, while combining these approaches in their entirety is sufficient (see Creswell & Plano Clark, 2011). Through triangulation, the validity and reliability of the research were improved by using a mixed-methods approach. Triangulation was achieved by combining the literature review with empirical data collected through both qualitative (semi-structured interviews) and quantitative (questionnaires) methods to address the research questions and objectives. In addition, the inclusion of both women in technical mining

positions and employer representatives added to the study's depth, as it provided different perspectives on how to attract, engage and retain women in technical mining positions.

Conclusion 4

Quantitative data were analysed with the support and assistance of North-West University's Statistical Consultation Services, which ensured the statistical accuracy of the quantitative results. The data were analysed using the SPSS 27.0 statistical software program for Windows. The statistical analysis of the quantitative data revealed that the identified constructs of attraction (application value and development value, interest value, economic value and social value), engagement (vigour, dedication and absorption) and retention (affective commitment, normative commitment, compensation, job characteristics, career development, work-life balance and intention to stay) could be validated. The reliability (Cronbach's alpha coefficient), suitability for multivariate analysis (Bartlett's test of sphericity) and sampling adequacy (KMO measure of sampling adequacy) measured for attraction and retention confirmed that the scales were a valid data collection instrument (see Chapter 5). Furthermore, CFA, reliability coefficient (Cronbach's alpha coefficient) and GFIs (CMIN/DF, CFI and RMSEA) measured for employee engagement confirmed that the scale was a valid data collection instrument (see Chapter 5).

Qualitative data were analysed using ATLAS.ti. The analyses revealed six major themes related to the attraction, engagement and retention of women in technical mining positions, which provided an in-depth understanding of factors affecting the attraction, engagement and retention of women in technical mining positions from the perspective of employers.

The following section discusses the conclusions and their recommendations in relation to the study's specific research objectives.

7.4 RESEARCH OBJECTIVES OF THE STUDY

The general research objective of this study was to explore the factors that influence the attraction, retention and engagement of women in technical mining positions and to, consequently, determine what can be done to promote women's successful participation in the mining industry in South Africa.

The general research objective of the study was realised by the following specific research objectives:

7.4.1 Specific research objective 1

The first specific research objective was to analyse the existing approaches, perspectives and theories on employee attraction, engagement and retention to obtain a better understanding of the factors that may influence the successful participation of women in the mining industry.

Conclusion 1

Berthon *et al*.'s (2005) theory of employer attractiveness has been shown to provide an important theoretical foundation for explaining employee attraction. According to Berthon *et al.* (2005), five dimensions influence attraction: interest, economic, social, development and application values. These dimensions encapsulate the anticipated benefits that prospective employees may seek from an organisation (Meehan, 2019:6). The theory is widely used to explain the dimensions of employee attraction through the application of their EmpAT scale. Through this theory, attraction has been studied using a variety of demographic variables (age, gender, different occupations, education and personality) in a variety of industries, educational institutions and countries.

Conclusion 2

Schaufeli *et al*.'s (2002) three-factor engagement model was identified as an appropriate theory for examining engagement. According to Schaufeli and Bakker (2004:5), employee engagement is defined by high levels of energy and a strong connection to one's work. In contrast, burnout is defined by low levels of energy combined with a lack of affiliation to one's work. Therefore, employee engagement is characterised by vigour, dedication and absorption (Moshoeu, 2017:164; Schaufeli *et al*., 2002:74). The three-factor engagement model is one of the most widely accepted theories of engagement. Numerous studies have found that the dimensions of vigour, dedication and absorption are critical components of employee engagement (Brand-Labuschagne *et al*., 2012; Coetzee & De Villiers, 2010; Drake, 2012; González-Romá *et al*., 2006; Jordaan, 2005; Mäkikangas *et al*., 2014; Moshoeu, 2017). In contrast to other theories that have struggled to develop a measurement tool for their notions of engagement, the three-factor engagement model has gained prominence through its UWES, which has become the most widely used measure of engagement (Drake, 2012).

Conclusion 3

Herzberg's two-factor theory is considered a viable theory for elucidating the role of motivation in retention (Almaaitah *et al.*, 2017; Berry & Morris, 2008; Owler & Morrison, 2015). The theory is commended for being simple and straightforward to comprehend and for being grounded in reality rather than academic abstractions (Armstrong, 2014:173). In addition, Herzberg's two-factor theory has significant implications for organisations, as it provides a better understanding of the importance of work as a motivating factor for employees, while taking into account the limited influence of hygiene factors (more money, fringe benefits and better working conditions) and the strong influence of motivators (achievement, recognition, responsibility and opportunities for advancement and growth) (French *et al*., 2011).

Recommendation

A sound theoretical framework is necessary to provide an in-depth understanding of the attraction, engagement and retention of employees, in general, and of women in technical mining positions, specifically.

7.4.2 Specific research objective 2

The second specific research objective aimed to review the literature on global and national trends and perspectives regarding the attraction, engagement and retention of women in the mining industry.

Conclusion 1

Globally and in Africa, including in South Africa, the mining industry continues to be dominated by men. This is due to past laws prohibiting women from working in mining, particularly underground. As a result, the majority of women are employed in non-core mining support functions such as administration, general labour and human resources.

Conclusion 2

In general, women in mining face similar challenges, regardless of the country in which they are employed. The most pervasive challenges include gender stereotypes embedded in masculinity, limited career and development opportunities and compulsion to work extra hard to demonstrate their capabilities to men due to their perceived weakness. Sexual harassment is also a common occurrence among women in mining. Sexual harassment occurs in mines in the form of profanity, disapproval of sexual assault, rape and the exchange of sexual favours (Botha, 2016b:4).

Conclusion 3

Women's fight to ensure that they are adequately represented in the industry and are not discriminated against is not solitary. Women in Mining organisations in various countries, and ILO, play a critical role in promoting women's participation in the industry and eliminating all forms of discrimination against them. Women in Mining forums, for example, provide a platform for women to discuss their concerns about working in mining and empowers them by expanding their access to a wide range of training and networking opportunities to grow their numbers in the industry.

Recommendation

There is a need for countries to share information about women in mining publicly. Sharing information with other countries may help increase awareness of the challenges faced by women

in mining and aid in the development of measures to increase their representation. Collaborations between countries could be formed in response to this, assisting in improving women's working conditions and participation in the industry.

Conclusion 4

The literature review revealed that the factors affecting the attraction, engagement and retention of women in mining are compensation and benefits, career development opportunities, remote workplace locations, work-life balance, gender stereotypes, workplace culture and hazardous working conditions, safety risks and sexual harassment. These factors have an impact on how people who want to work in the industry perceive it, on the engagement levels of existing employees and on their decisions regarding whether or not they want to stay in the industry.

Recommendation

Mining organisations should aim to implement measures aligned to the above-mentioned factors when implementing attraction, engagement and retention interventions.

7.4.3 Specific research objective 3

The third specific research objective aimed to analyse the statutory and regulatory frameworks guiding the inclusion of women in the South African mining industry.

Conclusion 1

The Constitution is the supreme law of the country, emphasising that women can participate in all aspects of life and have equal rights to men, and also assists in eradicationing injustices caused by gender bias.

Conclusion 2

Labour law is relevant to women in mining, as it addresses workplace gender issues. These laws include the LRA (No. 66 of 1995), the BCEA (No. 75 of 1997), the EEA (No. 55 of 1998), the SDA (No. 97 of 1998) and PEPUDA (2000), all of which aim to increase women's representation in the workplace and address issues of fair labour practices and discrimination.

Conclusion 3

Along with labour law, the mining and minerals industry is governed by sector-specific regulatory frameworks: the MHSA (No. 29 of 1996) and the MPRDA (No. 28 of 2002). As its mandate to broaden opportunities for previously disadvantaged individuals, including women, the MPRDA of 2002 gave effect to the Mining Charter. Since its inception, the Mining Charter has had three

reviews, with the latest published in 2018. The Mining Charter establishes a minimum level of female representation at various managerial levels to foster diversity in the workplace and ensure women's participation in all decision-making positions and core occupational categories in the mining industry.

Recommendation

While existing legislation has created opportunities for women to work in the mining industry and provides tools for increasing their representation, the emphasis should not be solely on meeting numerical representation, but also on enacting laws that address the challenges that women face in the industry.

7.4.4 Specific research objective 4

The fourth specific research objective aimed to ascertain factors that facilitate, inhibit and influence the attraction, engagement and retention of women employed in technical mining positions in South Africa. This was investigated through empirical research.

Conclusion 1

The qualitative findings corroborated the literature in noting that the mining industry continues to be dominated by men. Participants attributed this to historical practices that excluded women from particular occupations, the labour-intensive nature of mine work and a general lack of career awareness initiatives focused on mining-related qualifications to educate learners about industry careers.

Recommendation

Mining companies should continue to make a concerted effort to implement gender equality initiatives within their organisations. Employers are required by the EEA (No. 55 of 1998) to develop and implement an equity plan that promotes equal opportunities and diversity in the workplace.

7.4.4.1 Attraction

The following section contains a set of conclusions and recommendations specifically regarding attraction.

Conclusion 1

An adapted version of Berthon *et al*.'s (2005) EmpAt scale was used to measure the quantitative component of attraction. The descriptive statistics indicated that respondents regarded all the

RFS items as important when considering a potential employer. The exploratory factor analyses revealed four factors of attraction: application value and development value (the ability to apply what one has learned and the availability of platforms that provide recognition, self-worth and career advancement opportunities), economic value (the value placed on having attractive compensation packages and job security), interest value (an exciting and unique work environment) and social value (a fun and happy work environment with good collegial relationships and a team atmosphere). While all of these factors were regarded as important when considering a potential employer, their importance varied according to respondents' qualifications, their tenure in their organisations, their age, whether they were required to work night shifts and whether they had children. Highly qualified respondents considered application value and development value as well as economic value to be important factors in attracting potential employees. Application value and development value, as well as interest value and economic value, were the least important factors of attraction for those who had worked for their companies for a longer period. Younger respondents emphasised the importance of interest value over older respondents. In contrast to those who worked night shifts, respondents who did not work night shifts considered interest value and social value to be important employee attraction factors. Compared to respondents who had children, respondents without children were more likely to consider interest value as an important attraction factor.

Recommendation 1

Mining organisations must include elements of application value and development value, social value, economic value and interest value in their efforts to recruit women into technical mining positions. Berthon *et al.* (2005) argue that prospective employees typically consider these factors when seeking employment. Therefore, they recommend that organisations aim to create a brand image that will position them as 'employers of choice' to prospective employees. These factors should be considered early in the recruitment process and also implemented once employees are hired to attract women who are not currently employed in the mining industry. Where applicable, consideration should also be given to employees' demographics, for example employees' age, qualification, tenure, etc., when implementing these factors in recruitment processes.

Conclusion 2

To attract women to technical mining positions, a greater emphasis was placed on development value and economic value. This was confirmed by both the qualitative and the quantitative research findings.

Recommendation 2

Participants suggested that mining organisations should offer attractive compensation packages to attract women to technical mining positions, while also supporting their career advancement by providing opportunities for career development and growth. As a result, those who are not currently employed in the industry will be drawn to it.

Conclusion 3

The qualitative findings indicated that the primary factors affecting women's attraction to technical mining positions (the physically intensive nature of mine work and gender stereotypes) are similar to reasons for their industry-wide underrepresentation. Participants suggested that the major barrier to attraction was a lack of career awareness regarding mining occupations. In addition, male employees' reluctance to accommodate women and work-life balance were additional factors affecting attraction.

Recommendation 3(a)

Mining organisations must establish career awareness initiatives in schools and communities (both within and outside of mining) to educate people about mining careers and, consequently, attract women to technical mining positions. In addition, flexible working conditions should be considered in recruitment strategies to promote work-life balance and, consequently, attract women to technical mining positions.

Recommendation 3(b)

Women in mining in South Africa should collaborate with mining organisations to implement campaigns aimed at increasing their visibility. Mining companies can encourage active participation in these forums by allocating time during different work shifts for women to attend, thereby attracting those who might not be part of the industry yet.

7.4.4.2 Engagement

The following section contains specific conclusions and recommendations regarding engagement.

Conclusion 1

The descriptive statistics using the UWES revealed that respondents demonstrated high levels of engagement in their work. The confirmatory factor analyses showed that engagement has three dimensions, namely vigour, dedication and absorption. This is consistent with the three-factor

engagement model proposed by Schaufeli *et al*. (2002). The mean scores for vigour, dedication and absorption indicated that respondents were generally engaged in their work, although there is room for improvement. Employee engagement had an effect on only two biographical characteristics, namely the presence of children and participation in a work committee. The research found that respondents with children were slightly more absorbed in their work than those without children and respondents involved in a work committee were more likely to show traits of dedication than those who were not. In addition, there was a relationship between tenure and dedication. The more years respondents had been employed in a specific organisation, the less dedicated they were to their organisations.

Recommendation 1

Employee engagement should be elevated to a core human resource function. Human resource professionals must collaborate with mine supervisors and managers to develop programmes that encourage employees to be more absorbed in and dedicated to their work. The emphasis, however, should not be solely on absorption and dedication. The programmes that will be developed could be constructed using Schaufeli *et al*.'s (2002) conceptualisation of engagement, which views engagement through a positive lens, resulting in a workforce marked by a positive, fulfilling, work-related state of mind characterised by vigour, dedication and absorption. Employees (new and existing) should also be involved in the development of these programmes and should be monitored regularly.

Conclusion 2

The qualitative research found that employee engagement is impacted by unfavourable working conditions, work-life balance and the mining industry's male-dominated work culture. These were similar to the issues mentioned as affecting attraction.

Recommendation 2(a)

There is a need for mining organisations to improve the working conditions of women in mining and work arrangements that support work-life balance. Employing more women can help address the male-dominated work culture. This can begin while girls are still enrolled in school. This might include programmes aimed at providing bursaries, learnerships and internships exclusively for women.

Recommendation 2(b)

Human resource managers must also be trained on how to keep their employees engaged and address deterrents to employee engagement.

7.4.4.3 Retention

The following section contains conclusions and recommendations regarding retention.

Conclusion 1

According to the majority of participants in the qualitative research, their organisation faced no barriers to retaining female employees in technical mining jobs. They stated that the only women they had difficulty retaining were those in management and highly skilled occupations, as they were headhunted by other mining companies.

Conclusion 2

An adapted version of Döckel's (2003) RFS was used to measure the quantitative component of retention. The descriptive analyses results showed common perceptions (all neutral) about respondents' job characteristics, the availability of career development opportunities within their organisations, work-life balance and supervisory support. Respondents also expressed uncertainty about their impending departure from their organisation. There was, however, some optimism regarding the provision of compensation by mining organisations. The EFA revealed that there were seven retention factors with which women in technical mining positions identified. These were affective commitment (when an individual is emotionally attached to his/her organisation to the point where he/she is strongly committed to it, involved and enjoy being a part of it), normative commitment (the perceived obligation to remain in the organisation), compensation and benefits, career development and training, job characteristics, work-life balance and intention to stay. Factors of retention had an effect on whether respondents were required to work night shifts, were members of a work committee or had children. Respondents who were not required to work night shifts recognised job characteristics as an important retention determinant more than those who were required to work night shifts. Those who served on a work committee placed slightly higher importance on job characteristics and career development than those who did not serve on a work committee, and respondents with children were slightly more likely to stay within their organisations than those without children.

Recommendation 2(a)

Although mine jobs have predefined systems of operation, employers should be willing to incorporate opportunities for employees to use their own initiative or judgement in carrying out

their duties and to participate in interesting tasks. Employee retention will improve as a result of this, as it will instil feelings of increased competence in them, and the value they place in their work will foster greater organisational commitment.

Recommendation 2(b)

Organisations should cultivate and facilitate the advancement of women in technical mining positions. There should be a succession plan in place that is monitored regularly, guided by binding targets to facilitate women's career progression in the industry. This is consistent with the 2018 Mining Charter, which requires mining organisations to have a career progression plan for their employees aligned with their Social Labour Plan.

Conclusion 3

There was a relationship between retention factors and age, respondents' qualifications and respondents' tenure in their positions, organisations and mining in general. There was a greater likelihood of older respondents staying in their organisations and being retained by compensation and benefits. Those with higher qualifications considered work-life balance and job characteristics as critical factors to retain employees. Lower-qualified respondents tended to feel obliged to stay with their employers, making them less likely to leave. Those with more years of service in a specific position in an organisation and the mining industry as a whole were less optimistic about the support offered for career development and their job characteristics.

Recommendation 3

Employee retention programmes should be tailored to accommodate employees' age, qualifications and length of service in the industry, as research shows that they are not all retained by the same factors.

Conclusion 4

All retention factors (affective commitment, normative commitment, compensation and benefits, job characteristics, career development and training, and work-life balance) affected respondents' intentions to remain within their organisations. In addition, career development and training had a positive effect on all retention factors, but a negative relationship with work-life balance. Respondents who believed that they had been denied career development and training opportunities faced difficulties in balancing their work-life.

Recommendation 4

Organisations should aim to increase motivator factors such as creating an interesting work environment, providing opportunities for advancement, maximising competencies, involving

employees in tasks that involve increased responsibilities and new challenges, and providing them with recognition when necessary (Nguyen, 2017:23). Herzberg's two-factor theory stresses the importance of increasing motivator factors to retain employees.

Conclusion 5

Respondents who were satisfied with their job characteristics were likely to have a work-life balance. Those who were dissatisfied with their work-life balance were more likely to leave their organisations.

Recommendation 5

Similar to the recommendation provided for attraction, mining organisations should consider incorporating flexible working hours for women in mining. Mines that assign women to work night shifts should consider alternative working arrangements. This will help them spend more time with their families after work.

7.4.4.4 The attraction, engagement and retention of women in technical mining positions

The factors discussed previously shed light on factors that would attract, engage and retain women in technical mining positions on their own. The following section discusses the factors that collectively affect women's attraction, engagement and retention in technical mining positions based on the self-constructed questionnaire developed by the researcher.

Conclusion 1

A conducive work environment, and work benefits and career development are the two factors affecting the attraction, engagement and retention of women in technical mining positions. A conducive work environment entails a work environment that is free from gender discrimination, has supportive management, prioritises the health and safety of employees, provides them with adequate PPE, has appropriate ablution facilities and supportive colleagues and has a gender-balanced environment.

Recommendation 1(a)

Although all of the previously mentioned factors for attracting, engaging, and retaining women are critical, creating a conducive work environment that considers existing challenges women face should be a top priority for mining companies.

Recommendation 1(b)

Attraction, engagement and retention measures implemented by mining organisations should incorporate elements of work benefits and career development, i.e. above-average basic salaries, attractive overall compensation packages, including benefits, and career development. The elements of work benefits encompass Berthon *et al*.'s (2005) economic value and career development (development value), which are also components of Herzberg's motivators.

Conclusion 2

Having children affected respondents' views regarding the attraction, engagement and retention of women in technical mining positions. The research results revealed that respondents without children regarded a conducive work environment as an important factor for attracting, engaging and retaining women in technical mining positions, more than respondents with children.

Recommendation 2

A conducive work environment is an important factor for attracting, engaging and retaining women in technical mining positions. Although respondents without children emphasised the importance of this factor, it is critical to implement it across the board, as it entails addressing challenges faced by women in mining.

Conclusion 3

The research results showed a relationship between respondents' qualifications and the two factors of the attraction, engagement and retention of women in technical mining positions as well as these factors and respondents' tenure within their organisations and mining industry. The more qualified respondents were, the more they viewed a conducive work environment, work benefits and career development as critical factors for attracting, engaging and retaining women in technical mining positions. In addition, respondents who had worked long years for a specific organisation and in the mining industry were less positive about the importance of a conducive work environment as a factor that would attract, engage and retain women in technical mining positions.

Recommendation 3

Respondents' level of qualification and length of service in their organisations and mining appear to be common factors affecting women's attraction, engagement and retention, particularly in technical mining positions. Additional research should be conducted to determine the effect of these variables on women's attraction, engagement and retention in technical mining positions.

Conclusion 4

Working night shifts affected whether respondents would recommend a job to women in the mining industry or not. The research results showed that respondents who were not required to work night shifts were most likely than those who did work night shifts to recommend a job in the mining industry to women

Recommendation 4

If possible, mining organisations should limit the number of days women work the night shift to enable them to spend time with their families after work.

7.4.4.5 The relationship between attraction, engagement and retention

The empirical research revealed that there is a relationship between factors of attraction with engagement and retention. The conclusions in this regard are presented below.

Conclusion 1

Except for economic value, all factors of attraction were found to be important in stimulating employees' vigour, while all factors of attraction were found to be significant in promoting dedication and absorption.

Conclusion 2

Compensation, career development and job characteristics all had a positive effect on employees' vigour and dedication. These factors also had a positive effect on individuals' affective and normative commitment to an organisation, as well as their intention to stay. In addition, respondents with a high absorption score were influenced positively by these same factors, including work-life balance. Moreover, absorption had a positive effect on their affective and normative commitments, as well as their intention to stay within their organisations.

Conclusion 3

The more respondents valued application value and development value, interest value, economic value and social value, the more they valued a conducive work environment, work benefits and career development as important factors in attracting, engaging and retaining women in technical mining positions. Furthermore, the greater the respondents' vigour, dedication and absorption, the more they valued a conducive work environment as well as work benefits and career development.

Conclusion 4

Respondents who believed that work benefits and career development were important for attracting, engaging and retaining women were more likely to be positive about their jobs and work-life balance and to show affective and normative commitment to their organisation.

Recommendation (a)

The preceding findings demonstrated that the factors of attraction, engagement and retention are intertwined and, as a result, correlate with each another. Therefore, these factors should be considered in strategies or measures implemented by mining organisations to attract, engage and retain women in technical mining positions.

Recommendation (b)

Human resource practitioners must develop indicators for evaluating their successes, shortcomings and gaps in ensuring the attraction, engagement and retention of women in technical mining positions.

7.5 LIMITATIONS OF THE STUDY

As stated in Chapter 1 (section 1.8), the study's limitations were primarily due to Covid-19, which affected the method, timeframe and duration of data collection. Rather than conducting face-to-face interviews, web-based questionnaires were conducted and distributed across multiple platforms due to the restricted access to mines. In addition, the sampling technique used imposed constraints. The non-probability sampling technique restricted the ability of the study to generalise its results to the study's population (women in technical mining positions in South Africa). As a result, the study's results and conclusions are restricted to those who participated in the research.

7.6 AREAS FOR FUTURE RESEARCH

Taking into account the literature review and empirical research findings and results, the following recommendations for future research are proposed:

- In addition to the quantitative research conducted in this study, a qualitative study, utilising semi-structured and focus group interviews with women employed in technical mining positions, would be beneficial to elicit in-depth insight into the factors that attract, engage and retain women in technical mining positions.
- Research could be conducted to develop a model for attracting, engaging and retaining women in technical mining positions.
- As potential employees in the mining industry, a study could be conducted with female students in tertiary institutions to determine factors that would attract them to the industry.

- A study could be conducted to assess the awareness of mining careers in primary and secondary schools in South Africa.
- Research could be conducted on the role that work committees such as Women in Mining forums play to facilitate the attraction, engagement and retention of women in technical mining positions.

7.7 SUMMARY OF RESEARCH STUDY

The literature review demonstrated that the mining industry remains male-dominated. This was confirmed by the qualitative findings as well. Not only are women underrepresented numerically, but they also experience challenges while trying to integrate into the male-dominated work environment. The primary objective of the research was to explore factors that influence the attraction, retention and engagement of women in technical mining positions and to, consequently, determine what can be done to promote women's successful participation in the mining industry in South Africa. This objective was addressed through the following seven chapters:

Chapter 1 introduced the research by stating the problem, the research objectives and the research questions. In addition, the chapter discussed in detail the study's research methodology as well as its limitations and significance.

Chapter 2 provided the conceptual clarification of the terms 'attraction', 'engagement' and 'retention' and conducted a critical review of the most prevalent theories pertaining to attraction, engagement and retention. This review resulted in the development of a theoretical framework aimed at elucidating the factors affecting attraction, engagement and retention.

Chapter 3 provided an overview of women working in mining globally, as well as in Africa and South Africa. This information included historical information regarding women's involvement in mining, their present involvement in mines, the roles they play and the challenges they face on the job. Furthermore, the literature included a discussion of factors affecting women's attraction, engagement and retention in the mining industry.

Chapter 4 presented the statutory and regulatory frameworks regulating the inclusion of women in the South African mining industry. This framework included the discussion of both labour laws and sector-specific legislation. The legislation and policies that were discussed were all relevant to the topic of women in mining.

Chapters 5 and 6 presented and discussed the research's empirical results (quantitative) and findings (qualitative). This entailed a discussion of the research results and findings against the theoretical framework, literature pertaining to factors influencing the attraction, engagement and retention of women in mining and policy/legislative framework. The study was concluded in

Chapter 7, which presented the main conclusions and recommendations in relation to the study's stated research objectives. In addition, the chapter provided research recommendations for the future.

REFERENCE LIST

Abbasi, S.M. & Hollman, K.W. 2000. Turnover: the real bottom line. *Public Personnel Management*, 29(3):333–342.

Abid, G. & Butt, T. 2017. Expressed turnover intention: alternate method for knowing turnover intention and eradicating common method bias. *International Letters of Social and Humanistic Sciences*, 78:18–26. doi:10.18052/www.scipress.com/ILSHS.78.18

Aboul-Ela, G.M.B.E. 2016. Employer branding: what constitutes an employer of choice? *Journal of Business and Retail Management Research*, 11(1): 154–166.

Abrahamsson, L., Segerstedt, E., Nygren, M., Johansson, J., Johansson, B., Edman, I. & Akerlund, A. 2014. *Gender, diversity and work conditions in mining, mining and sustainable development*. https://www.diva-portal.org/smash/get/diva2:995297/FULLTEXT01.pdf Date of access: 15 Jul. 2020.

Action Aid Zambia. 2015. *Impacts of mining extractive industries on women in Zambia.* https://actionaid.nl/wp-content/uploads/2017/10/20150608-Impacts-of-Mining-on-Women-in-Zambia_Revised-Report.pdf Date of access: 15 Jul. 2020.

Adams, J.S. 1965. Inequity in social exchange. *Advances in Experimental Social Psychology*, 2:267–299. doi:10.1016/S0065-2601(08)60108-2

Adams, S.P. 2013. *Examining graduate applicant intentions to apply to an organisation: the theory of planned behaviour in the South African context*. Stellenbosch: Stellenbosch University. (Thesis – MA). https://scholar.sun.ac.za/bitstream/handle/10019.1/80375/adams_examining_2013.pdf;sequence=1 Date of access: 12 Feb. 2020.

Adu, G., Dramani, J.B. & Nkrumah, K. 2018. *Africa's mineral economies: breaking their dependence on mining.* The Nordic Africa Institute. https://www.diva-portal.org/smash/get/diva2:1256753/FULLTEXT01.pdf Date of access: 16. Jul. 2020.

Aguenza, B.B. & Som, A.P. 2012. Motivational factors of employee retention and engagement in organizations. *International Journal of Advances in Management and Economics*, 1(6):88–95.

Ahmad, K. & Azumah, K.K. 2012. *Employee retention strategies: the case of a patent firm in Australia.* School of Management. Blekinge Institute of Technology. https://www.diva-portal.org/smash/get/diva2%3A833433/FULLTEXT01.pdf Date of access: 2 Apr. 2021.

AHRC (Australian Human Rights Commission). 2013. *Women in male-dominated industries: a toolkit of strategies*. https://humanrights.gov.au/sites/default/files/document/publication/WIMDI_Toolkit_2013.pdf Date of access: 8 Feb. 2019.

AHRC (Australian Human Rights Commission). 2017. *A conversation in gender equality*: https://humanrights.gov.au/sites/default/files/document/publication/AHRC_conversation_gender_equality_2017_2.pdf Date of access: 3 Jun. 2020.

Alarcon, G., Lyons, J.B. & Tartaglia, F. 2010. Understanding predictors of engagement within the military. *Military Psychology*, 22:301–310. doi:10.1080/08995605.2010.492695

Albrecht, S.L. 2013. Work engagement and the positive power of meaningful work. In: Bakker, A. B., ed. *Advances in positive organizational psychology.* Bingley: Emerald Group. pp. 237–260.

Albrecht, S.L., Bakker, A.B., Gruman, J.A., Macey, W.H. & Saks, A.M. 2015. Employee engagement, human resource management practices and competitive advantage: an integrated approach. *Journal of Organisational Effectiveness: People and Performance*, 2(1):7–35. doi:10.1108/JOEPP-08-2014-0042

Allen, D.G. 2008. *Retaining talent: a guide to analysing and managing employee turnover*. SHRM Foundation Effective Practice Guidelines Series. Alexandria, VA: SHRM Foundation.

Allen, M. 2017. *The Sage encyclopaedia of communication research methods*. Vol. 4. Thousand Oaks, CA: Sage. doi:10.4135/9781483381411.n264

Allen, N.J. & Meyer, J.P. 1990. The measurement and antecedents of affective, continuance and normative commitment to the organisation. *Journal of Occupational Psychology*, 63:1–18. doi:10.1111/j.2044-8325.1990.tb00506.x

Ali, Z. & Bhaskar, S.B. 2016. Basic statistical tools in research and data analysis. *Indian Journal of Anaesthesia*, 60(9):662–669. doi:10.4103/0019-5049.190623

Almaaitah, M.F., Harada, Y., Sakdan, M.F. & Almaaitah, A.M. 2017. Integrating Herzberg and social exchange theories to underpinned human resource practices, leadership style and employee retention in health sector. *World Journal of Business and Management*, 3(1):16–34. doi:10.5296/wjbm.v3i1.10880

Alsaawi, A. 2014. Critical review of qualitative interviews. *European Journal of Business and Social Sciences*, 3(4):149–156. doi:10.2139/ssrn.2819536

Alvarez, M.L. 2013. *From unheard screams to powerful voices: a case study of women's political empowerment in the Philippines*. Paper presented at the 12th National Convention on Statistics (NCS) EDSA Shangri-La Hotel, Mandaluyong City, October. https://www.scribd.com/document/394343985/From-Unheard-Screams-to-Powerful-Voices-a-Case-Study-of-Women-s-Political-Empowerment-in-the-Philippines Date of access: 12 Nov. 2019.

Ambler, T. & Barrow, S. 1996. The employer brand. *Journal of Brand Management*, 4(3):185–206.

Alnıaçık, E. & Alnıaçık, Ü. 2012. Identifying dimensions of attractiveness in employer branding: effects of age, gender, and current employment status. *Procedia - Social and Behavioral Sciences*, 58:1336–1343.

Al-Zawahreh, A. & Al-Madi, F. 2012. The utility of equity theory in enhancing organizational effectiveness. *European Journal of Economics, Finance and Administrative Sciences,* 46:158–170.

Ampoty, J. 2014. *An investigation into the effects of career development on employee retention at Anglo Gold Ashanti Limited, Obuasi Mine*. Kumasi: Kwame Nkrumah University of Science and Technology. (Thesis – MBA). http://dspace.knust.edu.gh/xmlui/bitstream/handle/123456789/7644/Thesis%20%28final%20work%29%202.pdf?sequence=1 Date of access: 5 Aug. 2020.

Andersson, E. 2012. *Malmens manliga mysterium: En interaktiv studie om kön och tradition i modernt gruvarbete [Malmen's male mystery: an interactive study of gender and tradition in modern mining].* Luleå: Luleå tekniska universitet. (Thesis – PhD). https://www.diva-portal.org/smash/get/diva2:999565/FULLTEXT01.pdf Date of access: 23 May. 2020.

Andersson, E. & Andersson, L. 2016. Men's agency and resistance in the gendered mining workers' collective. In: *Proceedings of the 9th Biennial International Interdisciplinary Conference,* Keele University, 29 June – 1 July.

Andrade, C. 2020. Understanding the difference between standard deviation and standard error of the mean, and knowing when to use which. *Indian Journal of Psychological Medicine*, 42(4):409–410. doi:10.1177/0253717620933419

Andreasen, M. & Reinholt, T. 2019. *The challenge of attracting forthcoming graduates*: *a discrete choice experiment on the effect of employer branding on application intentions*. Aalborg: Aalborg University. (Thesis – MSc).

https://projekter.aau.dk/projekter/files/306188321/IM_Thesis_Maria_Andreasen_and_Trine_Reinholt.pdf Date of access: 11 Aug. 2021.

Antwi, S.K. & Hamza, K. 2015. Qualitative and quantitative research paradigms in business research: a philosophical reflection. *European Journal of Business and Management*, 7(3):217–225.

Arachchige, B.J. & Robertson, A. 2013. Employer attractiveness: comparative perceptions of undergraduate and postgraduate students. *Sri Lankan Journal of Human Resource Management*, 4(1):33–48.

Armah, F.A., Boamah, S.A., Quansah, R., Obiri, S. & Luginaah, I. 2016. Working conditions of male and female artisanal and small-scale goldminers in Ghana: examining existing disparities. *The Extractive Industries and Society*, 3:464–474. doi:10.1016/j.exis.2015.12.010

Armstrong, M. 2014. *Armstrong's handbook of human resource management practice.* 13th ed. London: Kogan Page.

Armstrong, M. 2016. *Armstrong's handbook of management and leadership for HR*. 14th ed. New York: Kogan Page.

Armstrong, M. & Taylor, S. 2020. *Armstrong's handbook of human resource management practice*. 15th ed. New York, NY: Kogan Page.

Arrehag, P. & Persson, S. 2014. *Describing the relationship between employer attractiveness and internal brand equity: a quantitative single cross-sectional study*. Växjö: Linnaeus University. (Thesis – BA). https: //www.diva-portal.org/smash/record.jsf?pid=diva2: 730542 Date of access: 22 Apr. 2020.

Asiyanbola, A.R. 2005. *Patriarchy, male dominance, the role of women empowerment in Nigeria.* Paper submitted for presentation as poster at the International Union for the S Scientific Study of Population (IUSSP/UIESP) XXV International Population Conference Tours, France. https://iussp2005.princeton.edu/papers/50005/ Date of access: 22 Apr. 2020.

Åteg, M. & Hedlund, A. 2011. Researching attractive work: analysing a model of attractive work using theories on applicant attraction, retention and commitment. https://journals.lub.lu.se/aio/article/download/17354/15711 Date of access: 22 Feb. 2019.

AusIMM (Australasian Institute of Mining and Metallurgy). 2009. *Gender pay equity and associated issues for women in mining: survey report.* https://www.ausimm.com.au/content/docs/gender_pay_equity_wim_report.pdf Date of access: 15 Jun. 2020.

Avery, D.R., McKay, P.F. & Wilson, D.C. 2007. Engaging the aging workforce: the relationship between perceived age similarity, satisfaction with co-workers, and employee engagement. *Journal of Applied Psychology,* 92:1542–1556. doi:10.1037/0021-9010.92.6.1542

AWRA (Australian Women in Resources Alliance). 2014. *The way forward guide to building an inclusive culture and engaged workforce*. http://awra.org.au/wp-content/uploads/2015/01/WFG05_EngagedInclusive140428.pdf Date of access: 20 Jun. 2020.

Ayub, S.Z. 2017. The impact of talent management on employee engagement and retention in achieving organizational performance. *Science International*, *29*(6): 1277-1281.

Baah-Boateng, W., Baffour, P.T. & Akyeampong, E.K. 2016. *Gender differences in the extractives sector: evidence from Ghana*. GrOW Project: growth in West Africa: impacts of extractive industry on women's economic empowerment in Cote d'Ivoire & Ghana. https://www.interias.org.gh/sites/default/files/GrOW_Ghana_WP_1.pdf Date of access: 20 Jul. 2020.

Babbie, E. & Mouton, J. 2008. *The practice of social research*. South African ed. Cape Town: Oxford University Press Southern Africa.

Badawi, A. 2019. *The relationship between employer attractiveness and hospitality students job pursuit intentions in terms of person-environment fit*. Texas: Texas Tech University. (Dissertation-PhD). https://ttu-ir.tdl.org/bitstream/handle/2346/85508/BADAWI-DISSERTATION-2019.pdf?sequence=1 Date of access: 12 Feb. 2020.

Badenhorst, C.J. & Platinum, A. 2009. *Occupational health and safety considerations for the employment of female workers in hard rock mines*. *Conference proceedings*. Southern African Institute of Mining and Metallurgy, Hard Rock Safety Conference, September, Sun City, South Africa. pp. 55–74.

Badubi, R.M. 2017. Theories of motivation and their application in organizations: a risk analysis. *International Journal of Innovation and Economic Development*, 3(3):44–51. doi:10.18775/ijied.1849-7551-7020.2015.33.2004

Bailey, S.G. 1988. Women in underground mining in Australia. *Mineral Resources Review*, Aug: 5–9.

Bailey-Kruger, A. 2012. *The psychological wellbeing of women operating mining machinery in a fly-in fly-out capacity*. Perth: Edith Cowan University. (Thesis – MA) http://ro.ecu.edu.au/cgi/viewcontent.cgi?article=2683&context=theses Date of access: 7 May. 2020.

Bakanauskiene, I., Bendaravičienė, R. & Bucinskaite, I. 2016. Employer's attractiveness: Generation Y employment expectations in Lithuania. *Human Resources Management & Ergonomics*, 10(1):6–22.

Bakanauskiene, I., Bendaravičienė, R. & Barkauskė, L. 2017. Organizational attractiveness: an empirical study on employees' attitudes in Lithuanian business sector. *Problems and Perspectives in Management*, 15(2):4–18. doi:10.21511/ppm.15(2).2017.01

Bakar, R.A. 2013. *Understanding factors influencing employee engagement: a study of the financial sector in Malaysia.* Melbourne: RMIT University. (Thesis – PhD). http: //citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.937.4425&rep=rep1&type=pdf Date of access: 19 Aug. 2021.

Baker, D.D., Ravichandran, R. & Randall, D.M. 1989. Exploring contrasting formulations of expectancy theory. *Decision Sciences*, 20:1–13. doi:10.1111/J.1540-5915.1989.TB01393.X

Bakker, A.B. & Bal, P.M. 2010. Weekly work engagement and performance: a study among starting teachers. *Journal of Occupational and Organizational Psychology,* 83:189–206. doi:10.1348/096317909X402596

Bakker, A.B. & Demerouti, E. 2006. The Job Demands-Resources model: state of the art. *Journal of Managerial Psychology,* 2(3):309–328. doi:10.1108/02683940710733115

Bakker, A.B., Demerouti, E. & Sanz-Vergel, A.I. 2014. Burnout and work engagement: the JD–R approach. *Annual Review of Organizational Psychology and Organizational Behaviour*, 1(1):389–411. doi:10.1146/annurev-orgpsych-031413-091235

Bakker, A.B., Hakanen, J.J., Demerouti, E. & Xanthopoulou, D. 2007. Job resources boost work engagement, particularly when job demands are high. *Journal of Educational Psychology,* 99:274–284. doi:10.1037/0022-0663.99.2.274

Bakker, A.B., Schaufeli, W.B. & Leiter, M.P. 2008. Work engagement: an emerging concept in occupational health psychology. *Work & Stress*, 22(3):187–200. doi:10.1080/02678370802393649

Balakrishnan, C., Masthan, D. & Chandra, V. 2013. Employee retention through employee engagement: a study at an Indian international airport. *International Journal of Business and Management Invention*, 2(8):9–16.

Balcazar, F., MacKay-Murphy, M., Keys, C., Henry, D. & Bryant, F. 1998. Assessing perceived agency adherence to the values of community inclusion: implications for staff satisfaction.

American Journal of Mental Retardation, 102:451–463. doi:10.1352/0895-8017(1998)102%3C0451:apaatt%3E2.0.co;2

Bandura, A. 1977. *Social learning theory*. Englewood Cliffs, NJ: Prentice Hall.

Bangani, A. & Vyas- Doorgapersad, S. 2020. The implementation of gender equality within the South African public service (1994–2019). *Africa's Public Service Delivery and Performance Review*, 8(1): art. #353. doi:10.4102/apsdpr.v8i1.353

Barrientos, D.J., Meruane, P.S., Varas, P.R. & Opao, P.M. 2009. Minería, Géneroy Cultura. Una Aproximación Etnográfica a Espacios de Esparcimiento y Diversión Masculina en el Norte de Chile [Mining, gender and culture: an ethnographic approach to spaces for male recreation and fun in northern Chile]. *Revista De Antropología Iberoamericana,* 4(3):385–408.

Baumeister, R. F., & Leary, M. R. 1995. The need to belong: Desire for interpersonal attachments as a fundamental human motivation. *Psychological Bulletin,* 117(3): 497–529. doi.org/10.1037/0033-2909.117.3.497

Bayeh, E. 2016. The role of empowering women and achieving gender equality to the sustainable development of Ethiopia. *Pacific Science Review B: Humanities and Social Sciences*, 2:37–42. doi:10.1016/j.psrb.2016.09.013

Beach, L. R. 1990. *Image theory: decision making in personal and organizational contexts*. Chichester, UK: John Wiley.

Beach, L.R. & Mitchell, T.R. 1987. Image theory: principles, goals and plans in decision making. *Acta Psychologica*, 66:201–220. doi:10.1016/0001-6918(87)90034-5

Belhekar, V.M. 2019. Analysis of variance. In: *Statistics for Psychology Using* R. 1–70. doi.org/10.4135/9789353282493

Benjamin, N. 2015. *Putting union gender equality policy into practice in South Africa: the role of transformational leadership*. Labor Research Service. https://www.lrs.org.za/wp-content/uploads/2021/01/Putting-union-gender-equality-policy-into-practice-in-South-Africa-The-role-of-transformational-leadership-.pdf Date of access: 21 Aug. 2020.

Benraiss-Noailles, L. & Viot, C. 2020. Employer brand equity effects on employees' well-being and loyalty. *Journal of Business Research*, 126:605–613. doi:10.1016/j.jbusres.2020.02.002

Benya, A. 2017. Women of the mines: apartheid and post-apartheid lived realities of South African women. *Storia delle Donne*, 13:79–101. doi:10.13128/SDD-23957

Benya, A.J. 2016. *Women in mining: occupational culture and gendered identities in the making*. Johannesburg: University of the Witwatersrand. (Thesis – PhD). https://wiredspace.wits.ac.za/bitstream/handle/10539/22425/PhD%20Thesis%20Benya%20Asanda%202016%20Women%20in%20Mining%20%282%29.pdf?sequence=2&isAllowed=y Date of access: 27 Jan. 2019.

Benya, A.P. 2009. *Women in mining: a challenge to occupational culture in mines*. Johannesburg: University of the Witwatersrand. (Dissertation – MA). https://www.academia.edu/download/31133348/MA_Report_15515_benya_women_mining.pdf Date of access: 4 Apr. 2019.

Berry, M.L. & Morris, M.L. 2008. *The impact of employee engagement factors and job satisfaction on turnover intent*. In: Chermack, T. J., ed. Academy of Human Resource Development International Research Conference in The Americas. Pp. 1 – 3. Panama City, FL. http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.934.6594&rep=rep1&type=pdf Date of access: 11 Apr. 2020.

Berthon, P., Ewing, M. & Hah, L.L. 2005. Captivating company: dimensions of attractiveness in employer branding. *International Journal of Advertising*, 24:151–72. doi:10.1080/02650487.2005.11072912

Best, J.W. & Kahn, J. 2006. *Research in education*. New Delhi: Prentice Hall of India.

Bhattacherjee, A. 2012. *Social science research: principles, methods, and practices*. Textbooks Collection. Vol. 3. http://scholarcommons.usf.edu/oa_textbooks/3 Date of access: 22 Jun. 2021.

Bhattacharya, Y. 2015. Employee engagement as a predictor of seafarer retention: a study among Indian officers. *The Asian Journal of Shipping and Logistics*, 31(2):295–318. doi:10.1016/j.ajsl.2015.06.007

Bickerton, G.R., Miner, M.H., Dowson, M. & Griffin, B. 2015. Spiritual resources as antecedents of clergy well-being: the importance of occupationally specific variables. *Journal of Vocational Behaviour*, 87:123–133. doi:10.1016/j.jvb.2015.01.002

Bidisha, L.D. & Mukulesh, B. 2013. Employee retention: a review of literature. *Journal of Business and Management*, 14:8–16. doi:10.9790/487X-1420816

Billsberry, J. 2004. ASA theory: an empirical study of the attraction proposition. *Conference proceedings.* Academy of Management Annual Meeting, Aug, New Orleans, LA. pp. 1–21.

Blankenship, K. L. 2018. Analysis of Variance (ANOVA). In: Allen, M., ed. *The SAGE encyclopedia of communication research methods.* Thousand Oaks: Sage.

Blomberg, E. 2006. Gender Relations in Iron Mining Communities in Sweden, 1900-1940. In: Gier, J.J. & Mercier, L., eds. *Mining women: gender in the development of a global industry, 1670 to 2005*. New York, NY: Palgrave Macmillan. pp. 120–152.

Blunch, N.J. 2008. *Introduction to structural equation modelling using SPSS and AMOS*. London: Sage.

Boikanyo, D.H. 2012. *An exploration of the effect of employee engagement on performance in the petrochemical industry*. Potchefstroom: North-West University. (Mini-dissertation – MBA). http: //repository.nwu.ac.za/bitstream/handle/10394/8825/Boikanyo_DH.pdf?sequence=1 Date of access: 16 Aug. 2021.

Bosman, J. 2005. *Job insecurity and wellness of employees in a government organisation*. Potchefstroom: North-West University. (Thesis – PhD). https://repository-nwu-ac-za.nwulib.nwu.ac.za/bitstream/handle/10394/2360/bosman_jacqueline.pdf?sequence=1

Botha, D. 2013. *Women in mining: a conceptual framework for gender issues in the South African mining sector.* Potchefstroom: North-West University. (Thesis – PhD). http://hdl.handle.net/10394/12234

Botha, D. 2016a. Women in mining: an assessment of workplace relations struggles. *Journal of Social Sciences*, 46(3):251–263. doi:10.1080/09718923.2016.11893533

Botha, D. 2016b. Women in mining still exploited and sexually harassed. *SA Journal of Human Resource Management*, 14(1):1–12. doi:10.4102/sajhrm.v14i1.753

Botha, D. 2017. Barriers to career advancement of women in mining: a qualitative analysis. *South African Journal of Labour Relations*, 41:15–32. doi:10.25159/2520-3223/3766

Botha, D. & Cronjé, J.F. 2014. Workplace Opportunities for Women Employed in Core Mining Activities. *Mediterranean Journal of Social Sciences,* 23: 1914-1926. doi:10.5901/mjss.2014.v5n23p1914

Botha, D. & Cronjé, F. 2015a. Occupational health and safety considerations for women employed in core mining positions. *SA Journal of Human Resource Management/SA Tydskrif vir Menslikehulpbronbestuur*, 13(1): art. #652. doi:10.4102/sajhrm.v13i1.652

Botha, D. & Cronjé, J.F. 2015b. The physical ability of women in mining: can they show muscle? *Journal of the Southern African Institute of Mining and Metallurgy*, 115:659–667. doi:10.17159/2411-9717/2015/v115n8a1

Bowlby, J. 1958. The nature of a child's tie to his mother. *International Journal of Psychoanalysis*, 99:265–272. doi:10.4324/9780429475931-15

Bradley, H. 1989. *Men's work, women's work: a sociological history of the sexual division of labour in employment.* Minneapolis, MN: University of Minnesota Press.

Bradley, J.C., Arthur, P.B. & George, J.M. 2002. More than the big five: personality and careers. In: Feldman, D.C., ed. *Work careers: a developmental approach*. San Francisco, CA: Jossey-Bass. pp. 27–62.

Brand-Labuschagne, L., Mostert, K., Rothmann, S. & Rothmann, J.C. 2012. Burnout and work engagement of South African blue-collar workers: the development of a new scale. *Southern African Business Review*, 16(1):58–93.

Bratton, J. & Gold, J. 2003. *Human resource management: theory and practice.* 3rd ed. New York, NY: Palgrave Macmillan.

Breaugh, J.A. 2008. Employee recruitment: current knowledge and important areas for future research. *Human Resource Management Review*, 18:103–18. doi:10.1016/j.hrmr.2008.07.003

Bretz, R.D. & Judge, T.A. 1994. The role of human resource systems in job applicant decision processes. *Journal of Management*, 20:531–551. doi:10.1016/0149-2063(94)90001-9

Britt, A., Summerfield, D., Senior, A., Kay, P., Huston, D., Hitchman, A., Hughes, A., Champion, D., Simpson, R., Sexton, M. & Schofield, A. 2017. *Australia's identified mineral resources 2017*. Canberra: Geoscience Australia. doi:10.11636/1327-1466.2017

Brooks, L. & Betz, N.E. 1990. Utility of expectancy theory in predicting occupational choices in college students. *Journal of Counselling Psychology,* 37(1):57–64. doi:10.1037/0022-0167.37.1.57

Brough, P., Timms, C., Siu, O.L., Kalliath, T., O'Driscoll, M.P., Sit, C.H., Lo, D. & Lu, C.Q. 2013. Validation of the Job Demands-Resources model in cross-national samples: cross-sectional and longitudinal predictions of psychological strain and work engagement. *Human Relations*, 66(10):1–40. doi:10.1177%2F0018726712472915

Brown, T. A. 2006. *Confirmatory factor analysis for applied research*. New York: Guilford Press.

Brown, D.A. 2011. *Examining employee attraction, retention, and engagement in ultra small entrepreneurial technology firms*. Michigan, MI: Walden University. (Dissertation – DBA). https://search.proquest.com/openview/d994d19a40dea8b30d616ba308f73a4c/1?pq-origsite=gscholar&cbl=18750 Date of access: 2 Jul. 2019.

Brown, T.A. 2015. *Confirmatory factor analysis for applied research*. New York, NY: Guilford.

Bryman, A. 2012. *Social research methods*. 4th ed. New York, NY: Oxford university press.

Brymer, R.A., Molloy, J.C. & Gilbert, B.A. 2014. Human capital pipelines competitive implications of repeated interorganizational hiring. *Journal of Management*, 40(2):483–508. doi:10.1177%2F0149206313516797

BSR (The Business of a Better World). 2017. *Women's economic empowerment in sub-Saharan Africa: recommendations for the mining sector.* https://www.bsr.org/reports/BSR_Womens_Empowerment_Africa_Mining_Brief.pdf Date of access: 20 Nov. 2019.

Bush, J.F. 2012. *Environmental concern as an important value in the choice of organisation in the South African context.* Johannesburg: University of the Witwatersrand. (Dissertation – MA). https: //core.ac.uk/download/pdf/39670478.pdf Date of access: 12 Aug. 2021.

Cable, D.M. & Judge, T.A. 1996. Person-organization fit, job choice decisions, and organizational entry. *Organizational Behaviour and Human Decision Processes,* 67:294–311. doi:10.1006/obhd.1996.0081

Cable, D. M. & Turban, D. 2001. Establishing the dimensions, sources and value of job seekers' employer knowledge during recruitment. *Research in Personnel and Human Resources Management*, 20: 115–163.

Cahill, P. 2018. *An exploratory analysis of the effect of employer branding on attraction and retention of employees in the drinks industry in Ireland.* Dublin: National College of Ireland. (Dissertation– MA). http: //norma.ncirl.ie/id/eprint/3304 Date of access: 2 May. 2019.

Calecas, K.J. 2019. *Job satisfaction, employee engagement, and turnover intention in federal employment.* Minneapolis, MN: Walden University. (Dissertation – DBA). https://scholarworks.waldenu.edu/cgi/viewcontent.cgi?article=8257&context=dissertations Date of access: 6 Apr. 2020.

Calitz, P.L. 2004. *Experiences of women in the platinum mining industry*. Potchefstroom: North-West University. (Thesis – MA). https://repository.nwu.ac.za/bitstream/handle/10394/515/calitz_pl.pdf?sequence=1

Campbell, K. 2007. Woman miners "no better industry", but retaining women after recruiting them seen as challenge. *Mining Weekly*. https://www.miningweekly.com/print-version/039no-better-industry039-but-retaining-women-after-recruiting-them-seen-as-challenge-2007-08-03 Date of access: 22 Jul. 2020.

Cane, I. 2014. *Community and company development discourses in mining: the case of gender in Mongolia.* Queensland: The University of Queensland. (Thesis – PhD). https://espace.library.uq.edu.au/view/UQ:345421/s41600588_phd_submission.pdf?dsi_version=31fcdc4948989de44bf6811b2f81af26 Date of access: 3 Jun. 2020.

Cane, I., Schleger, A., Ali, S., Kemp, D., McIntyre, N., McKenna, P., Lechner, A., Dalaibuyan, B., Lahiri-Dutt, K. & Bulovic, N. 2015. *Responsible mining in Mongolia: enhancing positive engagement*. Brisbane: Sustainable Minerals Institute.

Carnahan, D. 2013. *A study of employee engagement, job satisfaction and employee retention of Michigan CRNAs*. Flint, MI: University of Michigan-Flint. (Dissertation – PhD). https://deepblue.lib.umich.edu/bitstream/handle/2027.42/143415/Carnahan.pdf?se Date of access: 1 Mar. 2019.

Cartwright, S. & Holmes, N. 2006. The meaning of work: the challenge of regaining employee engagement and reducing cynicism. *Human Resource Management Review,* 16:199–208. doi:10.1016/j.hrmr.2006.03.012

Carvalho, M.M. 2018. *Perceived employer attractiveness: the effects of individual demographics and experience in practicing volunteering*. Porto: University of Porto. (Dissertation – MA). https://repositorio-aberto.up.pt/bitstream/10216/116269/2/293808.pdf Date of access: 19 Aug. 2021.

Castellanos, Y. 2014. *An analysis of motivational theories that could aid the college management to enhance employee engagement*. Dublin: National College of Ireland. (Dissertation – Hons). https://nanopdf.com/download/email160protected-national-college-of-ireland_pdf Date of access: 15 Oct. 2019.

Catalyst. 2013. *Women in male dominated industries and occupations in U.S. and Canada*. http://www.catalyst.org/knowledge/womenFmaledominatedFindustriesFandFoccupationsFusFandFcanada Date of access: 10 Feb. 2019.

Catalyst. 2019. *Women in energy – gas, mining, and oil: quick take.* https://www.catalyst.org/research/women-in-energy-gas-mining-oil/ Date of access: 4 Jun. 2020.

Catalyst. 2020. *Women in the workforce: China: quick take.* https://www.catalyst.org/research/women-in-the-workforce-china/ Date of access: 4 Jun. 2020.

Chandel, P. 2018. The evolution of employee engagement: a unique construct. *International Journal of Human Resource Management and Research*, 8(6):199–216. doi:10.24247/ijhrmrdec201822

Charlier, S.D., Guay, R.P. & Zimmerman, R.D. 2016. Plugged in or disconnected? A model of the effects of technological factors on employee job embeddedness. *Human Resource Management*, 55(1):109–126. doi:10.1002/hrm.21716

Chester, E. 2005. *Getting them to give a damn: how to get your frontline to care about your bottom line.* Chicago: Dearborn Trade.

Chew, J.C.L. 2004. *The influence of human resource management practices on the retention of core employees of Australian organisations: an empirical study.* Perth*:* Murdoch University. (Dissertation – PhD). https: //researchrepository.murdoch.edu.au/id/eprint/656/2/02Whole.pdf Date of access: 28 Jan. 2019.

Chiboiwa, M.W., Samuel, M.O. & Chipunza, C. 2010. An examination of employee retention strategy in a private organization in Zimbabwe. *African Journal of Business Management*, 4(10):2103–2109.

Chichester, O., Pluess, J.D. & Taylor, A. 2017. *Women's economic empowerment in sub-Saharan Africa: recommendations for the mining sector*. BSR. https://www.bsr.org/reports/BSR_Womens_Empowerment_Africa_Mining_Brief.pdf Date of access: 5 Dec. 2019.

Child, D. 2006. *The essentials of factor analysis*. 3rd ed. New York, NY: Continuum.

Chilisa, B. & Kawulich, B.B. 2012. Selecting a research approach: paradigm, methodology and methods. In: Wagner, C., Kawulich, B.B. & Garner, M., eds. *Doing social research: a global context*. London: McGraw-Hill. pp. 51–61.

Chinomona, R. & Dhurup, M. 2013. The influence of the quality of working life on employee job satisfaction, job commitment and tenure intention in the SME sector in Zimbabwe. *The South African Journal of Economic and Management Sciences,* 17(4):363–378. doi:10.4102/sajems.v17i4.296

Chiongson, R.A., Desai, D., Marchiori, T. & Woolcock, M. 2011. *World development report 2012: gender equality and development.* Washington, DC: The World Bank.

Chovwen, C. 2007. Barriers to acceptance, satisfaction and career growth: implications for career development and retention of women in selected male occupations in Nigeria. *Women in Management Review*, 22(1):68–78. doi:10.1108/09649420710726238

Christopher, A. N. 2017. Comparing two group means: the independent samples *t* test. In: *interpreting and using statistics in psychological research.* 1–41. doi.org/10.4135/9781506304144

Clark, L.A. & Watson, D. 1995. Constructing validity: basic issues in objective scale development. *Psychological Assessment*, 7:309–319. doi:10.1037/1040-3590.7.3.309

Cliffe Dekker Hofmeyr. 2017. *Employment alert: women in the workplace.* https://www.cliffedekkerhofmeyr.com/export/sites/cdh/en/news/publications/2017/employment/downloads/Employment-Alert-14-August-2017.pdf Date of access: 18 Jan. 2021.

Cliffe Dekker Hofmeyr. 2018. *Employment alert: how will the 2018 Mining Charter affect you? The Mining Charter 2010 v the 2018 Mining Charter*. https://www.cliffedekkerhofmeyr.com/en/news/publications/2018/Corporate/mining-alert-28-september-how-will-the-2018-mining-charter-affect-you-the-mining-charter-2010-v-the-2018-mining-charter.html Date of access: 14 Sep. 2020.

Coetzee, M. & De Villiers, M. 2010. Sources of job stress, work engagement and career orientations of employees in a South African financial institution. *South African Business Review,* 14(1):27–57.

Coetzee, M. & Stoltz, E. 2015. Employees' satisfaction with retention factors: exploring the role of career adaptability. *Journal of Vocational Behavior*, 89:83–91. doi:10.1016/j.jvb.2015.04.012

Cohen, J. 1988. *Statistical power analysis for the behavioral sciences*. 2nd ed. Hillsdale, NJ: Lawrence Erlbaum Associates.

Coldwell, D.A.L. & Perumal, S. 2007. Perceptions of the measurability, importance and effects of work equity on job satisfaction and work motivation: an exploratory study of the utility of equity theory. *Alternation*, 14(1):197–217.

Commission for Gender Equality. 2017. *Failing gender transformation in mining*. http://cge.org.za/wp-content/uploads/2021/01/failing-gender-transformation-in-mining.pdf Date of access: 25 Feb. 2019

ComunidadMujer. 2018. *Género, educación y trabajo: avances, contrastes y retos de tres generaciones* [Gender, education and work: advances, contrasts and challenges of three generations]. http://www.comunidadmujer.cl/biblioteca-publicaciones/wp-content/uploads/2018/10/INFORME-GET-2018_Tres-Generaciones.pdf Date of access: 2 Jun. 2020.

Connell, C. & Claughton, D. 2018. Women in mining: dig the changing face of Australia's mining industry. *ABC News,* 23 May. https://www.abc.net.au/news/2018-05-22/dig-the-changing-face-of-mining-as-women-make-inroads/9786020 Date of access: 6 Jul. 2020.

Coolidge, F.L. 2020. *Statistics: A gentle introduction*. Thousand Oaks, CA: Sage.

Consejo Minero. 2009. *Informe ambiental y social segunda regi_on Antofagasta [Environmental and social report second Antofagasta region].* www.consejominero.cl/home/documentos_informe_social_2009.html Date of access: 1 Jun. 2020.

Consultancy Africa Intelligence. 2011. *Women in mining: legislation and representation for women in mining*. https://www.polity.org.za/article/women-in-mining-legislation-and-representation-for-women-in-mining-2011-08-25 Date of access: 10 Feb. 2019.

Cooke, F. 2011. Labour market disparities and inequalities. In: Sheldon, P., Kim, S., Li, Y. & Warner, M., eds. *China's changing workplace: dynamism, diversity and disparity.* Abingdon: Routledge. pp. 259–276.

Costa, V. & Sarmento, R. 2019*. Confirmatory factor analysis: a case study*. arXiv Preprint. https://arxiv.org/ftp/arxiv/papers/1905/1905.05598.pdf Date of access: 7 Jul. 2021.

Creswell, J.W. 2014. *Research design: qualitative, quantitative and mixed methods approaches.* 4th ed. Thousand Oaks, CA: Sage.

Creswell, J. W., & Plano Clark, V. L. 2007. *Designing and conducting mixed methods research*. London: Sage.

Creswell, J.W. & Plano Clark, V.L. 2011. *Designing and conducting mixed research methods.* Thousand Oaks, CA: Sage.

CRIRSCO (Committee for Mineral Reserves International Reporting Standards). 2013. *International reporting template for the public reporting of exploration results, mineral resources and mineral reserves*. https://mrmr.cim.org/media/1045/511-irt_november_2013.pdf Date of access: 20 Nov. 2019.

Cropanzano, R., Anthony, E.L., Daniels, S.R. & Hall, A.V. 2017. Social exchange theory: a critical review with theoretical remedies. *Academy of Management Annals*, 11(1):479–516. doi:10.5465/annals.2015.0099

Cropanzano, R. & Mitchell, M. 2005. Social exchange theory: an interdisciplinary review. *Journal of Management*, 31(6):874–900. doi:10.1177/0149206305279602

Cropanzano, R., Prehar, C.A. & Chen, P.Y. 2002. Using social exchange theory to distinguish procedural from interactional justice. *Group & Organizational Management*, 27:324–351. doi:10.1177/1059601102027003002

CSRM (Centre for Social Responsibility in Mining). 2006. *Retention of women in the minerals industry.* Brisbane: The University of Queensland.

Daley, E., Lanz, K., Narangerel, Y., Driscoll, Z., Lkhamdulam, N., Grabham, J., Suvd, B. & Munkhtuvshin, B. 2018. *Gender, land and mining in Mongolia*. Oxford: Mokoro & PCC Mongolia.

Dasgupta, S., Matsumoto, M. & Xia, C. 2015. *Women in the labour market in China*. Bangkok: ILO.

Dawis, R.V. 2005. The Minnesota theory of work adjustment. In: Brown, S.D. & Lent, R.W., eds. *Career development and counselling: putting theory and research to work*. Hoboken, NJ: Wiley. pp. 3–23.

Dawis, R.V. & Lofquist, L.H. 1984. *A psychological theory of work adjustment: an individual differences model and its application*. Minneapolis, MN: University of Minnesota Press.

DBE (Department of Basic Education). 2020. *Report on the 2019 National Senior Certificate examination.* https://www.education.gov.za/LinkClick.aspx?fileticket=a20XbsuSdcc%3D&tabid=92&portalid=0&mid=4359 Date of access: 24 Jun. 2020.

DCA (Diversity Council Australia). 2020. *About DCA*. https://www.dca.org.au/about-dca Date of access: 12 Oct. 2020.

Deci, E.L. & Ryan, R.M. 1985. *Intrinsic motivation and self-determination in human behaviour.* New York, NY: Plenum.

Deci, E.L. & Ryan, R.M. 2000. The 'what' and 'why' of goal pursuits: human needs and the self-determination of behaviour. *Psychological Inquiry*, 11:227–268. doi:10.1207/S15327965PLI1104_01

Deci, E.L. & Ryan, R.M. 2008. Facilitating optimal motivation and psychological well-being across life's domains. *Canadian psychology/Psychologie canadienne*, *49*(1): 14-23. doi: 10.1037/0708-5591.49.1.14

De Jager, H. 2000. Importance of legislation. *Auditing SA*, 3–4. https://repository.up.ac.za/bitstream/handle/2263/14758/DeJager_Importance%282000%29.pdf?sequence=1&isAllowed=y

De Klerk, I. 2012. *The perceptions of the work environment of women in core mining activities.* Potchefstroom: North-West University. (Mini dissertation – MBA). http://repository.nwu.ac.za/bitstream/handle/10394/8670/De_Klerk_I.pdf?sequence=1

Deloitte. 2017. *Rewriting the rules for the digital age*. https://www2.deloitte.com/content/dam/Deloitte/global/Documents/HumanCapital/hc-2017-global-human-capital-trends-gx.pdf Date of access: 11 Apr. 2020.

Demerouti, E., Bakker, A.B., De Jonge, J., Janssen, P.P.M. & Schaufeli, W.B. 2001. Burnout and engagement at work as a function of demands and control. *Scandinavian Journal of Work and Environment and Heath*, 27:279–286.

Department of Justice. 2020. *Basic provisions of the Constitution*. https://www.justice.gov.za/legislation/constitution/basicprov.html Date of access: 9 Dec. 2020.

Derous, E. & Wille, L. 2017. Organizational attraction. In: Rogelberg, S., Shockley, K. & Toninandel, S. eds. *The Sage encyclopaedia of industrial and organizational psychology*. 2nd ed. New York, NY: Sage. pp. 1060–1064.

Deshwal, P. 2015. Green HRM: an organizational strategy of greening people. *International Journal of Applied Research*, 1(13):176–181.

Dhaatri Resource Centre for Women and Children. 2020. *Our Livelihoods.* https://dhaatriwebsite.wixsite.com/dhaatri Date of access: 7 Apr. 2020.

DHET (Department of Higher Education and Training). 2020*. statistics on post-school education and training in South Africa:2018*. https://www.dhet.gov.za/SiteAssets/Statistics%20on%20Post-School%20Education%20and%20Training%20in%20South%20Africa%2C%202018.pdf Date of access: 9 Aug. 2020.

Dickens, L. 2000. Collective bargaining and the promotion of gender equality at work: opportunities and challenges for trade unions. *Transfer European Review of Labour and Research*, 93–208. doi:10.1177%2F102425890000600205

Dineen, B.R., Ash, S.R. & Noe, R.A. 2002. A web of applicant attraction: person-organization fit in the context of web-based recruitment. *Journal of Applied Psychology*, 87:723–734. doi:10.1037/0021-9010.87.4.723

Dirección del Trabajo. 2018*. Codigo del Trabajo, Artículo 15 Transitorio [Labor code, transitory article 15 labor].* http://www.dt.gob.cl/legislacion/1624/w3-propertyvalue-157248.html Date of access: 14 May 2020.

DiStefano, C. & Hess, B. 2005. Using confirmatory factor analysis for construct validation: an empirical review. *Journal of Psych Educational Assessment*, 23(3):225–241. doi:10.1177%2F073428290502300303

DMR (Department of Mineral Resources). 2011. *Briefing by the Department on SAWIMA and the intended objectives on establishing the organisation*. https://pmg.org.za/files/docs/111123dmr_0.ppt Date of access: 20 Feb. 2019.

Döckel, A. 2003. *The effect of retention factors on organisational commitment: an investigation of high technology employees.* Pretoria: University of Pretoria. (Thesis – MA). https://repository.up.ac.za/bitstream/handle/2263/27597/dissertation.pdf?sequence=1 Date of access: 4 Apr. 2019.

Drake, T.J. 2012. *Assessing employee engagement: a comparison of the job engagement scale and the Utrecht Work Engagement Scale*. Boulder, CO: Colorado State University. (Thesis – MSc). https://mountainscholar.org/bitstream/handle/10217/68003/Drake_Travis_colostate_0053N_11172.pdf;sequence=1 Date of access: 12 Sep. 2021.

Dulagil, A. 2012. *The relationship of employee engagement and wellbeing to organisational and student outcomes.* Paper presented at the SBS HDR Student Conference. https://ro.uow.edu.au/cgi/viewcontent.cgi?article=1039&context=sbshdr Date of access: 3 Apr. 2020.

Duranti, A. 2006. Transcripts, like shadows on a wall. *Mind, Culture and Activity*, 13(4):301–310.

Durusu, A., Şengül, B.A. & Karagöz, Ö.F. 2020. *The glass ceiling effect and coping mechanisms in academia*. https://www.researchgate.net/profile/Boran-Senguel/publication/342339115_The_Glass_Ceiling_Effect_and_Coping_Mechanisms_in_Academia/links/5eee6ac9299bf1faac66eb31/The-Glass-Ceiling-Effect-and-Coping-Mechanisms-in-Academia.pdf Date of access: 18 Feb. 2021.

Eagly, A.H. & Chaiken, S. 1984. Cognitive theories of persuasion. *Advances in Experimental Social Psychology*, 17:267–359. doi:10.1016/S0065-2601(08)60122-7

Eagly, A.H. & Chaiken, S. 1993. *The psychology of attitudes*. Fort Worth, TX: Harcourt Brace Jovanovich.

Ebrahim, S. 2016. Equal pay for work of equal value in terms of the employment equity act 55 of 1998: lessons from the International Labour Organization and the United Kingdom. *Potchefstroomse Elektroniese Regstydskrif / Potchefstroom Electronic Law Journal*, 19: 1– 27. doi.org/10.17159/1727-3781/2016/v19n0a1230

Eger, L., Mičík, M., Gangur, M. & Řehoř, P. 2019. Employer branding: exploring attractiveness dimensions in a multicultural context. *Technological and Economic Development of Economy*, 25(3):519–541.

Eggerth. D. E. 2008. From theory of work adjustment to person environment correspondence counseling: vocational psychology as positive psychology. *Journal of Career Assessment*, 16(1): 60-74. doi: 10.1177/1069072707305771

Ehrhart, H.K. & Ziegert, J.C. 2005. Why are individuals attracted to organizations? *Journal of Management*, 31(6):901–919. doi:10.1177/0149026305279759

Eiselen, R. & Uys, T. 2018. *Analysing survey data using SPSS version 25: a workbook*. 7th ed. Johannesburg: University of Johannesburg.

Eiselen, R., Uys, T. & Potgieter, T. 2005. *Analysing survey data using SPSS13*. 3rd ed. Johannesburg: STATKON, University of Johannesburg.

Elfil, M. & Negida, A. 2017. Sampling methods in clinical research: an educational review. *Emergency*, 5(1): 1–23. doi:10.22037/emergency.v5i1.15215

Els, F. 2017. *Top 50 biggest mining companies*. Mining.com. http://www.mining.com/top-50-biggest-mining-companies/ Date of access: 3 Jun. 2020.

Engelbrecht, A. & Samuel, O.M. 2019. The effect of transformational leadership on intention to quit through perceived organisational support, organisational justice and trust. *South African Journal of Economic and Management Sciences*, 22(1):1–8. doi:10.4102/sajems.v22i1.2338

Etikan, I., Musa, S.A. & Alkassim, R.S. 2016. Comparison of convenience sampling and purposive sampling. *American Journal of Theoretical and Applied Statistics*, 5(1):1–4. doi:10.11648/j.ajtas.20160501.11

Fabricius, P. 2019. An improvement, but transformation still trumps sustainability. https://admin.irr.org.za/reports/atLiberty/files/liberty-april-2019-2014-issue-41.pdf/@@download/file/@Liberty%20April%202019%20%C3%A2%E2%82%AC%E2%80%9D%20Issue%2041.pdf Date of access: 24 Jul. 2020.

Falkenbach, K., Schaab, G., Pfau, O., Ryfa, M. & Birkan, B. 2013. *Mere exposure effect.* https://www.wiwi.europa-uni.de/de/lehrstuhl/fine/mikro/bilder_und_pdf-dateien/WS0910/VLBehEconomics/Ausarbeitungen/MereExposure.pdf Date of access: 3 Mar. 2020.

Field, A. P. 2009. *Discovering statistics using SPSS: and sex, drugs and rock 'n' roll.* 3rd ed. Los Angeles, LA: Sage.

Felps, W.A., Mitchell, T.R., Hekman, D.R., Lee, T.W., Holtom, B.S. & Harman, W.S. 2009. Turnover contagion: how co-workers' job embeddedness and co-workers' job search behaviours influence quitting. *Academy of Management Journal,* 52(3):545–561. doi:10.5465/amj.2009.41331075

Ferguson, A.E. 2014*. An exploration of employee engagement in medical contexts.* Sydney: Macquarie University. (Thesis – PhD). https://www.researchonline.mq.edu.au/vital/access/services/Download/mq:39557/SOURCE1 Date of access: 11 Apr. 2020.

Fernandez-Stark, K., Couto, V. & Bamber, P. 2019. *How can 21st century trade help to close the gender gap?* Background paper for WBG-WTO Global Report on Trade and Gender. https://documents.worldbank.org/curated/en/824061568089601224/pdf/Background-Paper-for-WBG-WTO-Global-Report-on-Trade-and-Gender-How-can-Twenty-First-Century-Trade-Help-to-Close-the-Gender-Gap-Industry-4-0-in-Developing-Countries-The-Mine-of-the-Future-and-the-Role-of-Women.pdf Date of access: 3 Mar. 2020.

Ferreira, N. & Coetzee, M. 2014. Psychological career resources as predictors of employees' job embeddedness: an exploratory study. *South African Journal of Labour Relations*, 38(2):9–26.

Fischer, H.R. 2001. Abductive reasoning as a way of world making. *Foundations of Science*, 6(4):361–283. doi:10.1023/A:1011671106610

Fouché, E. 2015. *The relationships between engagement, burnout and performance in an e-commerce retail company*. Stellenbosch: Stellenbosch University. (Thesis – MCom). https://scholar.sun.ac.za/bitstream/handle/10019.1/96792/fouche_relationships_2015.pdf?sequence=3 Date of access: 16 Aug. 2021.

Freedman, J.B. 2008. Making a difference: the effect of information access on persistent voluntary engagement. *Dissertation Abstracts International.* (UMI No. 3298634).

French, R., Rayner, C., Rees, G. & Rumbles, S. 2011. *Organisational behaviour*. 2nd ed. Chichester: Wiley.

Frey, B., ed. 2018. *The Sage encyclopaedia of educational research, measurement, and evaluation*. Sage. https: //0-methods-sagepub-com.ujlink.uj.ac.za/base/download/ReferenceEntry/the-sage-encyclopedia-of-educational-research-measurement-and-evaluation/i7064.xml Date of access: 6 Jul. 2021.

FSE (Federation for Sustainable Environment). 2018. The impact of mining on the South African economy and living standards. https://fse.org.za/index.php/2018/02/10/the-impact-of-mining-on-the-south-african-economy-and-living-standards/ Date of access 16 Jun, 2019.

Gagné, M. & Deci, E.L. 2005. Self-determination theory and work motivation. *Journal of Organizational Behaviour*, 26:331–362. doi:10.1002/job.322

Gagné, M., Forest, J., Vansteenkiste, M., Crevier-Braud, L., Van den Broeck, A. & Westbye, C. 2014. The Multidimensional Work Motivation Scale: validation evidence in seven languages and nine countries. *European Journal of Work and Organizational Psychology*, 24:178–196. doi:10.1080/1359432X.2013.877892

Gair, S. 2018. *The impact of talent management on employee engagement in a South African car sales company*. Potchefstroom: North-West University. (Dissertation – MBA). https://dspace.nwu.ac.za/handle/10394/30975

Gashgari, R. 2016. Equity theory and its effect on performance outcome. *International Journal of Scientific & Engineering Research*, 7(4):517–520.

Ghose, M. 2004. Impact of mining on the female community: a perspective of female miners in the Indian context. *Minerals & Energy*, 19(4):16–24. doi:10.1080/14041040410002450

Ghosh, D. & Gurunathan, L. 2015. Do commitment based human resource practices influence job embeddedness and intention to quit? *IIMB Management Review*, 27:240–251. doi:10.1016/j.iimb.2015.09.003

Gibson, G. &. Scoble, M. 2004. “Regenderneering” the mining industry: a survey of women's career experiences in mining. *CIM Bulletin,* 97(1082):54–60.

Gingrich, P. 2004. *Introductory Statistics for the Social Sciences.* Regina, SK: University of Regina.

Glueck, W.F. 1974. Decision making: organization choice. *Personnel Psychology*, 27:77–93. doi:10.1111/j.1744-6570.1974.tb02064.x

Goliath-Yarde, L. & Roodt, G. 2011. Differential item functioning of the UWES-17 in South Africa. *SA Journal of Industrial Psychology*, *37*(1):1–11.

González-Romá, V., Schaufeli, W.B., Bakker, A.B. & Lloret, S. 2006. Burnout and work engagement: independent factors or opposite poles? *Journal of Vocational Behaviour*, 68:165–174. doi:10.1016/j.jvb.2005.01.003

Gorgievski, M.J., Moriano, J.A. & Bakker, A.B. 2014. Relating work engagement and workaholism to entrepreneurial performance. *Journal of Managerial Psychology*, 29:106–121. doi:10.1108/JMP-06-2012-0169

Gouldner, A. 1960. The norm of reciprocity: a preliminary statement*. American Sociological Review,* 25(2):161–178. doi:10.2307/2092623

Govindaraju, N. 2018. The role of traditional motivation theories on employee retention. *International Journal of Arts, Humanities and Management Studies*, (4):95–110.

Graham, M.W. & Messner, P.E. 1998. Principals and job satisfaction. *International Journal of Educational Management*, 12(5):196–202. doi:10.1108/09513549810225925

Gravetter, F.J. & Forzano, L.A.B. 2009. *Research methods for the behavioural sciences.* Belmont, CA: Wadsworth Cengage Learning.

Green Jr, P.I., Finkel, E.J., Fitzsimons, G.M. & Gino, F. 2017. The energizing nature of work engagement: Toward a new need-based theory of work motivation. *Research in Organizational Behavior,* 37: 1-18. doi.org/10.1016/j.riob.2017.10.007

Greenovation Hub. 2014. *China's mining industry at home and overseas: development, impacts and regulation*. https://www.ghub.org/cfc_en/wp-content/uploads/sites/2/2014/11/China-Mining-at-Home-and-Overseas_Main-report2_EN.pdf Date of access: 5 Oct. 2020.

Gruman, J.A. & Saks, A.M. 2011. Performance management and employee engagement. *Human Resource Management Review,* 21:123–136. doi:10.1016/j.hrmr.2010.09.004

Guest, D. 2014. Employee engagement: a sceptical analysis. *Journal of Organizational Effectiveness: People and Performance*, 1(2):141–156*.* doi:10.1108/JOEPP-04-2014-0017

Gupta, K. & Singh, N. 2015. Fit estimation in structural equation modelling: a synthesis of related statistics. HSB Research Review, 9(1): 20 –27.

Gurudatt, K. & Gazal, Y. 2015. Role of (QWL) quality of work life on employee retention in private sector companies. *International Journal of Engineering and Management Sciences*, 6(1):11–15.

Hair, J. F., Black, W. C., Babin, B. J. & Anderson, R. E. 2010. *Multivariate data analysis*. 7th ed. Upper Saddle River, NJ: Pearson Prentice Hall.

Halbesleben, J.R.B. 2010. A meta-analysis of work engagement: relationships with burnout, demands, resources and consequences. In: Bakker, A.B. & Leiter, M.P., eds. *Work engagement: recent developments in theory and research.* New York, NY: Psychology Press. pp. 102–117.

Halbesleben, J.R.B. & Wheeler, A.R. 2008. The relative roles of engagement and embeddedness in predicting job performance and intention to leave. *Work & Stress*, 22:242–256. doi:10.1080/02678370802383962

Halcomb, E.J. & Davidson, P.M. 2006. Is verbatim transcription of interview data always necessary? *Applied Nursing Research*, 19(1):38–42. doi:10.1016/j.apnr.2005.06.001

Hallberg, U.E. & Schaufeli, W.B. 2006. "Same same" but different? Can work engagement be discriminated from job involvement and organizational commitment? *European Psychologist,* 11:119–127. doi:10.1027/1016-9040.11.2.119

Halvorsen, B., Treuren, G.J.M. & Kulik, C.T. 2015. Job embeddedness among migrants: fit and links without sacrifice. *The International Journal of Human Resource Management*, 26(10):1298–1317. doi:10.1080/09585192.2 014.990399

Harlow, H.F. 1958. The nature of love. *American Psychologist,* 13:673–685. doi:10.1037/h0047884

Harman, W.S., Lee, T.W., Mitchell, T.R., Felps, W. & Owens, B.P. 2007. The psychology of voluntary employee turnover. *Current Directions in Psychological Science*, 16(1):51–54. doi:10.1111/j.1467-8721.2007.00474.x

Hatton, C., Emerson, E., Rivers, M., Mason, H., Mason, L. & Swarbrick, R. 1999. Factors associated with staff stress and work satisfaction in services for people with intellectual disability. *Journal of Intellectual Disability Research,* 43:253–267. doi:10.1046/j.1365-2788.1999.00208.x

Hausknecht, J., Day, D. & Thomas, S. 2004. Applicant reactions to selection procedures: an updated model and meta-analysis. *Personnel Psychology*, 57:639–683. doi:10.1111/j.1744-6570.2004.00003.x

Heine, A. 2008. *A model for managing the barriers of introducing women into a mining industry.* Pretoria: University of Pretoria. (Dissertation – MCom). https://repository.up.ac.za/handle/2263/28565 Date of access: 6 Apr. 2019.

Helbert, M. 2018. Australian women in mining: still a harsh reality. In: Stevens, L., Tait, P. & Varney, D., eds. *Feminist Ecologies.* Cham: Palgrave Macmillan. pp. 231–246.

Hendriks, M. 2016. *Organizational reputation, organizational attractiveness and employer branding: clarifying the concepts*. Enscheda: University of Twente. (Thesis – MBA). http://essay.utwente.nl/71211/1/hendriks_MA_bms.pdf

Henha, E.P.N. 2019. *An exploratory study on the predictors of turnover intentions among expatriate academics and talent retention strategies at selected universities in KwaZulu-Natal, South Africa*. Durban: Durban University of Technology. (Thesis – PhD). https://openscholar.dut.ac.za/bitstream/10321/3268/1/HENHAEPN_2019.pdf Date of access: 1 Apr. 2020.

Hermanus, M.A. 2007. Occupational health and safety in mining-status, new developments, and concerns. *Journal of the Southern African Institute of Mining and Metallurgy*, 107:531–538.

Herzberg, F., Mausner, B. & Synderman B. 1959. *The motivation to work.* New York, NY: Wiley,

Herzberg, F. 1987. One more time: How do you motivate employees. *Harvard Business Review*, 5-16. https://www.insidemarketing.it/wp-content/uploads/2020/08/one_more_time_-_how_do_you_motivate_employees.pdf

Herzberg, F. 2003. One more time: how do you motivate employees? *Harvard Business Review*: 86–96. https://qi.elft.nhs.uk/wp-content/uploads/2015/12/9-herzberg.pdf

Herzberg, G. & Howe, L.L. 1959. The Lyman bands of molecular hydrogen. *Canadian Journal of Physics*, 37(5):636–659. doi:10.1139/p59-070

Highhouse, S., Lievens, F. & Sinar, E.F. 2003. Measuring attraction to organizations. *Educational and Psychological Measurement*, 63(6):986–1001. doi:10.1177/0013164403258403

Hill, R. E. 1974. An empirical comparison of two models for predicting preference for standard employment offers. *Decision Sciences*, 5: 243-254.

Hinton, J. 2012. *Guidelines for mainstreaming gender in the minerals sector*. International Conference on the Great Lakes Region. http://icglr-rinr.org/images/resources/documents/ICGLRGuidelinesMainstreamingGenderMiningSector.pdf Date of access: 16 Jul. 2020.

Hinton, J. 2016. *The gender dimensions of tin, tantalum and tungsten mining in the Great Lakes Region.* Gender and Knowledge Advisory Services, Netherlands Ministry of Foreign Affairs. https://www.kit.nl/wp-content/uploads/2019/02/The-Gender-Dimensions-of-3Ts-in-the-GLR-1.pdf Date of access: 16 Jul. 2020.

Hlapho, T. 2015. *Key drivers of employee engagement in the large platinum mines in South Africa*. Pretoria: University of Pretoria. (Mini-dissertation – MBA). https://repository.up.ac.za/handle/2263/52407#:~:text=Job%20design%20and%20characteristics%2C%20supervision,engagement%20on%20the%20platinum%20mines Date of access: 5 Aug. 2019.

Hofmans, J. 2012. Individual differences in equity models. *Psicologica: International Journal of Methodology and Experimental Psychology*, 33:473–482.

Holbeche, L. & Mathews, G. 2012. *Engaged: unleashing your organisation's potential through employee engagement*. Chichester: Wiley.

Holtom, B.C., Mitchell, T.R. & Lee, T.W. 2006. Increasing human and social capital by applying job embeddedness theory. *Organizational Dynamics*, 35(4):316–331. doi:10.1016/j.orgdyn.2006.08.007

Homans, G.C. 1958. Social behavior as exchange. *American Journal of Sociology*, 63:597–606.

Hoole, C. & Bonnema, J. 2015. Work engagement and meaningful work across generational cohorts. *South African Journal of Human Resource Management,* 13(1):1–11. doi:10.4102/sajhrm.v13i1.681

Hooper, D. 2012. Exploratory factor analysis. In: Chen, H., ed. *Approaches to quantitative research – theory and its practical application: a guide to dissertation students*. Cork: Oak Tree Press. pp. 1–32.

Hove, E. & Hlongwana, J. 2015. A step into the male-dominated mining sector: women's participation in mining, the case of Kwekwe district. *Journal of Humanities and Social Science*, 20(7):99–104. doi:10.9790/0837-207799104

Huang, G. & Ali, S. 2015. Local sustainability and gender ratio: evaluating the impacts of mining and tourism on sustainable development in Yunnan, China. *International Journal of Environmental Research and Public Health*, 12:927–939. doi:10.3390/ijerph120100927

Huddy, L. 2004. Contrasting theoretical approaches to intergroup relations. *Political Psychology*, 25(6):947–967. doi:10.1111/j.1467-9221.2004.00404.x

Hughes, C.M. 2012. *A study on the career advancement and retention of highly qualified women in the Canadian mining industry*. Vancouver: University of British Columbia. (Thesis – MA). https://internationalwim.org/wp-content/uploads/2020/06/a_study_on_the_career_advancement_and_retention_of_highly.pdf Date of access: 5 Apr. 2019.

Hung, C.J. 2005. Exploring types of organization-public relationships and their implications for relationship management in public relations. *Journal for Public Relation Research*, 17(4):393–425. doi:10.1207/s1532754xjprr1704_4

Hutchings, K., De Cieri, H. & Shea, T. 2011. Employee attraction and retention in the Australian resources sector. *Journal of Industrial Relations*, 53(1):83–101. doi:10.1177/0022185610390299

Ibidunni, S., Osibanjo, O., Adeniji, A., Salau, O.P. & Falola, H. 2016. Talent retention and organizational performance: a competitive positioning in Nigerian banking sector. *Periodica Polytechnica Social and Management Sciences*, 24(1):1–13. doi:10.3311/PPso.7958

ICIT Technology Training & Advancement. 2020. *Google forms: creating, editing, and distributing*. Madison, WI: University of Wisconsin Whitewater.

IBIS Education for development. 2014. *Resource-rich countries in sub-Saharan Africa (SSA).* http://oxfamibis.dk/sites/default/files/media/pdf_global/aap_pdf/map_of_resource-rich_countries_in_sub-saharan_africa_final.pdf Date of access: 21 Jul. 2020.

Implats. 2019. *Mineral resource and mineral reserve statement as at 30 June 2019: value over volume*. http://www.implats.co.za/pdf/mrr-2019/mrr-2019.pdf Date of access: 16 Nov. 2019.

ILO (International Labour Organization). 2017. *C045 Underground Work (Women) Convention, 1935 (No. 45).* https://www.ilo.org/dyn/normlex/en/f?p=NORMLEXPUB:12100:0::NO::P12100_ILO_CODE:C045 Date of access: 2 Apr. 2020.

ILO (International Labour Organization). 2012. *Gender equality and decent work: selected ILO conventions and recommendations that promote gender equality as of 2012.* https://www.ilo.org/wcmsp5/groups/public/@ed_norm/@normes/documents/publication/wcms_088023.pdf Date of access: 10 Oct. 2020.

ILO (International Labour Organization). 2014. *South Africa: equality of opportunity and treatment.* https://www.ilo.org/dyn/natlex/natlex4.detail?p_lang=&p_isn=51169&p_classification=05 Date of access: 22 Aug. 2020.

ILO (International Labour Organization). 2020. *Mission and impact of the ILO.* https://www.ilo.org/global/about-the-ilo/mission-and-objectives/lang--en/index.htm Date of access: 27 Nov. 2020.

IOA (In on Africa). 2011. Women in mining: Legislation and representation for women in mining. *Polity*, 25 Aug. https://www.polity.org.za/article/women-in-mining-legislation-and-representation-for-women-in-mining-2011-08-25 Date of access 16 Apr. 2019.

Islam, M.T. 2020. *Learning SPSS without pain: a comprehensive manual for data analysis and interpretation of outputs*. https://www.researchgate.net/publication/343670643_Learning_SPSS_without_Pain_A_Comprehensive_Manual_for_Data_Analysis_and_Interpretation_of_Outputs/link/5f4aa2e6299bf13c50530e44/download Date of access: 1 Jul. 2021.

Isotalo, J. 2001. *Basics of statistics*. University of Tampere. https://www.schoollearningresources.com/PDF/_Basics%20of%20Statistics.pdf Date of access: 5 Jul. 2021.

IWiM (International Women in Mining). 2020. *Our impact*. https://internationalwim.org/our-impact/ Date of access: 5 Oct. 2020.

IWRAW (International Women's Rights Action Watch). 2020. *About the International Women's Rights Action Watch.* https://www.iwraw-ap.org/ Date of access: 2 Apr. 2020.

Jackson, S.L. 2008. *Research methods: a modular approach*. Belmont, CA: Thomson Wadsworth.

Janse van Rensburg, Y., Boonzaier, B. & Boonzaier, M. 2013. The job demands-resources model of work engagement in South African call centres. *South African Journal of Human Resource Management/SA Tydskrif vir Menslikehulpbronbestuur*, 11(1): 1-13. doi.org/10.4102/sajhrm.v11i1.484

Jeffrey, E., Diamond, T., Stewart, H., Thompson, B., Reid, T. & Wood, C. 2018. *Gender diversity in the Australian resources and energy industry leading, lagging or losing out?* AWRA. http://awra.org.au/wpcontent/uploads/2018/03/08032018_AWRA_Gender_Diversity_Leading_lagging_losing2.pdf Date of access: 30 Jun. 2020.

Jenitta, J. N. & Elangkumaran, P. 2014. Quality of work life (QWL) and its impact on job satisfaction: a special reference of National Water Supply and Drainage Board (NWS&DB) in Trincomalee District. In: *Proceedings of the International Conference on Contemporary Management*. Jaffna, Sri Lanka. pp. 1–11.

Jiang, Y. 2001. Abductive reasoning as pragmatic inference: towards a formal theory of pragmatics. In: Pan, H., ed. *Studies in Chinese linguistics, volume ii, linguistic society of Hong Kong book series*. pp. 91 – 115. doi:10.13140/2.1.3120.8968

JICA (Japan International Cooperation Agency). 2013. *Country gender profile: Mongolia final report*. https://www.jica.go.jp/english/our_work/thematic_issues/gender/background/c8h0vm0000anjqj6-att/mongolia_2013.pdf Date of access: 3 Jun. 2020.

Johansson, M. & Ringblom, L. 2017. The business case of gender equality in Swedish forestry and mining-restricting or enabling organizational change. *Gender, Work & Organization*, 24(6):628–642. doi:10.1111/gwao.12187

Jones, T.L., Baxter, M.A.J. & Khanduja, V. 2013. A quick guide to survey research. *Annals of the Royal College of Surgeons of England*, 95(1):5–7. doi:10.1308/003588413X13511609956372

Jordaan, G.M.E. 2005. *Work engagement of academic staff in higher education institutions in South Africa.* Potchefstroom: North-West University. (Mini-dissertation – BA Hons). http://repository.nwu.ac.za.nwulib.nwu.ac.za/bitstream/handle/10394/800/jordaan_gertruidam.pdf;sequence=1

Judge, T. A. & Bretz, R. D. 1992. Effects of work values on job choice decisions. *Journal of Applied Psychology*, 77:261-271.

Judge, T. A. & Cable, D. M. 1997. Applicant personality, organizational culture, and organization attraction. *Personnel Psychology*, 50: 359-393.

Kaggwa, M. 2019. Interventions to promote gender equality in the mining sector of South Africa. *The Extractive Industries and Society*, 7(2): 1–7. doi:10.1016/j.exis.2019.03.015

Kahn, W.A. 1990. Psychological conditions of personal engagement and disengagement at work. *Academy of Management Journal*, 4(33):692–724. doi:10.2307/256287

Kaiser, H. F. 1974. An index of factorial simplicity. *Psychometrika*, 39(1): 31 – 36. doi.org/10.1007/BF02291575

Kanwar, Y.P.S., Singh, A.K. & Kodwani, A.D. 2012. A study of job satisfaction, organizational commitment and turnover intent among the IT and ITES sector employees. *Vision*, 16(1):27–35. doi:10.1177%2F097226291201600103

Kapoor, S. & Meachem, A. 2012. Employee engagement: a bond between employee and organisation. *Amity Global Business Review*, 7(1): 14–22.

Kaushik, V. & Walsh, C.A. 2019. Pragmatism as a research paradigm and its implications for social work research. *Social Sciences*, 8(9):1–17. doi:10.3390/socsci8090255

Keba, M.C. 2017. *A feminist ethical analysis of the Democratic Republic of the Congo's mining policy*. Pietermaritzburg: University of KwaZulu-Natal. (Thesis – PhD). https://ukzn-dspace-ukzn-ac-za.nwulib.nwu.ac.za/bitstream/handle/10413/15700/Keba_Muko_Cyril_2017.pdf?sequence=1&isAllowed=y Date of access: 16 Feb. 2020.

Keck, J. & Powell, M. 2006. Women into mining jobs at Inco: challenging the gender division of labor. In: Gier, J.J. & Mercier, L., eds. *Mining women: gender in the development of a global*

Khabir, M.L. 2014. What are the factors that make an employer attractive in the eyes of prospective employees in Bangladesh? In: *Proceedings* of the *International Conference on Business, Law and Corporate Social Responsibility (ICBLCSR'14)*, Phuket. pp. 133–136. doi:10.15242/ICEHM.ED1014020

Khan, T., Rogier van Den, B. & Baasanjav, O. 2013. *Mongolia: raising female participation in the large scale mining sector.* The World Bank. https://openknowledge.worldbank.org/handle/10986/16499?locale-attribute=en Date of access: 3 Jun. 2020.

Khoza, N. 2015. *Women's career advancement in the South African mining industry: exploring the experiences of women in management positions at Lonmin Platinum mine*. Pietermaritzburg: University of KwaZulu-Natal. (Dissertation – MBA). http://ukzn-dspace.ukzn.ac.za/bitstream/handle/10413/13777/Khoza_Nompumulelo_2015.pdf?sequence=1&isAllowed=y Date of access: 15 Feb. 2019.

Kilu, R.H., Andersson, E., Sanda, M.A. & Uden, M. 2017. Reflections on organizational barriers vis-à-vis women participation in large scale Ghanaian mines. *International Journal of Business and Social Science*, 1–18.

Kim T. K. 2015. T test as a parametric statistic. *Korean journal of anesthesiology*, *68*(6): 540–546. doi.org/10.4097/kjae.2015.68.6.540

Kispál-Vitai, Z. 2016. Comparative analysis of motivation theories. *International Journal of Engineering and Management Sciences*, 1(1):1–13. doi:10.21791/IJEMS.2016.1.25.

Kivunja, C. & Kuyini, A.B. 2017. Understanding and applying research paradigms in educational contexts. *International Journal of Higher Education*, 6(5):26–41. doi:10.5430/ijhe.v6n5p26

Kljajevic, B. 2015. *An investigation into the underrepresentation of women in the Pilbara mining region of Western Australia*. Perth: Curtin University. (Thesis – MA). https://espace.curtin.edu.au/bitstream/handle/20.500.11937/862/240765_Kljajevic%202016.pdf?sequence=2 Date of access: 30 Jun. 2020.

Knox, H.J. 2013. *Attracting and retaining talent: identifying employee value proposition (EVP) drivers of attraction and retention in the South African labour market*. Port Elizabeth: Nelson Mandela Metropolitan University. (Dissertation – MA). http://vital.seals.ac.za:8080/vital/access/manager/PdfViewer/vital:9410/SOURCEPDF?viewPdfInternal=1 Date of access: 15 Aug. 2019.

Koonmee, K., Singhapakdi, A., Virakul, B. & Lee, D.J. 2010. Ethics institutionalization, quality of work life and employee job-related outcomes: a survey of human resource managers in Thailand. *Journal of Business Research*, 63:20–26. doi:10.1016/j.jbusres.2009.01.006

Korman, A.K. 1967. Self-esteem as a moderator of the relationship between self-perceived abilities and vocational choice. *Journal of Applied Psychology*, 51:65–67. doi:10.1037/H0024237

Korte, R.F. 2007. A review of social identity theory with implications for training and development. *Journal of European Industrial Training*, 31(3):166–180. http://dx.doi.org/10.1108/03090590710739250

Korunka, C., Hoonakker, P. & Carayon, P. 2008. Quality of working life and turnover intention in information technology work. *Human Factors and Ergonomics in Manufacturing*, 18(4):409–423. doi:10.1002/hfm.20099

Kotler, P. 1994 *Marketing management: analysis, planning, implementation and control.* 8th ed. Englewood Cliffs, NJ: Prentice-Hall.

KPMG. 2020. *Tax and legal news*. https://assets.kpmg/content/dam/kpmg/us/pdf/2020/03/tnf-sa2-mar24-2020.pdf Date of access: 16 Jul. 2020.

KPMG International. 2014. *Chile: country mining guide*. http://www.iberglobal.com/files/2016/chile_mining_kpmg.pdf Date of access: 4 Apr. 2020.

Kraimer, M.L., Shaffer, M.A., Harrison, D.A. & Ren, H. 2012. No place like home? An identity strain perspective on repatriate turnover. *Academy of Management Journal,* 55(2):399–420. doi:10.5465/amj.2009.0644

Krommendijk, K. 2020. *Generational differences in employer preferences: using the employer attractiveness scale in the Netherlands.* Utrecht: Utrecht University. (Dissertation – MA). https://dspace.library.uu.nl/handle/1874/399228 Date of access: 12 Aug. 2021.

Kuhn, T.S. 1962. *The structure of scientific revolutions*. Chicago, IL: University of Chicago Press.

Kular, S., Gatenby, M., Rees, C., Soane, E. & Truss, K. 2008. *Employee engagement: a literature review*. Kingston University. http://eprints.kingston.ac.uk/4192/1/19wempen.pdf Date access: 11 Apr. 2020.

Kumari, S. & Saini, G.K. 2018. Do instrumental and symbolic factors interact in influencing employer attractiveness and job pursuit intention? *Career Development International*, 23(4):444–462. doi:10.1108/CDI-03-2018-0069

Kundu, S.C. & Lata, K. 2017. Effects of supportive work environment on employee retention: mediating role of organizational engagement. *International Journal of Organizational Analysis*, 25(4): 703-722. DOI 10.1108/IJOA-12-2016-1100

Kundu, S.C. & Kusum, L. 2017. Effects of supportive work environment on employee retention. *International Journal of Organizational Analysis*, 25(4):703–722. doi:10.1108/IJOA-12-2016-1100

Kundy, J. & Wuliji, T. 2012. Exploring the relationship between engagement, performance, and retention of health workers delivering HIV/AIDS services in Tanzania. https://www.usaidassist.org/sites/assist/files/tanzania_health_worker_engagement_study_protocol_5th_jan_2012_doc_-_urc_review.pdf Date of access: 4 Apr.2020.

Kuok, A.C. & Taormina, R.J. 2017. Work engagement: evolution of the concept and a new inventory. *Psychological Thought*, 10(2):262–287. doi:10.5964/psyct.v10i2.236

Lahiri-Dutt, K. 2012. Digging women: towards a new agenda for feminist critiques of mining: gender. *Gender Place and Culture A Journal of Feminist Geography*, 19(2):193–212. doi:10.1080/0966369X.2011.572433

Lahiri-Dutt, K. 2015. The feminisation of mining. *Geography Compass*, *9*(9): 523-541.

Lahiri-Dutt, K. 2019. The act that shaped the gender of industrial mining: unintended impacts of the British mines act of 1842 on women's status in the industry. *The Extractive Industries and Society*, 7(2): 1–9. doi:10.1016/j.exis.2019.02.011

Lahiri-Dutt, K. & Macintyre M., eds. 2006. *Women miners in developing countries: pit women and others*. Aldershot: Ashgate.

Lambert, S. & Loiselle, C. 2008. Combining individual interviews and focus groups to enhance data richness. *Journal of Advanced Nursing*, 62(2):228–237. doi:10.1111/j.1365-2648.2007.04559.x

Landelahni. 2013. *Mining report: local mining mirrors global skills*. http://www.landelahni.co.za/research-report-2/ Date of access: 27 Feb. 2019.

Larsen. D. A.& Phillips. J.I. 2002. Effect of recruiter on attraction to the firm: implications of the elaboration likelihood model. *Journal of Business and Pshychology*, 16(3), 347-364.

Larsson, S. & Rosell, H. 2014. *Employer branding: employer attractiveness, corporate reputation, and job application intentions.* Luleå: Luleå University of Technology. (Thesis – MSc). https: //www.diva-portal.org/smash/get/diva2: 1021295/FULLTEXT02 Date of access: 12 Aug. 2021.

Latham, G.P. & Pinder, C.C. 2005. Work motivation theory and research at the dawn of the twenty-first century. *Annual Review of Psychology,* 56:485–516. doi:10.1146/annurev.psych.55.090902.142105

Layman, L. 2014. *The encyclopedia of women & leadership in twentieth-century Australia.* https://www.womenaustralia.info/leaders/biogs/WLE0382b.htm Date of access: 5 Aug. 2020.

Ledwaba, K.S. 2017. Breaking down gender barriers*: exploring experiences of underground female mine workers in a mining compan*y. Johannesburg: University of the Witwatersrand. (Dissertation – MA). https://core.ac.uk/download/pdf/188775057.pdf Date of access: 3 Apr. 2019.

Ledwith, S. & Munakamwe, J. 2015. Gender, union leadership and collective bargaining: Brazil and South Africa. *The Economic and Labour Relations Review*, 26(3):411–429. doi:10.1177/1035304615596316

Lee, T.W. & Mitchell, T.R. 1994. An alternative approach: the unfolding model of voluntary employee turnover. *The Academy of Management Review*, 19(1):51–89. doi:10.2307/258835

Lee, T.W. & Mitchell, T.R. 2001. The unfolding model of voluntary turnover and job embeddedness: foundations for a comprehensive theory of attachment. *Research Organisation Behaviour,* (23):189–246. doi:10.1016/S0191-3085(01)23006-8

Lee, W.T., Burch, T.C. & Mitchell, T.R. 2014. The story of why we stay: a review of job embeddedness. *Annual Review of Organizational Psychology and Organizational Behavior,* 1(1):199–216. doi:10.1146/annurev-orgpsych-031413-091244

Leiner, D.J., 2016. Our research's breadth lives on convenience samples: a case study of the online respondent pool "SoSci Panel". *SCM Studies in Communication and Media*, *5*(4): 367-396.

Leiter, M.P. & Maslach, C. 2017. Burnout and engagement: contributions to a new vision. *Burnout Research*, 5:55–57.

Legislation Line. 2020. *Gender equality.* https://www.legislationline.org/topics/topic/7 Date of access: 26 Aug. 2020.

Letlape, L.H. 2014. *Life stories of managerial and professional women in the South African mining industry*. Pretoria: University of Pretoria. (Dissertation – MCom). https://repository.up.ac.za/bitstream/handle/2263/37277/Letlape_Life_2014.pdf?sequence=4 Date of access: 4 Apr. 2019.

Lewig, K., Xanthopoulou, D., Bakker, A.B., Dollard, M. & Metzer, J. 2007. Burnout and connectedness among Australian volunteers: a test of the Job Demands-Resources model. *Journal of Vocational Behavior,* 71:429–445. doi:10.1016/j.jvb.2007.07.003

Lewin, K. 1935. *Dynamic theory of personality*. New York, NY: McGraw-Hill.

Lievens, F., Decaesteker, C., Coetsier, P. & Geirnaert, J. 2001. Organizational attractiveness for prospective applicants: a person-organisation fit perspective. *Applied Psychology: An International Review*, 50:30–51. doi:10.1111/1464-0597.00047

Lindholm, R. 2013. *Managing retention by engaging employees in a case company*. Lappeenranta: Saimaa University of Applied Sciences. (Thesis – BA). https://www.theseus.fi/handle/10024/62021 Date of access: 3 Apr. 2019.

Liu, C.H. & Matthews, R. 2005. Vygotsky's philosophy: constructivism and its criticisms examined. *International Education Journal*, 6(3):386–399.

Lockwood, N.R. 2007. *Leveraging employee engagement for competitive advantage: HR's strategic role.* 2007 SHRM Research Quarterly. www.shrm.org Date of access: 3 Mar. 2020.

Lord, L. & Eastham, J. 2011. *Attraction and retention of women in the minerals industry: Stage one report for the Minerals Council of Australia.* Curtin University. https://espace.curtin.edu.au/bitstream/handle/20.500.11937/21578/159028_37259_Stage%20One%20Report%20MCA%20Attraction%20and%20Retention%20of%20Women%20in%20the%20Resources%20Industry%20May%202011.pdf?sequence=2 Date of access: 28 Jan. 2019.

Lozeva, S. & Marinova, D. 2010. Negotiating gender: experience from Western Australian mining industry. *Journal of Economic & Social Policy*, 13(2):1–21.

Lussier, R.N. & Achua, C.F. 2015. *Leadership: theory, application, & skill development*. 5th ed. Mason, OH: Cengage Learning.

Luthans, F. & Peterson, S.J. 2002. Employee engagement and manager self-efficacy: implications for managerial effectiveness and development. *Journal of Management Development,* 5:376–387. doi:10.1108/02621710210426864

Mabaso, C. & Moloi, C. 2016. Talent Attraction and Its Relationship to Organisational Productivity. *Canadian Social Science, 12*(10): 21-33. http://52.196.142.242/index.php/css/article/download/8840/9805

Macey, W.H. & Schneider, B. 2008. The meaning of employee engagement. *Industrial and Organizational Psychology*, 1(1):3–30. doi:10.1111/j.1754-9434.2007.0002.x

Magbool, M.A.H., Amran, A., Nejati, M. & Jayaraman, K. 2016. Corporate sustainable business practices and talent attraction. *Sustainability Accounting, Management and Policy Journal*, 7(4):539–559. doi:10.1108/SAMPJ-06-2015-0042

Maguire, M. & Delahunt, B. 2017. Doing a thematic analysis: a practical, step-by-step guide for learning and teaching scholars. *All Ireland Journal of Higher Education*, 8(3): 3351-33514.

Mäkikangas, A., Kinnunen, U., Rantanen, J., Mauno, S., Tolvanen, A. & Bakker, A.B. 2014. Association between vigour and exhaustion during the workweek: a person-centered approach to daily assessments. *Anxiety, Stress & Coping: An International Journal*, 27(5):555–575.

Malan, C. 2010. *A framework for the sustained policy implementation of the Mining Charter of 2002: the role of women in the South African mining industry*. Johannesburg: University of Johannesburg. (Thesis – PhD). https://ujcontent.uj.ac.za/vital/access/services/Download/uj:7484/CONTENT1 Date of access: 10 Jul. 2020.

Malhotra, N.K. 2010. *Marketing research: an applied orientation*. 6th ed. Upper Saddle River, NJ: Pearson.

Mamah, A.A. & Ulo, F.U. 2015. Application of equity theory on skilled manpower retention: a study of medical practitioners in public specialist hospitals in Enugu metropolis, Nigeria. *International Journal of Research in Business Management*, 3(11):95–110.

Mangaroo-Pillay, S. 2018. *The perceptions of women in the workplace in the South African mining industry.* Potchefstroom: North-West University. (Mini-dissertation- MBA). http://repository.nwu.ac.za.nwulib.nwu.ac.za/handle/10394/31007

Mangaroo-Pillay, S. & Botha, D. 2020. An exploration of women's workplace experiences in the South African mining industry. *Journal of the Southern African Institute of Mining and Metallurgy,* 120:475–483. doi:10.17159/2411-9717/1099/2020

Marais, L.M. 2017. *Exploring leaders' strategies for employee engagement in the South African mining industry*. Washington, DC: Walden University. (Thesis – PhD).

http://scholarworks.waldenu.edu/cgi/viewcontent.cgi?article=4411&context=dissertations Date of access: 16 Feb. 2019.

Marisi, S., Cox, S.S. & Bennett, R.J. 2016. Job embeddedness: is it always a good thing? *Journal of Managerial Psychology*, 31(1):141–153. doi:10.1108/JMP-05-2013-0150

Markwich, C. & Robertson-Smith, G. 2009. *Employee engagement: a review of current thinking*. Institute for Employment Studies. http://www.employment-studies.co.uk/system/files/resources/files/469.pdf Date of access: 3 Mar. 2020.

Marshall, B. 2018. *Facts and figures of the Canadian mining industry: facts and figures 2018.* The Mining Association of Canada. https://mining.ca/wp-content/uploads/2019/03/Facts-and-Figures-English-Web_0.pdf Date of access: 22 Jun. 2020.

Marshall, B. 2019. *Facts and figures 2019: the state of Canada's mining industry.* The Mining Association of Canada. https://mining.ca/documents/facts-and-figures-2019/ Date of access: 22 Jun. 2020.

Marshall, C. & Rossman, G.B. 1999. *Designing qualitative research*. 3rd ed. London: Sage.

Martin, P.G. 2013. *The experience of women in male-dominated professions and environments in South Africa*. Pretoria: University of South Africa. (Dissertation – MA). http://uir.unisa.ac.za/bitstream/handle/10500/8594/dissertation_martin_pg.pdf.pdf?sequence=1 Date of access: 8 Feb. 2019.

Mascha, K. 2007. Staff morale in day care centres for adults with intellectual disabilities. *Journal of Applied Research in Intellectual Disabilities,* 20:191–199. doi:10.1111/j.1468-3148.2006.00316.x

Masenya, R.W. 2018. *Measuring student investment potential: a mixed methods approach*. Potchefstroom: North-West University. (Thesis – MCom). http://repository.nwu.ac.za/bitstream/handle/10394/28321/Masenya_RW_2018.pdf?sequence=1&isAllowed=y Date of access: 14 Jun. 2021.

Mashiane, B.R. 2009. *Transformational barriers against women's advancement in South African platinum mining companies*. Pretoria: University of South Africa. (Dissertation – MBL). https://uir.unisa.ac.za/handle/10500/3747 Date of access: 4 Apr. 2019.

Maslach, C. & Leiter, M.P. 1997. *The truth about burnout: How organizations cause personal stress and what to do about it*. San Francisco, CA: Wiley.

Maslach, C. & Leiter, M.P. 2007. Burnout. In: Fink G, ed. *Encyclopedia of stress*. 2nd ed. Elsevier. pp. 368–371. https: //www.researchgate.net/publication/303791742_Burnout Date of access: 14 Sep. 2021.

Maslach, C., Schaufeli, W.B. & Leiter, M.P. 2001. Job burnout. *Annual Review of Psychology,* 52(1):397–422. doi:10.1146/annurev.psych.52.1.397

Maslow, A. 1943. A theory of human motivation. *Psychological Review*, 50:370–396. doi:10.1037/h0054346

Masvaure, P., Ruggunan, S. & Maharaj, A. 2014. Work engagement, intrinsic motivation and job satisfaction among employees of a diamond mining company in Zimbabwe. *Journal of Economics & Behavioural Studies*, 6(6):488–499. doi:10.22610/jebs.v6i6.510

Mathur-Helm, B. 2006. Women and the glass ceiling in South African banks: an illusion or reality? *Women in Management Review,* 21(4):311–326. doi:10.1108/09649420610667028

Matshingane, L.B. 2017. *Experiences of woman working underground at a coal mine in Mpumalanga province*. Johannesburg: University of the Witwatersrand. (Dissertation – MSc). http://wiredspace.wits.ac.za/jspui/bitstream/10539/24048/1/LINDIWE-BETTY-MATSHINGANE-981249.%20EXPERIENCES%20OF%20WOMEN%20WORKING%20UNDERGROUND%20AT%20A%20COAL%20MINE%20IN%20MPUMALANGA%20PROVINCE.pdf Date of access: 20 Feb. 2019.

Mawere, M., Mubaya, T.R., Van Reisen, M. & Van Stam, G. 2016 Maslow's theory of human motivation and its deep roots in individualism: interrogating Maslow's applicability in Africa. In: Mawere, M. & Nhemachena, A., eds. *Theory, knowledge, development and politics: what role for the academy in the sustainability of Africa?* Bamenda: Langaa Research & Publishing. pp. 55–72.

May, D.R., Gilson, R.L. & Harter, L.M. 2004. The psychological conditions of meaningfulness, safety and availability and the engagement of the human spirit at work. *Journal of Occupational and Organizational Psychology,* 77:11–37.

Mayes, R. 2014. Gendered dimensions of resource extraction: the place of women. In: Durey, A., Mayes, R., Pforr, C. & Brueckner, M., eds. *Resource curse or cure? On the sustainability of development in Western Australia.* CSR, Sustainability, Ethics and Governance. Germany: Springer. pp. 121–133.

MCA (Minerals Council of Australia). 2005. *Unearthing new resources: attracting and retaining women in the Australian minerals industry.* Australian Government Office for Women. https://www.csrm.uq.edu.au/media/docs/394/unearthing_new_resources_attracting_retaining_women_australian_mining_industry.pdf Date of access: 5 Aug. 2020.

McBain, R. 2007. The practice of engagement: research into current employee engagement practice. *Strategic HR Review*, 6(6):16–19. doi:10.1108/14754390780001011

MCSA (Minerals Council South Africa). 2019. *Women in Mining South Africa: fact sheet.* https://www.mineralscouncil.org.za/industry-news/publications/fact-sheets/send/3-fact-sheets/738-women-in-mining Date of access: 23 Jul. 2020.

MSCA (Minerals Council South Africa). 2020. *Economic impact of COVID-19 lock-down on the SA economy*. https://www.mineralscouncil.org.za/downloads/send/68-covid-19/946-economic-impact-of-covid-19-lock-down-on-the-sa-economy Date of access: 23 Jul. 2020.

McCulloch, J. 2003. Women mining asbestos in South Africa, 1893–1980. *Journal of Southern African Studies*, 29(2):413–432.

McKim, C.A. 2017. The value of mixed methods research: a mixed methods study. *Journal of Mixed Methods Research*, 20:202–222. doi:10.1177/1558689815607096

Measham, T.G. & Zhang, A. 2019. Social licence, gender and mining: moral conviction and perceived economic importance. *Resources Policy*, 61:363–368. doi:10.1016/j.resourpol.2018.11.001

Meehan, L. 2019. *Employer attractiveness, career orientation and self-perceived employability.* Johannesburg: University of Witwatersrand. (Dissertation – MA). https://wiredspace.wits.ac.za/bitstream/handle/10539/29305/Lauren%20Meehan%20%28921026%29.pdf?sequence=1&isAllowed=y Date of access: 9 Oct. 2021.

Mello, D., Penceliah, Y., Phago, K., Maserumule, M., Wessels, R., Ndevu, Z., Mahlangu, L., Mzini, Z., Lues, L. & Dorasamy, N. 2013. *Managing human capital in the public sector*. Pretoria: Van Schaik.

Mercier, L. 2011. Bordering on equality: women miners in North America. In: Lahiri-Dutt, K., ed. *Gendering the field: towards sustainable livelihoods for mining communities*. Canberra: ANU Press. pp. 33–47. doi:10.22459/GF.03.2011.03

MERIT. 2016. *MERIT project gender equality strategy*. https://www.ceso-saco.com/app/uploads/2018/05/MERIT-Gender-Strategy-FINAL-Nov2016-3.pdf Date of access: 3 Jun. 2020.

Mertens, D.M. 2015. *Research and evaluation in education and psychology*. 4th ed. Thousand Oaks, CA: Sage.

Meyer, J.P. & Gagné, M. 2008. Employee engagement from a self-determination theory perspective. *Industrial and Organizational Psychology,* 1:60–62. doi:10.1111/j.1754-9434.2007.00010.x

Meyer, J.P. & Smith, C.A. 2000. HRM practices and organizational commitment: test of a mediation model. *Canadian Journal of Administrative Sciences*, 17:319–331. doi:10.1111/j.1936-4490.2000.tb00231.x

Meyer, J.P., Stanley, D.J., Herscovitch, L. & Topolnytsky, L. 2002. Affective, continuance, and normative commitment to the organization: a meta-analysis of antecedents, correlates, and consequences. *Journal of Vocational Behavior*, 61(1):20–52.

MHSC (Mine Health and Safety Council). 2021. *Legislation*. https://mhsc.org.za/legislation/ Date of access: 20 Sep. 2021.

Mihalčová, B., Pružinský, M. & Gontkovičová, B. 2015. The consequences of gender stereotypes in the work of managers. *Procedia Economics and Finance*, 23:1260–1265. doi:10.1016/S2212-5671(15)00464-5

MiHR (Mining Industry Human Resources Council). 2011. *Unearthing possibilities: human resources challenges and opportunities in the Canadian mineral exploration sector.* https://www.pdac.ca/docs/default-source/members---membership/programs---students/labour-market-research/mihr-unearthing-possibilities-(full-version-eng).pdf?sfvrsn=9ce3a52e_6 Date of access: 28 Jul. 2020.

MiHR (Mining Industry Human Resources Council). 2016. *Strengthening mining's talent alloy: exploring gender inclusion.* https://mihr.ca/wp-content/uploads/2020/03/MiHR_Gender_Report_EN_WEB.pdf Date of access: 2 May 2020.

MiHR (Mining Industry Human Resources Council). 2017. *Canadian mining labour market outlook.* https://mihr.ca/wp-content/uploads/2020/03/National-Report-2017-Infographic_EN_Web.pdf Date of access: 7 Jul. 2020.

MiHR (Mining Industry Human Resources Council). 2018. *HR data miner.* https://mihr.ca/wp-content/uploads/2020/03/HR-Data-Miner-2-Women-in-Mining-EN.pdf Date of access: 7 Jul. 2020.

MiHR (Mining Industry Human Resources Council). 2019a. *Canadian mining labour market: 10-year outlook.* https://mihr.ca/wp-content/uploads/2020/03/MIHR_National_Report_web2.pdf Date of access: 9 Jul. 2020.

MiHR (Mining Industry Human Resources Council). 2019b. *Canadian mining labour market outlook.* https://internationalwim.org/wp-content/uploads/2020/12/NationalOutlook2019.pdf Date of access: 9 Jul. 2020.

Miles, J.A. 2012. *Management and organisation theory.* San Francisco, CA: Wiley.

Mining Council. 2020. *Cifras actualizadas de la minería [Updated mining figures].* https://consejominero.cl/wp-content/uploads/2020/06/Cifras-actualizadas-de-la-mineria-Mayo-2020.pdf Date of access: 7 May 2020.

Mining Dot Com. 2014. *Let's talk about: women in the mining industry*. https://www.mining.com/lets-talk-about-women-in-the-mining-industry-31775/ Date of access: 1 Dec. 2020.

Ministry of Labour & Employment. 2019. *Equal employment opportunities for women in mines and exemption from the provision of section 46 of the Mines Act, 1952-Reg. (Notice 01).* New Delhi: Government of India.

Ministry of Mines, Government of India. 2016. *E-book on mining sector.* https://mines.gov.in/writereaddata/UploadFile/ebookmines.PDF Date of access: 23 Jul. 2020.

Mitchell, T.R., Holtom, B.C., Lee, T.W., Sablynski, C.J. & Erez, M. 2001. Why people stay: Using job embeddedness to predict voluntary turnover. *Academy of management journal*, 44(6): 1102-1121.

mm&P (minerals & PEOPLE). 2020. *Background. Declarations*. https://www.mmpindia.in/declatation/ Date of access: 15 Jul.2020.

Mohanty. S. 2019. Becoming an employer of choice in the infrastructure and construction sector. *International Journal of Innovative Technology and Exploring Engineering,* 8(11):576–589.

Mojapelo, T.D., Usher, K. & Mills, J. 2016. Effective pain management as part of palliative care for persons living with HIV/AIDS in a developing country: a qualitative study. *Journal of Clinical Nursing*, 25:1598–1605. doi:10.1111/jocn.13145

Mokotong, R.D. 2016. *The coping mechanisms of women in the mining industry*. Pretoria: University of Pretoria. (Dissertation – MA).

https://repository.up.ac.za/bitstream/handle/2263/53441/Mokotong_Coping_2016.pdf?sequence=1 Date of access: 27 Apr. 2019.

Moletsane, M., Tefera, O. & Migiro, S. 2019. The relationship between employee engagement and organisational productivity of sugar industry in South Africa: the employees' perspective. *African Journal of Business and Economic Research*, 14(1):113–134. doi:10.31920/1750-4562/2019/v14n1a6

Mondal, H., Mondal, S., Ghosal, T. & Mondal, S. 2018. Using Google forms for medical survey: a technical note. *International Journal of Clinical and Experimental Physiology*, 5(4):216–218. doi:10.5530/ijcep.2018.5.4.26

Moraka, N.V. 2018. *An African feminist study of talent management practices applied to improve gender equality in JSE-listed South African mining boards: a multiple case analysis*. Pretoria: University of South Africa. (Thesis – PhD). http://uir.unisa.ac.za/bitstream/handle/10500/25143/thesis_moraka_nv.pdf?isAllowed=y&sequence=1 Date of access: 3 Aug. 2020.

Moraka, N.V. & Jansen van Rensburg, M., 2015. Transformation in the South African mining industry-looking beyond the employment equity scorecard. *Journal of the Southern African Institute of Mining and Metallurgy*, 115(8): 669-678. http://dx.doi.org/10.17159/2411-9717/2015/v115n8a2

Morgan, D. 2007. Paradigms lost and pragmatism regained: methodological implications of combining qualitative and quantitative methods. *Journal of Mixed Methods Research*, 1:48–76. doi:10.1177/2345678906292462

Morrell, K., Loan-Clarke, J., Arnold, J. & Wilkinson, A. 2008. Mapping the decision to quit: a refinement and test of the unfolding model of voluntary turnover. *Applied Psychology*, 57(1):128–150. doi:10.1111/j.1464-0597.2007.00286.x

Morris, J. 2016. Examining Employee Engagement to Predict Retention Rates. *Senior Projects*. Paper 7. http://scholarworks.gvsu.edu/lib_seniorprojects/7 Date of access: 4 Apr.2020.

Mosadeghrad, A. M. 2013. Quality of working life: an antecedent to employee turnover intention. *International Journal of Health Policy and Management*; 1(1): 49-58.

Moshoeu, A.N. 2017. *A model of personality traits and work-life balance as determinants of employee engagement*. Pretoria: University of South Africa. (Dissertation – PhD). https://uir.unisa.ac.za/bitstream/handle/10500/23247/thesis_moshoeu_an.pdf?sequence=1&isAllowed=y Date of access: 3 Oct. 2021.

Mouton, J. 2001. *How to succeed in your master's and doctoral studies: a South African guide and resource book*. Pretoria: Van Schaik.

Moyo, T. 2011. Extractive Industries and Women in Southern Africa. *BUWA! A Journal on African Women's Experiences*, 61-69.

MQA (Mining Qualifications Authority). 2006. *Sector skills plan for the mining and minerals sector: 2005 to 2010.* http://www.mqa.org.za/sites/default/files/SSP%20Update%2017%20November%202006.pdf Date of access: 19 May 2020.

MQA (Mining Qualifications Authority). 2018. *Sector skills plan 2017/2018.* http://www.mqa.org.za/sites/default/files/MQA%20SSP%20Update%202019-20%20Final%20%2001%20August%202018_1.pdf Date of access: 5 Feb. 2019.

MQA (Mining Qualifications Authority). 2019a. Analysis of the 2019 workplace skills plan and annual training. Johannesburg. (Unpublished report).

MQA (Mining Qualifications Authority). 2019b. Sector skills plan for the mining and minerals sector. https://mqa.org.za/sector-skills-planning/ Date of access: 5 Feb. 2020.

MQA (Mining Qualifications Authority). 2020a. Understanding the occupational health and safety matters in the South African mining and minerals sector (MMS). Johannesburg. (Unpublished report).

MQA (Mining Qualifications Authority). 2020b. Women in mining: understanding factors that influence access and mobility in and within occupational structures in the MMS. Johannesburg. (Unpublished report).

MQA (Mining Qualifications Authority). 2021. Sector Skills Plan for the mining and minerals sector submitted by the Mining Qualifications Authority (MQA) to the Department of Higher Education and Training 2020–2025. Johannesburg. (Unpublished report).

Muchadenyika, D. 2015. Women struggles and large-scale diamond mining in Marange, Zimbabwe. *The Extractive Industries and Society*, 2:714–721. doi:10.1016/j.exis.2015.08.003

Mudimba, P.C. 2017. *Re-defining gender equality in the South African mining sector*. Pretoria: University of Pretoria. (Dissertation – LLM). https://repository.up.ac.za/bitstream/handle/2263/65698/Mudimba_Defining_2017.pdf?sequence=1 Date of access: 28 Jan. 2019.

Munish, R.A. & Agarwal, R. 2017. Employee engagement and retention: a review of literature. *International Journal of BRIC Business Research*,*6*(1): 1-19. DOI :10.14810/ijbbr.2017.6101

Munn, S.L. 2013. Unveiling the work–life system: the influence of work–life balance on meaningful work. *Advances in Developing Human Resources*, *15*(4): 401-417. doi: 10.1177/1523422313498567

Murray, H. 1938. *Explorations in personality*. New York, NY: Oxford University Press.

Musingwini, C., Cruise, J.A. & Phillips, H.R. 2013. A perspective on the supply and utilisation of mining graduates in the South African context. *Journal of the Southern African Institute of Mining and Metallurgy*, 113(3):235–241.

Musonda, J. 2020. Undermining gender: women mineworkers at the rock face in a Zambian underground mine. *Anthropology Southern Africa*, 43(1):32–42. doi:10.1080/23323256.2020.1736945

Mutasa, F.C. 2017. *Gender equality and corporate social responsibility in the workplace: a case study of Anglo American Platinum Mine and Impala Platinum Mines Rustenburg, South Africa*. Johannesburg: University of Witwatersrand. (Dissertation – MA). http://wiredspace.wits.ac.za/handle/10539/24430 Date of access: 19 May. 2020.

Muthuveloo, R., Basbous Khalit, O., Ping Ai, T. & Long Sang, C. 2013. Antecedents of employee engagement in the manufacturing sector. *American Journal of Applied Sciences*, 10(12):1546–1552. doi:10.3844/ajassp.2013.1546.1552

Mxhakaza, J.N. 2010. *Perceived discrimination of women in the mining sector.* Potchefstroom: North-West University. (Dissertation – MA). https://repository-nwu-ac-za.nwulib.nwu.ac.za/bitstream/handle/10394/8297/Mxhakaza_JN_Chapter_4.pdf?sequence=5

Nabavi, R.T. 2012. Bandura's social learning theory & social cognitive learning theory. *Theory of Developmental Psychology*, 1–24.

Nayak, P. & Mishra, S.K. 2005. Gender and sustainable development in mining sector in India. *General Economics and Teaching*, 1–7.

NCGE (National Committee on Gender Equality). 2019. *About organization*. https://www.gender.gov.mn/statistics?lang_id=2 Date of access: 6 Jun. 2020.

Ndanduleni, D.H. 2016. *Employees' perceptions towards gender equality: a case study of two mining companies in Limpopo province*. Thohoyandou: University of Venda. (Dissertation – MA). https://univendspace.univen.ac.za/bitstream/handle/11602/896/Dissertation%20-%20Nndanduleni,%20d.h.-.pdf?sequence=1 Date of access: 16 Feb. 2020.

Ndeipanda, E. 2018. *Towards developing retention strategies: a study of the professional and administrative staff of the Namibian Ministry of Education, arts and culture*. Stellenbosch: Stellenbosch University. (Thesis – MPA). http://scholar.sun.ac.za/bitstream/handle/10019.1/103608/ndeipanda_towards_2018.pdf?sequence=1 Date of access: 24 May. 2019.

Ndlovu, V., Ndlovu, V. & Mpofu, M. 2019. Against all odds.: female small scale mine owners in Gwanda, Zimbabwe. *Journal of Sustainable Development*, 12(1):139–147. doi:10.5539/jsd.v12n1p139

Nel, P.S, Werner, A., Schuz, H., Poisat, P., Du Plessis, A., Ngalo, O. & Sono, T. 2011. *Human resources management*. 8th ed. Cape Town: Oxford University Press South Africa.

Newell, P.J. 2005. Business and international environmental governance: the state of the art. In: David, L.L. & Newell, PJ., eds*. The business of global environmental governance*. Cambridge: The MIT Press. pp. 135–166.

New South Wales Minerals Council. 2014. *NSW women in mining: a snapshot a survey by the NSW Minerals Council*. https://www.nswmining.com.au/NSWMining/media/NSW-Mining/Publications/NSW-Women-in-Mining-A-snapshot.pdf Date of access: 6 Jun. 2020.

Nguluwe, U.W. 2016. *Women and mining in Zambia*. http://www.academia.edu/30251328/WOMEN_AND_MINING_IN_ZAMBIA Date of access: 15 Jun. 2020.

Nguyen, M.L. 2017. *The impact of employees' motivation on organizational effectiveness*. Vaasa: Vaasa University of Applied Sciences. (Thesis). https://www.diva-portal.org/smash/get/diva2%3A833433/FULLTEXT01.pdf Date of access: 18 Mar. 2020.

NHS Leadership Academy. 2015. *Talent and talent management insights.* https://eoeleadership.hee.nhs.uk/sites/default/files/Insight-5-retaining-talented-people.pdf Date of access: 14 Feb. 2019.

Nishishiba, M., Jones, M. & Kraner, M. 2014. Comparing means of more than two groups: analysis of variance (ANOVA). *In Research methods and statistics for public and nonprofit administrators.* 1–30. doi.org/10.4135/9781544307763

Nite, D.K. 2015. Women mineworkers and family-oriented labour: an Indian coalfield (Jharia), 1895–1950. *Journal of Archive India Institute*, 2:1–36.

Noor, S.M. & Abdullah, M.A. 2012. Quality work life among factory workers in Malaysia. *Procedia - Social and Behavioral Sciences*, 35:739–745. doi:10.1016/j.sbspro.2012.02.144

Noutel, R., Araujo, P., Fernandes, R. & Arriscado, P. 2021. An employer branding strategy: developing a talent attraction model through action research. *South Florida Journal of Development*, 2(1):417–431.

Ntsane, M.M. 2014. *Factors influencing employee turnover and engagement of staff within branch network in Absa (central region)*. Bloemfontein: University of the Free State. (Dissertation – MBA). https://scholar.ufs.ac.za/bitstream/handle/11660/715/NtsaneMM.pdf?sequence=1&isAllowed=y Date of access: 28 Jan. 2019.

NWU (North-West University). 2010. Manual for post-graduate students. NWU: Potchefstroom.

Nyabeze, T., Espley, S. & Beneteau, D. 2010. *Gaining insights on career satisfaction for women in mining*. CIM, ICM. https://internationalwim.org/wp-content/uploads/2020/06/Tech-Paper_MEMO_2010_Beneteau_Espley_Nyabeze_Gaining-Insights-on-Career-Sati.pdf Date of access: 17 Jul. 2020.

Nyambura, N. &. Kamara, J. 2017. Influence of career development practices on employee retention in public universities: a case of Technical University of Kenya. *Journal of Strategic Business and Change Management,* 4(30):510–522.

Obilor, E.I. & Amadi, E.C. 2018. Test for significance of Pearson's correlation coefficient. *International Journal of Innovative Mathematics, Statistics & Energy Policies*, *6*(1): 11–23.

O'Driscoll, E. 2017. *Employer attractiveness and employee commitment: the case of a large multinational software company in Ireland*. Athlone: Athlone Institute of Technology. (Dissertation – MBA). https://research.thea.ie/bitstream/handle/20.500.12065/2559/Eimearodriscoll.pdf?sequence=1 Date of access: 16 Feb. 2019.

OECD (Organisation for Economic Co-operation and Development). 2018. *The impact of legal frameworks on women's economic empowerment around the world: challenges and good practices.* https://www.oecd.org/mena/competitiveness/2107-March-on-Gender-Legal-Framework-Highlights.pdf Date of access: 26 Aug. 2020.

Olivier, E. 2015. *Advocacy for the open access mandates implementation at the University of Pretoria: a case study.* https://repository.up.ac.za/handle/2263/17418 Date of access: 19 Aug. 2021.

Olsson, O., Skånberg, K. & Larsen, R.K. 2019. The Swedish mining sector in sustainable futures. *Stockholm Environment Institute*: Stockolm, Sweeden. https://www.sei.org/wp-

content/uploads/2019/05/swedish-mining-sustainable-futures-sei-report.pdf Date of access: 23 May.2020.

Onah, F.O. & Anikwe, O.S. 2016. The task of attraction and retention of academic staff in Nigerian universities. *Journal of Management and Strategy*, 7(2):9–20. doi:10.5430/jms.v7n2p9

Orçan, F. 2018. Exploratory and confirmatory factor analysis: which one to use first? *Journal of Measurement and Evaluation in Education and Psychology*, 9(4):414–421. doi:10.21031/epod.394323

Osaro, C. 2016. Talent attraction and employee retention in oil firms in Rivers State. *International Journal of Novel Research in Humanity and Social Sciences*, 3(2):75–84.

Ott, R.L. & Longnecker, M.T. 2010. *An introduction to statistical methods and data analysis*. 6th ed. Belmont, CA: Cengage Learning.

Owler, K. & Morrison, R.L. 2015. What makes work enjoyable and motivating for learning advisors in Aotearoa-New Zealand? *Association of Tertiary Learning Advisors Aotearoa/New Zealand,* 1:16–33.

Ozkan, U.R. & Beckton, C. 2012. *The pathway forward: creating gender inclusive leadership in mining and resources*. Carleton University. https://www.bcctem.ca/sites/default/files/the_pathway_forward.pdf Date of access: 17 May 2020.

Pactwa, K. 2019. Is there a place for women in the polish mines? Selected issues in the context of sustainable development. *Sustainability*, 11:1–14. doi:10.3390/su11092511

Padayachee, K.M. 2017. *A total rewards framework for the attraction and retention of the youth.* Pretoria: University of South Africa (Thesis – PhD). https://uir.unisa.ac.za/bitstream/handle/10500/23628/thesis_mohamed-padayachee_k..pdf?isAllowed=y&sequence=1 Date of access: 2 Apr. 2019.

Palaya, J., Pearson, S. & Nash, T. 2018. Perception of social support in individuals living with a diabetic foot: a qualitative study. *Diabetes Research and Clinical Practice*, 146:267–277. doi:10.1016/j.diabres.2018.10.016

Pandita, D. & Ray, S. 2018. Talent management and employee engagement–a meta-analysis of their impact on talent retention. *Industrial and Commercial Training*, 50(4): 185-199. doi.org/10.1108/ICT-09-2017-0073

Pattenden, C. 1998. *Women in mining: a report to the women in Mining Taskforce*. The Australasian Institute of Mining and Metallurgy. https://www.ausimm.com.au/content/docs/wimreport.pdf Date of access: 13 Feb. 2020.

Pattenden, C.A. & Brereton, D. 2015. *Women in Australian mining 1997 to 2013: a generation of change.* Brisbane: The University of Queensland. https://www.csrm.uq.edu.au/media/docs/1341/arcwim-lp100200159-report-revised-final-250116-mr.pdf Date of access: 5 Aug. 2020.

Peltier-Huntley, J.O. 2019. *Closing the gender gap in Canadian mining: an interdisciplinary mixed methods study*. Saskatoon: University of Saskatchewan. (Thesis – MSc). https://harvest.usask.ca/bitstream/handle/10388/12102/PELTIER-HUNTLEY-THESIS-2019.pdf?sequence=1 Date of access: 6 Jul. 2020.

Pennsylvania State University. 2018. *Empirical research in the social sciences and education.* https://guides.libraries.psu.edu/emp Date of access: 27 Feb. 2019.

Peterson, R.A. 1994. A meta-analysis of Cronbach's coefficient alpha. *Journal of Consumer Research*, 21:381–391. doi:10.1086/209405

Pham-Thai, N.T., McMurray, A.J., Muenjohn, N. & Muchiri, M. 2018. Job engagement in higher education. *Personnel Review*, 47(4):951–967. doi:10.1108/PR-07-2017-0221

Phiri, B. & Chileshe, P.R. 2015. Gender in Zambian mining: women in nonmetalliferous small scale surface mining sector. *International Journal of Engineering Research & Technology*, 4(7):1226–1233.

Pingle, S.S. & Kaur, R. 2019. Employer attractiveness: a comparative analysis of professionals & MBA students' perceptions. *Indian Journal of Industrial Relations*, 55(1):153–166.

Ployhart, R.E., Weekley, J.A. & Baughman, K. 2006. The structure and function of human capital emergence: a multilevel examination of the attraction-selection-attrition model. *Academy of Management Journal*, 49(4):661–677. doi:10.2307/20159791

Portela, D.M.P. 2012. *Contributo das técnicas de análise fatorial para o estudo do programa ocupação científica de jovens nas férias* [Contribution of factor analysis techniques to the study of the scientific occupation program for young people on vacation]. Lisbon: Universidade Aberta (Dissertation –MSc). https://repositorioaberto.uab.pt/handle/10400.2/2536 Date of access: 11 Jul. 2021.

Potgieter, I.L. & Ferreira, N. 2018. Female human resource professionals' job embeddedness in relation to commitment foci: an exploratory study. *Acta Commercii*, 18(1):1–8. doi:10.4102/ac.v18i1.493

Priyadarshini, C., Mamidenna, S. & Sayeed, O.B. 2016. Identifying dimensions of employer attractiveness in Indian universities: an approach towards scale development. *Journal of Asia Business Studies*, 10(2):183–193. doi:10.1108/JABS-02-2015-0023

Purevjav, B. 2011. Artisanal and small-scale mining: gender and sustainable livelihoods in Mongolia. In: Lahiri-Dutt, K., ed. *Gendering the field: towards sustainable livelihoods for mining communities*. Canberra: ANU Press. pp. 197–211. doi:10.22459/GF.03.2011.11

Purvee, A. 2019. *Women in engineering in Mongolia*. World Engineers Convention. https://www.wec2019.org.au/wp-content/uploads/pdfs/presentation_668.pdf Date of access: 2 Jun. 2020.

PWC (PricewaterhouseCoopers). 2012. *Mind the gap: solving the skills shortages in resources.* https://vital.voced.edu.au/vital/access/services/Download/ngv:55770/SOURCE201 Date of access: 28 May 2020.

PWC (PricewaterhouseCoopers). 2013. *Mining for talent: a study of women on boards in the mining industry by WIM (UK) and PwC.* https://www.pwc.com/gr/en/publications/assets/mining-for-talent.pdf Date of access: 28 May 2020.

PWC (PricewaterhouseCoopers). 2015. *Mining for talent 2015: q review of women on boards in the mining industry 2012–2014*. https://www.pwc.co.uk/assets/pdf/women-in-mining-2015.pdf Date of access: 2 Jun. 2021.

Ralushai, M. 2003. *Experiences of women working on the mines: a case study from Rustenburg Platinum mines*. Johannesburg: University of Johannesburg. (Mini-dissertation – MA). https://ujcontent.uj.ac.za/vital/access/services/Download/uj:13465/CONTENT1 Date of access: 19 May. 2020.

Ramesh, A. & Gelfand, M. 2010. Will they stay or will they go? The role of job embeddedness in predicting turnover in individualistic and collectivist cultures. *Journal of Applied Psychology*, 95:807–823. doi:10.1037/a0019464

Ramlall, S. 2004. A review of employee motivation theories and their implications for employee retention within organizations. *Journal of American Academy of Business*, 5(1/2): 52–63.

Ramos, J. 2017. *Desafio de la productividade en Chile y e da la mayor: partipicion laboral femenina [Productivity challenge in Chile and the greatest: female labour participation].* https://slideplayer.es/slide/13499062/ Date of access: 2 Jun. 2020.

Ranchod, S. 2001. Mining, minerals, sustainable development, southern Africa: gender and mining workplace. Birnam Park: African Institute of Corporate Citizenship. *Minerals & Energy - Raw Materials Report,* 21(2):23-35.

Rathbone, A.D. 2006. *Work engagement of employees in the mining environment.* Potchefstroom: North-West University. (Mini-dissertation – MBA). http://repository.nwu.ac.za/bitstream/handle/10394/1404/rathbone_albertd.pdf?sequence=1 Date of access: 16 Aug. 2021.

Redmond, M.V. 2015. *Social exchange theory*. https://lib.dr.iastate.edu/cgi/viewcontent.cgi?article=1003&context=engl_reports Date of access: 12 Apr. 2021.

Regnault, A., Willgoss, T. & Barbic, S. 2018. International Society for Quality of Life Research (ISOQOL) Mixed Methods Special Interest Group (SIG): Towards the use of mixed methods inquiry as best practice in health outcomes research*. Journal of Patient-Reported Outcomes*, 2(19):1–4. doi:10.1186/s41687-018-0043-8

Reis, G.G. & Braga, B.M. 2016. Employer attractiveness from a generational perspective: implications for employer branding. *Revista de Administração (São Paulo)*, 51:103–116.

Reis, G.G., Braga, B.M. & Trullen, J. 2017. Workplace authenticity as an attribute of employer attractiveness. *Personnel Review*, 46(8):1962–1976. doi:10.1108/PR-07-2016-0156

Renfors, J. 2017. *Employee motivation and engagement as a business strategy.* Helsinki: Haaga-Helia University of Applied Sciences. (Thesis – BA). https://www.theseus.fi/bitstream/handle/10024/131530/Bachelor%20Thesis_Employee%20Motivation%20and%20Engagement%20as%20a%20Business%20StrategyFINAL.pdf?sequence=1&isAllowed=y Date of access: 8 Aug. 2019.

Republic of India. 1952. Mines Act No 35 of 1952. *Gazette of India,* 195235, 7 Jan.

Reynolds, L.M. 2008. *A study of the relationship between associate engagement and transformational leadership in a large, faith-based health system*. Dissertation Abstracts International. (UMI No. 3345479).

Rich, B.L., Lepine, J.A. & Crawford, E.R. 2010. Job engagement: antecedents and effects on job performance. *Academy of Management Journal*, 53(3):617–635. doi:10.5465/AMJ.2010.51468988

Rickard, S., Treasure, W., McQuilken, J., Mihaylova, A. & Baxter, J. 2017. *Women in mining, can a mining law unlock the potential of women.* Adam Smith International & International Women in Mining. https://www.researchgate.net/publication/321361345_Women_in_Mining_Can_a_mining_law_unlock_the_potential_of_women_in_mining Date of access: 20 May 2020.

Roberts, R.G., 2014. *Assessing the relationship between leadership trust and work engagement at a university.* Pothefstroom: North-West University.(Mini-dissertation, MBA). http://repository.nwu.ac.za.nwulib.nwu.ac.za/handle/10394/10800

Robbins, S.P. 1989. *Organizational behaviour: concepts, controversies, and applications.* Englewood Cliffs, NJ: Prentice-Hall.

Robbins, S.P. 1994. *Management*. 4th ed. Englewood Cliffs, NJ: Prentice Hall.

Robbins, S.P. & Judge, T. 2008. *Organizational behaviour*. 13th ed. Upper Saddle River, NJ: Pearson Prentice Hall.

Robinson. D., Perryman. S. & Hayday. S. 2004. *The drivers of employee engagement.* Brighton, BN: Institute for Employment Studies.

Rochat, S. 2018. Examining motivational interviewing in career counselling from a motivational system theory perspective. *British Journal of Guidance & Counselling,* 46(5):632–643. doi:10.1080/03069885.2018.1483005

Rogelberg, S., ed. 2017. *The Sage encyclopaedia of industrial and organizational psychology.* 2nd ed. Thousand Oaks, CA: Sage.

Rohmah, N., Mohamad, H. & Shofiyuddin, M. 2018. Implementation of Google Forms in ECE to face digital era. In: *4th International Conference on Early Childhood Education. Semarang Early Childhood Research and Education Talks (SECRET 2018).* Semarang: Atlantis Press. pp. 177–180.

Romano, R.B. & Papastefanaki, L. 2020. Women and gender in the mines: Challenging masculinity through history: An introduction. *International Review of Social History*, 65(2), 191–230. doi:10.1017/S0020859019000774

Roos, M. 2014. *Determining mutual challenges faced by opencast mines and their women employees.* Potchefstroom: North-West University. (Mini-dissertation – MBA).

http://repository.nwu.ac.za.nwulib.nwu.ac.za/bitstream/handle/10394/15530/Roos_M.pdf?sequence=1

Rossi, M. 2018. *Characteristics of employee turnover: a case study of industrial product and service provider.* Tampere: University of Tampere. (Thesis – MA). https://core.ac.uk/download/pdf/250153734.pdf Date of access: 4 Apr. 2019.

Rossman, G. & Wilson, B. 1991. Numbers and words revisited: being shamelessly eclectic. *Evaluation Review*, 9(5):627–643. doi:10.1177/0193841 X8500900505

Rossmann, D. 2010. Understanding organizational culture and group dynamics: reframing the normative orientation of the role of information professionals within organizations. In: Pankle, E.D., Thesis. W. & Bushing. M., eds. *Recruitment, development, and retention of information professionals: trends in human resources and knowledge management.* Hershey, PA: IGI Global. pp. 206–217.

Rothbard, N.P. 2001. Enriching or depleting? The dynamics of engagement in work and family roles. *Administrative Science Quarterly*, 46(4):655–684. doi:10.2307/3094827

Rothmann, S. & Baumann, C. 2014. Employee engagement: the effects of work/homework interaction and psychological conditions. *South African Journal of Economics and Management Science*, 17(4):515–530. doi:10.4102/sajems.v17i4.419

Rothmann, S. & Jordaan, G.M.E. 2006. Job demands, job resources and work engagement of academic staff in South African higher education institutions. *South African Journal of Industrial Psychology,* 32(4):87–96. doi:10.4102/sajip.v32i4.247

Rousseau, P. 2008. *Talent chooses prestige over pay.* Vlerick Leuven Gent. http://www.vlerick.com/en/media/press/releases/9412-VLK.html Date of access: 13 Feb. 2020.

Rozsa, Z., Formánek, I. & Maňák, R. 2019. Determining the factors of the employees' intention to stay or leave in the Slovak's SMEs. *International Journal of Entrepreneurial Knowledge,* 7(2):63-72. doi:10.2478/ijek-2019-0011

RSA (Republic of South Africa). 1995. Labour Relations Act, No. 66 of 1995. (Notice no. 2083). *Government Gazette*, 17678, 18 Dec.

RSA (Republic of South Africa). 1996(a). Constitution of the Republic of South Africa, Act No. 108 of 1996. (Notice no. 16861). *Government Gazette*, 1877, 13 Dec.

RSA (Republic of South Africa). 1996(b). Mine Health and Safety Act No. 29 of 1996. (Notice no. 967). *Government Gazette*, 17242, 14 Jun.

RSA (Republic of South Africa). 1997. Basic Conditions of Employment Act No. 75 of 1997. (Notice no. 1631). *Government Gazette*, 1877, 13 Dec.

RSA (Republic of South Africa). 1998(a). Employment Equity Act, No. 55 of 1998. (Notice no. 23922). *Government Gazette*, 18491, 5 Dec.

RSA (Republic of South Africa). 1998(b). Skills Development Act, No. 97 of 1998. (Notice no.1400). *Government Gazette*, 19420, 2 Nov.

RSA (Republic of South Africa). 2000. Promotion of Equality and Prevention of Unfair Discrimination Act 4 of 2000. *Government Gazette,* 29876, 2 Feb.

RSA (Republic of South Africa). 2002. Mineral and Petroleum Resources Development Act 28 of 2002. (Notice no. 1323). *Government Gazette*, 1273, 10 Oct.

RSA (Republic of South Africa). 2004. Broad-based Socio-economic Empowerment Charter for the South African Mining Industry. (Notice no. 1639). *Government Gazette*, 25899:6–17, 13 Aug.

RSA (Republic of South Africa). 2010(a). Amendment of the Broad-based Socio-economic Empowerment Charter for the South African Mining and Minerals Industry. (Notice no. 838). *Government Gazette*, 33573*,* 20 Sep.

RSA (Republic of South Africa). 2010(b). Guideline for the Submission of a Social and Labour Plan: As Required in Terms of Regulation 46 of the Mineral and Petroleum Resources Development Act (Act 28 of 2002), 1 Oct.

RSA (Republic of South Africa). 2013. Employment Equity Act, 1998 (Act 55 of 1998 as Amended), Code of Good Practice on Equal Pay/Remuneration for Work of Equal Value. (Notice no. 448). *Government Gazette*, 38837, 1 Jun.

RSA (Republic of South Africa). 2015. Women Empowerment and Gender Equality Bill. *Government Gazette*, 37005, 6 Nov.

RSA (Republic of South Africa). 2018(a). Basic Conditions of Employment Amendment Bill, 31 Jan.

RSA (Republic of South Africa). 2018(b). Broad-Based Socio-Economic Empowerment Charter for the South African Mining Industry. (Notice no. 1002). *Government Gazette*, 41934, 27 Sep.

Rufai, H.K., Anderson, E. & Sanda, M.A. 2014. Examining gender equity research in Ghanaian mines: a meta-analytical approach. In: *2nd UGBS Conference on Business and Development 2014 Conference Proceedings* (Vol. 264). Luleå: Luleå University of Technology. pp. 264–271.

Russo, D. 2010. *17 rules successful companies use to attract and keep top talent*. Canada: Financial Times Press.

Ryan, R.M. 1993. Agency and organization: intrinsic motivation, autonomy and the self in psychological development. In: Jacobs, J., ed. *Nebraska Symposium on Motivation: Developmental Perspectives on Motivation,* Lincoln, NE: University of Nebraska Press. pp. 1–56.

Rynes, S.L. 1989. Recruitment, job choice, and post-hire consequences. In: Dunnette, M.D., ed. *Handbook of industrial and organizational psychology.* 2nd ed. Palo Alto, CA: Consulting Psychologists Press. pp. 399–444.

Rynes, S. & Barber, A. 1989. Applicant attraction strategies: an organizational perspective. *Academy of Management Review,* 15:286–310.

Ryu, Y. & Kim, S. 2015. Testing the heuristic/systematic information-processing model (HSM) on the perception of risk after the Fukushima nuclear accidents. *Journal of Risk Research*, 18(7):840–859. doi:10.1080/13669877.2014.910694

Sabbagah, M.F. 2016*. A model of employee motivation and job satisfaction for staff retention practices within a South African foreign exchange banking organisation*. Pretoria: University of South Africa. (Thesis – DCom). https://uir.unisa.ac.za/bitstream/handle/10500/23278/thesis_sabbagha,%20mfds.pdf?sequence=1&isAllowed=y Date of access: 20 Apr. 2020.

Sahito, Z. & Vaisanen, P. 2017. The diagonal model of job satisfaction and motivation: extracted from the logical comparison of content and process theories. *International Journal of Higher Education*, 6(3):209–230. doi:10.5430/ijhe.v6n3p209

Sahni, J. 2019. Role of quality of work life in determining employee engagement and organizational commitment in telecom industry. *International Journal for Quality Research*, 13(2):285–300. doi:10.24874/ijqr13.02-03

Saks, A.M. 2006. Antecedents and consequences of employee engagement. *Journal of Managerial Psychology*, 21(7):600–619. doi:10.1108/02683940610690169

Salanova, M., Agut, S. & Peiro, J.M. 2005. Linking organizational resources and work engagement to employee performance and customer loyalty: the mediation of service climate. *Journal of Applied Psychology,* 90:1217–1227. doi:10.1037/0021-9010.90.6.1217

Salinas, P. 2013. Discourses as control devices in the mining culture: tensions in the integration of women in Chilean mining. *International Journal of Communication*, 7:1835–1851.

Salinas, P. & Romaní, G. 2014. Gender barriers in Chilean mining: a strategic management. *Academia Revista Latinoamericana de Administración,* 27(1):92–107. doi:10.1108/ARLA-11-2013-0184

Salinas, P., Romaní, G. & Silva, J. 2018. Gender equality or diversity in the mining industry for 2035? Crossroads for Chilean higher education. *Journal of Education and Work*, 31(7/8):628–644. doi:10.1080/13639080.2018.1563288

Salkind, N.J., ed. 2010. *Encyclopedia of research design.* Vol. 1. Thousand Oaks, CA: Sage. doi:10.4135/9781412961288

SAMREC (South African Mineral Resource Committee). 2016. *The South African code for the reporting of exploration results, mineral resources and mineral reserves (the SAMREC Code).* http://www.samcode.co.za/codes/category/8-reporting-codes?download=120:samrec Date of access: 28 Nov. 2019.

Samson, A. & Voyer, B.G. 2012. Two minds, three ways: dual system and dual process models in consumer psychology. *AMS Review*, 2(2–4):48–71. doi:10.1007/s13162-012-0030-9

Samuel, M.O. & Chipunza, C. 2013. Attrition and retention of senior academics at institutions of higher learning in South Africa: the strategies, complexities and realities. *Journal of Social Sciences*, 35(2):97–109. doi:10.1080/09718923.2013.11893151

Santos, K.S., Ribeiro, M.C., Queiroga, D., Silva, I. & Ferreira, S. 2020. O uso de triangulação múltipla como estratégia de validação em um estudo qualitativo [The use of multiple triangulations as a validation strategy in a qualitative study]. *Ciencia & saude coletiva*, 25(2):655–664. doi:10.1590/1413-81232020252.12302018

Sapsford, R. & Jupp, V. 2006. *Data collection and analysis*. Thousand Oaks, CA: Sage.

Sauder, D. 2017. Examining the type I error and power of 18 common post-hoc comparison tests. Harrisonburg, VA: James Madison University. (Thesis – MA). https://commons.lib.jmu.edu/cgi/viewcontent.cgi?referer=&httpsredir=1&article=1498&context=master201019 Date of access: 18 Jul. 2021.

Schaufeli, W.B. 2017. Applying the Job Demands-Resources model: a 'how to' guide to measuring and tackling work engagement and burnout. *Organizational Dynamics,* 46:120–132.

Schaufeli, W.B. & Bakker, A.R. 2004. Job demands, job resources, and their relationship with burnout and engagement: a multi-sample study. *Journal of Organizational Behaviour*, 25(3):293–315. doi:10.1002/job.248

Schaufeli, W.B., Salanova, M., González-Romá, V. & Bakker, A.B. 2002. The measurement of engagement and burnout: a two sample confirmatory factor analytic approach. *Journal of Happiness Studies*, 3(1):71–92.

Schaufeli, W.B., Taris, T.W. & Van Rhenen, W. 2008. Workaholism, burnout, and work engagement: three of a kind or three different kinds of employee well-being? *Applied Psychology: An International Review*, 57(2):173–203. doi:10.1111/j.1464- 0597.2007.00285

Schneider, B. 1987. The people make the place. *Personnel Psychology*, 40:437–454. doi:10.1111/j.1744-6570.1987.tb00609.x

Schneider, B. 2001. Fits about fit. *Applied Psychology: An International Review*, 1(50):141–152. doi:10.1111/1464-0597.00051

Schneider, B. & Goldstein, H.W. 1996. The ASA framework: an update. *Personnel Psychology*, 48(4):747–774. doi:10.1111/j.1744-6570.1995.tb01780.x

Schultz, R. & Grimm, M. 2008. Recruitment and retention challenges in the mining industry. *Human resources: Mining.com*, 54–56 http://magazine.mining.com/issues/0807/RecruitmentRetentionMining.pdf Date of access: 15 Apr. 2019.

Schwandt, T.A. 2000. Three epistemological stances for qualitative inquiry: interpretivism, hermeneutics, and social constructionism. In: Denzin, N.K. & Lincoln, Y.S., eds. *Handbook of qualitative research.* Thousand Oaks, CA: Sage. pp. 189–213.

Segerstedt, E. & Abrahamsson, L. 2019. Diversity of livelihoods and social sustainability in established mining communities. *The Extractive Industries and Society*, 6:610–619. doi:10.1016/j.exis.2019.03.008

Sekiguchi, T. 2004. Toward a dynamic perspective of person-fit environment. *Osaka Keidai Ronshu,* 55(1):177–190.

Seltman, H.J. 2018. *Experimental design and analysis*. Pittsburgh, PA: Carnegie Mellon University.

SERNAM. 2017. *Más derechos para las Mujeres. Mejor Chile más Feliz y Digno. Ministerio de la Mujer y la Equidad de Género [More rights for women: a better Chile, happier and worthy. Ministry of Women and Gender Equity].* https://www.minmujeryeg.cl/sernameg/reformas-legales/leyes-que-benefician-alas-mujeres/ Date of access: 14 Jun. 2020.

SGU (Sveriges Geologiska Undersökning). 2019. *Facts about & metals 2018: Geological Survey of Sweden.* https://www.sgu.se/globalassets/mineralnaring/facts-about-minerals-and-metals-2018.pdf Date of access: 17 Sep. 2020.

Shadfar, S. & Malekmohammadi, I. 2013. Application of structural equation modeling (SEM) in restructuring state intervention strategies toward paddy production development. *International Journal of Academic Research in Business and Social Sciences*, 3(12):576–618. doi:10.6007/IJARBSS/v3-i12/472

Simango, K.B. 2006. An investigation of the factors contributing to failure of heat tolerance screening by women at Impala Platinum. Modderfontein: The Da Vinci Institute for Technology Management. (Unpublished Dissertation – MA).

Simha, B.S. & Vardhan, B.V. 2015. Enhancing "performance and retention" through employee engagement*. International Journal of Scientific and Research Publications*, 5(8):1–6.

Sinha, C. & Sinha, R. 2012. Factors affecting employee retention: a comparative analysis of two organizations from heavy engineering industry. *European Journal of Business and Management*, 4(3):145–162.

Sivertzen, A.M., Nilsen, E.R. & Olafsen, A.H. 2013. Employer branding: employer attractiveness and the use of social media. *Journal of Product & Brand Management*, 22(7):473–483. doi:10.1108/JPBM-09-2013-0393

Slaughter, J.E., Stanton, J.M., Mohr, D.C. & Shoel, W.A. 2005. The interaction of attraction and selection: implications for college recruitment and Schneider's ASA model. *Applied Psychology: An International Review*, 54(4):419–441. doi:10.1111/j.1464-0597.2005.00218.x

Soelberg, P.O. 1967. Unprogrammed decision making. *Industrial Management Review*, 8:19–29.

Sohn, S.Y. & Lee, J.H. 2008. *Strategies for advancing the status of women scientists and engineers in Korea*. Cambridge: University of Cambridge.

South African Labour Guide. 2021*. Code of good practice on sexual harassment.* https://dev.labourguide.co.za/43-general/general/600-code-of-good-practice-on-sexual-harassment13 Date of access: 24 Feb. 2021.

Spence, M. 1973. Job market signaling. *Quarterly Journal of Economics*, 87:355–374. doi:10.2307/1882010

Stairs, M., Galpin, M., Page, N. & Linley, A. 2006. Retention on a knife edge: The role of employee engagement in talent management. *Selection and Development Review*, *22*(5):19-23.

Stats SA (Statistics South Africa). 2021. *Quarterly labour force survey: quarter 2: 2021.* http://www.statssa.gov.za/publications/P0211/P02112ndQuarter2021.pdf Date of access: 30 Sep. 2021.

Steers, R.M. & Porter, W.L. 1991. *Motivation and work behaviour.* 5th ed. New York, NY: McGraw-Hill.

Steinfeld, J. 2014. Degree of inequality. *Index on Censorship,* 43(2):138–142. doi:10.1177/0306422014535529

Stevens, C.K. 1998. Image theory and career-related decisions: finding and selecting occupations and jobs. In: Beach, L.R., ed. *Image theory: theoretical and empirical foundations.* Mahwah, NJ: Lawrence Erlbaum. pp. 227–239.

Storm, K. & Rothmann, S. 2003. A psychometric analysis of the Utrecht Work Engagement Scale in the South African Police Service. *SA Journal of Industrial Psychology*, 29(4):62–70.

Stroebe, W. 2012. Strategies of attitude and behaviour change. In: Hewstone, M., Stroebe, W. & Jonas, K., eds. *Introduction to social psychology*. Oxford: Blackwell. pp. 201–234.

Suciu, L.E., Mortan, M. & Lazar, L. 2013. Vroom's expectancy theory. An empirical study: civil servant's performance appraisal influencing expectancy. *Transylvanian Review of Administrative Sciences*, 9(39):180–200.

Suhr, D.D. 2006. *Exploratory or confirmatory factor analysis?* Paper delivered at the 31st Annual SAS Users Group International Conference. Cary, NC: SAS Institute. https://www.researchgate.net/profile/Z-Al-Hemyari/post/I-have-two-questions-regarding-Factor-analysis-EFA-and-CFA/attachment/5b3df24bb53d2f892898d304/AS%3A644978975977473%401530786379471/download/200-31.pdf Date of access: 8 Jul. 2021.

Sun, K. 2016. *The power of perks: equity theory and job satisfaction in Silicon Valley*. Claremont, CA: Scripps College. (BA – Thesis). http://scholarship.claremont.edu/cgi/viewcontent.cgi?article=1886&context=scripps_theses Date of access: 10 Oct. 2019.

Sushil, S. 2013. Motivation and retention: HR strategies in achieving quality of work life. *Global Journal of Management and Business Studies*, 3(7):763–768.

Svemin. 2020. *An attractive mining industry for everyone*. https://www.svemin.se/en/women-in-mining-sweden/#:~:text=About%20WIM%20Sweden,the%20industry%20can%20exchange%20experiences.&text=WIM%20Sweden%20is%20part%20of,organization%20International%20Women%20In%20Mining Date of access: 17 Sep. 2020.

Tabachnick, B.G. & Fidell, L.S. 2013. *Using multivariate statistics.* 5th ed. Boston, MA: Pearson Education.

Taherdoost, H. 2016. Sampling methods in research methodology: how to choose a sampling technique for research. *International Journal of Academic Research in Management,* 5(2):18–27. doi:10.2139/SSRN.3205035

Tajfel, H. &Turner, J.C. 1986. The social identity theory of intergroup behavior. In: Worchel, S. & Austin, W.G., eds. *Psychology of intergroup relations.* 2nd ed. Chicago, IL: Nelson-Hall. pp. 7–24.

Tamoniene, D. 2015. *Employer branding: current and future employees' perceptions of employer's attractiveness attributes.* Dublin: National College of Ireland. (Dissertation – MA). http://norma.ncirl.ie/2038/1/diletatamoniene.pdf Date of access: 16 Feb. 2020.

Tanova, C. & Holtom, B.C. 2008. Using job embeddedness factors to explain voluntary turnover in four European countries. *International Journal Human Resources Management,* 19(9):1553–68. doi:10.1080/09585190802294820

Tavora, I. 2012. *Trade unions and gender equality in the workplace: case-based evidence from the UK.* University of the West of England. http://www2.uwe.ac.uk/faculties/BBS/BUS/Research/CESR/July_2012_Tavora.pdf Date of access: 21 Aug. 2020.

Taylor, S. 2002. *The employee retention handbook*. Trowbridge: Cromwell Press.

Teddlie, C. & Tashakkori, A. 2009. *Foundations of mixed methods research*. London: Sage.

Tenbrink, A.N. 2015. *Shocks and satisfaction predicting turnover in a laboratory setting*. Athens, OH: Ohio University. (Dissertation – PhD). https://etd.ohiolink.edu/apexprod/rws_etd/send_file/send?accession=ohiou1426671149&disposition=inline Date of access: 16 Feb. 2020.

Terrill, J.L. 2016. *Women in the Australian mining industry: careers and families.* Brisbane: UQ Business School, the University of Queensland. (Thesis – PhD).

https://espace.library.uq.edu.au/view/UQ:406948/s42717773_final_thesis.pdf Date of access: 24 May. 2019.

Test, D.W., Flowers, C., Hewitt, A. & Solow, J. 2003. Statewide study of the direct support staff workforce. *Mental Retardation,* 41:276–285. doi:10.1352/0047-6765(2003)41%3C276:ssotds%3E2.0.co;2

Tharenou, P., Donohue, R. & Cooper, B. 2007. *Management research methods*. New York, NY: Cambridge University Press.

Tiefenbrun, S. 2017. China's employment laws and their impact on women working in China. *UC Davis Journal of International Law and Policy*, 23(2): 1–36.

Toohey, T., Boak, A. & Borkin, P. 2014. Labour market recovery and progress on female participation? *Australia and New Zealand economic analyst*, https://www.wgea.gov.au/sites/default/files/Female_Participation_Update_27March2014.pdf Date of access: 27 Apr. 2019.

Tuchten, G. 2011. *Concept development for facilitating the health and safety efficacy of South African mine workers*. Pretoria: University of Pretoria. (Thesis – PhD). https://repository.up.ac.za/bitstream/handle/2263/24196/Complete.pdf?sequence=11&isAllowed=y Date of access: 11 Aug. 2020.

Turban, D.B. 2001. Organizational attractiveness as an employer on college campuses: an examination of the applicant population. *Journal of Vocational Behaviour*, 58:293–312. doi:10.1006/jvbe.2000.1765

Turban, D.B. & Keon, T.L. 1993. Organizational attractiveness: an interactionist perspective. *Journal of Applied Psychology*, 78:184–193. doi:10.1037/0021-9010.78.2.184

Turnea, E.S. 2018. Attraction and retention of the employees: a study based on multinationals from Romania. *Procedia - Social and Behavioral Science*, 238:73–80. doi:10.1016/j.sbspro.2018.03.009

Turner, A.G. 2003. Sampling frames and master samples. In: *Designing Household Survey Samples: Practical Guidelines*; UN: New York. pp. 1–26.

Turner, D. 2019. Sampling methods in research design. *American Headache Society*, 60(1):8–12. doi:10.1111/head.13707

Tustin, D.H., Ligthelm, A.A., Martins, J.H. & Van Wyk, H.J. 2005. *Marketing research in practice.* Pretoria: Unisa Press.

Tuzuner, V.L. & Yuksel, C.A. 2009. Segmenting potential employees according to firms' employer attractiveness dimensions in the employer branding concept. *Journal of Academic Research in Economics,* 1: 47–62.

UN (United Nations). 2014. *Gender stereotypes and stereotyping and women's rights.* https://www.ohchr.org/documents/issues/women/wrgs/onepagers/gender_stereotyping.pdf Date of access: 2 Feb. 2021.

University of Melbourne. 2013. *Reviewing the literature: a critical review.* http://services.unimelb.edu.au/academicskills/all_resources/writing-resources Date of access: 27 Feb. 2019.

Universum Communications Sweden AB. 2011. *Employer branding insights.* https://ww1.prweb.com/prfiles/2011/02/15/4574704/EBInsights2011.pdf Date of access: 2 Feb. 2021.

Uysal, H.T., Aydemir, S. & Genc, E. 2017. Maslow's hierarchy of needs in 21st century: the examination of vocational differences. *Researches on Science and Art in 21st Century Turkey,* 1:211-227.

Van den Broeck, A., Vansteenkiste, M., De Witte, H. & Lens, W. 2008. Explaining the relationships between job characteristics, burnout, and engagement: the role of basic psychological need satisfaction. *Work & Stress*, 22(3):277–294. doi:10.1080/02678370802393672

Van der Walt, M. 2008. *Job demands, job resources, burnout and engagement of employees in the mining industry in South Africa*. Potchefstroom: North-West University. (Mini-dissertation – Hons). https://repository.nwu.ac.za/bitstream/handle/10394/5072/vanderwalt_m%281%29.pdf?sequence=1 Date of access: 29 Apr. 2019.

Validakis, V. 2013. *Chinese women banned from studying mining degrees*. Australian Mining. https://www.australianmining.com.au/news/chinese-women-banned-from-studying-mining-degrees/ Date of access: 5 Jun. 2020.

Van Hooft, E.A., Born, M.P., Taris, T.W. & Van der Flier, H. 2006. Ethnic and gender differences in applicants' decision-making processes: an application of the theory of reasoned action. *International Journal of Selection and Assessment*, 14(2):156–166. doi:10.1111/j.1468-2389.2006.00341.x

Van Wyk, B. 2012. *Research design and methods, Part 1.* University of the Western Cape. https://www.uwc.ac.za/Students/Postgraduate/Documents/Research_and_Design_I.pdf Date of access: 27 Feb. 2019.

Venkata Subrahmanyam, C.V, Meenakshi, S.P. & Ravichandran, K. 2013. Quality of work life: the need of the hour. *International Journal of Business and Management Invention,* 2(11):1–4.

Veerman, P.E. 1992. *The rights of the child in the changing image of childhood.* Dordrecht: Martinus Nijhoff.

Vegter, I. 2019. *Why mining still matters: the socio-economic importance of the mining industry.* South African Institute of Race Relations. https://irr.org.za/reports/occasional-reports/files/01-2014-page-1-21-2014-why-mining-still-matters-11-03-2019.pdf Date of access: 12 Dec. 2019.

Vishwanath, A. 2015. Examining the distinct antecedents of e-mail habits and its influence on the outcomes of a phishing attack. *Journal of Computer-Mediated Communication*, 20: 570-584. doi:10.1111/jcc4.12126

Vokić, P.N. & Mostarac, V. 2019. *Is there a need for a change in employer branding practices? A shift in employer attractiveness attributes/dimensions during the last decade*. EFZG working paper series, (5):1–16. https: //hrcak.srce.hr/file/319446 Date of access: 9 Aug. 2021.

Vosloo, P. 2015. *An investigation into the relationship between employee value proposition and work engagement*. Port Elizabeth: Nelson Mandela Metropolitan University. (Dissertation – MA). https: //core.ac.uk/download/pdf/145036809.pdf Date of access: 16 Feb. 2019.

Vroom, V.H. 1964. *Work and motivation*. New York, NY: Wiley.

Walliman, N. 2010. *Research methods: the basics*. London: Routledge.

Walton, R.E. 1973. Quality of work life: what is it? *Sloan Management Review*, 15(1):11–21.

Wanous, J.P., Keon, T.L. & Latack, J.C. 1983. Expectancy theory and occupational/organizational choice: a review and test. *Organizational Behaviour and Human Performance*, 32:66–86. doi:10.1016/0030-5073(83)90140-X

Waterfield., J. 2018. In: Frey, B.B., ed. *The SAGE encyclopedia of educational research, measurement, and evaluation*. Thousand Oaks: Sage. https://dx.doi.org/10.4135/9781506326139

Watkins, M.W. 2018. Exploratory factor analysis: a guide to best practice. *Journal of Black Psychology*, 44(3):219–246. doi:10.1177%2F0095798418771807

Weidert, J.M. 2011. *Physiological measurement of employee engagement.* Fort Collins, CO: Colorado State University. (Thesis – MSc). https://mountainscholar.org/handle/10217/47421 Date of access: 11 Apr. 2020.

Weldegiorgis, F., Lawson, L. & Verbrugge, H. 2018. *Women in artisanal and small-scale mining: challenges and opportunities for greater participation*. International Institute for Sustainable Development. https://www.iisd.org/system/files/publications/igf-women-asm-challenges-opportunities-participation.pdf Date of access: 21 May 2020.

Wellins, R.S., Bernthal, P. & Phelps, M. 2005. *Employee engagement: The key to realize competitive advantage.* DDI. http://www.ddiworld.com/ddi/media/monographs/employeeengagement_mg_ddi.pdf?ext=.pdf Date of access: 7 Apr. 2020.

Western Sydney University Library. 2017. *Literature review purpose*. https://www.westernsydney.edu.au/__data/assets/pdf_file/0006/1254786/Literature_review_purpose.pdf Date of access: 27 Feb. 2019.

Wetzel, A.P. 2011. *Factor analysis methods and validity evidence: a systematic review of instrument development across the continuum of medical education*. Richmond, VA: Virginia Commonwealth University. (Dissertation – PhD). http://scholarscompass.vcu.edu/cgi/viewcontent.cgi?article=3384&context=etd Date of access: 16 Feb. 2020.

WGEA (Workplace Gender Equality Agency). 2018. *About the agency.* https://www.wgea.gov.au/about Date of access: 12 Oct. 2020.

Wilson, S. & MacLean, R. 2011. *Research methods and data analysis for psychology*. London: McGraw-Hill.

WIMC (Women in Mining Canada). 2010. *Ramp up: a study on the status of women in Canada's mining and exploration sector*. Ottawa.

WIMC (Women in Mining Canada). 2020. *About us.* https://old.wimcanada.org/who-are-we/ Date of access: 12 Oct. 2020.

WIM Chile (Women in Mining Chile). 2020. *Women in Mining Chile.* https://www.womeninminingchile.cl/wimchile Date of access: 1 Jun. 2020.

WIMM (Women in Mining Mongolia). 2016. *Preliminary findings on the women participation in the mining industry of Mongolia*. https://www.wimmongolia.org/resources-in-english/preliminary-

findings-on-the-participation-of-women-in-mongolias-mining-industry-ulaanbaatar-city-mongolia-march-8-2016 Date of access: 3 Jun. 2020.

WIMM (Women in Mining Mongolia). 2020. *Women in Mining Mongolia (WIM Mongolia).* https://www.wimmongolia.org/ Date of access: 10 Jun. 2020.

WIMWA (Women in Mining and Resources Western Australia). 2015. *About WIMWA.* https://womeninmining.com/wimwa-community/about-wimwa/ Date of access: 10 Aug. 2020.

Winters, R., Winters, A. & Amedee, R.G. 2010. Statistics: a brief overview. *Ochsner Journal*, 10(3):213–216.

Women Leaders Institute. 2020. *Who are we?* https://www.womenleadersinstitute.org/ Date of access: 12 Oct. 2020.

WRM (World Rainforest Movement). 2004. *India: women's response to devastating mining*. https://wrm.org.uy/articles-from-the-wrm-bulletin/section1/india-womens-response-to-devastating-mining/ Date of access: 7 Apr. 2020.

Wright, K.E. 2010. *Deconstructing signaling theory: the role of organizational, referent other, and self-referential inferences in recruitment.* Oshkosh, WI: University of Wisconsin Oshkosh. (Thesis-MSc). https://minds.wisconsin.edu/bitstream/handle/1793/47096/K%20Wright%20Thesis.pdf?sequence=1 Date of access: 10 Apr. 2020.

Xanthopoulou, D., Bakker, A.B., Demerouti, E. & Schaufeli, W.B. 2009. Reciprocal relationships between job resources, personal resources, and work engagement. *Journal of Vocational Behaviour,* 74:235–244. doi:10.1016/j.jvb.2008.11.003

Yao, L. 2006. Women in the mining industry of contemporary China. In: Lahiri-Dutt, K. & Macintyre, M., eds. *Women miners in developing countries: pit women and others.* Aldershot: Ashgate. pp. 227–264.

Yong, A.G. & Pearce, S. 2013. A beginner's guide to factor analysis: focusing on exploratory factor analysis. *Tutorials in Quantitative Methods for Psychology*, 9(2):79–94. doi:10.20982/tqmp.09.2.p079

Young, J. 2012. *Heroes of employee engagement No. 3: Frederick Herzberg's two factor theory.* Workday. https://peakon.com/blog/future-work/frederick-herzberg-two-factor-theory/ Date of access: 7 Apr. 2020.

Yu, K.Y.T. & Cable, D.M., eds. 2014. *The Oxford handbook of recruitment*. New York, NY: Oxford University Press.

Yuan, Z., Li, Y. & Tetrick, L.E. 2015. Job hindrances, job resources, and safety performance: the mediating role of job engagement. *Applied Ergonomics*, 51:163–171. doi:10.1016/j.apergo.2015.04.021

Yukl, G. 2010. *Leadership in organisations*. 8th ed. Upper Saddle River, NJ: Prentice Hall.

Zajonc, R.B. 1968. The attitudinal effects of mere exposure. *Journal of Personality and Social Psychology*, 9:1–27. doi:10.1037/h0025848

Zhang, M., Fried, D.D. & Griffeth, R.W. 2012. A review of job embeddedness: conceptual measurement issues, and directions for future research. *Human Resource Management Review*, 22(3):220–231. doi:10.1016/j.hrmr.2012.02.004

Zikmund, W.G. & Babin, B.J. 2010. *Essentials of marketing research*. Mason, OH: Cengage Learning.

Zineldin, M. 2000. Total relationship management (TRM) and total quality management (TQM). *Managerial Auditing Journal*, 15(1/2): 20–28. doi:10.1108/02686900010304399

Zohrabi, M. 2013. Mixed method research: instruments, validity, reliability and reporting findings. *Theory and Practice in Language Studies,* 3(2):254–262. doi:10.4304/tpls.3.2.254-262

Zungu, L.I. 2011*. Women in the South African mining industry: an occupational health and safety perspective.* Inaugural lecture, Unisa. http://uir.unisa.ac.za/bitstream/handle/10500/5005/Inaugurallecture_Women%20in%20the%20SAMI_LIZungu_20October2011.pdf?sequence=1 Date of access: 30 Jan. 2019.

ANNEXURES

ANNEXURE A: QUESTIONNAIRE INVESTIGATING THE ATTRACTION, ENGAGEMENT AND RETENTION OF WOMEN IN TECHNICAL MINING POSITIONS

Dear prospective participant

You are invited to participate in a research study titled **An investigation into the attraction, engagement and retention of women employed in technical mining positions in South Africa**. This study will be conducted by Nelly Mashaba, an enrolled master's student at North-West University. Approval to conduct the research has been obtained from the Arts Research Ethics Committee, Faculty of Humanities, North-West University (ethics number NWU – 01007-20-A7).

The aim of the study is to explore factors that influence the attraction, engagement and retention of women in technical mining positions and to consequently determine what can be done to promote women's successful participation in the mining industry in South Africa.

You are eligible to participate in the study if you are a female employee working in a technical position at a mining organisation, i.e. your job requires mining and technical skills in the mining value chain, with tasks ranging from exploration, quantification and development to the extraction and processing of mineral resources. Such positions are held, for example, in the fields of geology, mining engineering, mine surveying, plant operations, mine health and safety, laboratory technics, mine surveying, plant operation, metallurgical engineering, chemical engineering, electrical engineering, analytical chemistry, and jewellery design and manufacturing.

Participation in this study is completely voluntary. Information gathered during the research will be used solely for the purpose of this study and all efforts will be made to ensure the confidentiality of participants' personal information. The information provided by you in this questionnaire will not be used in any manner that would allow identification of your individual responses. The data gathered will be captured in a database, will be statistically analysed and will be used for research purposes.

If you decide not to participate, there will not be any negative consequences. Please be aware that if you decide to participate, you may withdraw from the study at any time and your data will be destroyed. If you choose to participate in this survey, it will take up no more than 20 minutes of your time.

Should you require any further information, want feedback on the study or need to contact the researcher about any aspect of this study, please contact Nelly Mashaba at nelly.mashaba@gmail.com or 074 814 8812.

INFORMED CONSENT:

- I understand the purpose and nature of this study and I am participating voluntarily.
- I understand that I can withdraw from the study at any time, without any penalty or consequences.
- I agree that the information that I provided may be used for research purposes.

I agree	
I don't agree	

SECTION A: BIOGRAPHICAL INFORMATION

1. In which province are you currently employed?

Eastern Cape	1
Free State	2
Gauteng	3
KwaZulu-Natal	4
Limpopo	5
Mpumalanga	6
Northern Cape	7
North West	8
Western Cape	9

2. In which of the following mining subsectors does the organisation for which you are currently working fall?

Coal mining	1
Gold mining	2
PGM mining	3
Diamond mining	4
Other mining	5
Cement, lime, aggregates and sand	6
Diamond processing	7
Jewellery manufacturing	8
Other	9

3. Which of the following best describes your occupation?

Driller/Miner/Shot-firer	1
Electrician	2
Building and engineering technician	3
Earthmoving plant operator	4
Mine mechanic	5
Mining engineer	6
Process engineer	7
Metallurgist	8
Geologist/Geophysicist	9
Construction/Mining labourer	10
Plant manager	11
Mine health and safety worker	12
Mine health and safety manager	13
Mine captain/overseer	14
Mining supervisor	15
Mining manager	16
General miner	17
Mine planner	18
Rock engineer	19
Chemical engineer	20
Mechanical engineer	21
Diesel mechanic	22
Mine surveyor	23

Jewellery manufacturer	24
Other (please specify)	25

4. What is your age?

Younger than 20	1
20–29	2
30–39	3
40–49	4
50–59	5
60 and older	6

5. What is your highest qualification?

No schooling	1
Less than high (secondary) school	2
Completed some high (secondary) school	3
Standard 10 / Grade 12, NATED 3 / NCV Level 3	4
National / Higher Certificate	5
Advanced Certificate	6
Diploma	7
Advanced diploma	8
BTech degree	9
Bachelor's degree	10
Postgraduate diploma	11
Honour's degree	12
Master's degree	13
Doctoral degree and/or postdoctoral degree	14

6. How long have you …

	Less than a year	1–3 years	4–6 years	7–9 years	10 years or more
Been in your present position?	1	2	3	4	5
Worked for this organisation?	1	2	3	4	5
Worked in the mining industry?	1	2	3	4	5

7. Where do you work at the mine?

Underground	1
On the surface	2
Underground and on the surface	3

8. Are you required to work night shifts?

Yes	1
No	2

9. What is your marital status?

Married	1
Cohabiting/Living together	2
Single	3
Separated	4
Divorced	5
Widowed	6

10. Do you have children?

Yes	1
No	2

11a. Are you part of any work committees in your organisation, for example a Women in Mining Forum, Transformation Committee, Skills Development Committee, etc.?

Yes	1
No	2

11b. If yes, please specify.

SECTION B: ATTRACTION

This section aims to determine your perceptions regarding factors that affect the attraction of women to technical mining positions.

1. Please provide the PRIMARY reason why you have selected a career in mining.

Close to home	1
Unemployment	2
Difficult to get another job	3
Job security	4
Bursary	5
Exciting work environment	6
Challenging industry	7
Ability to apply skills	8
Competitive pay and benefits	9
Opportunities for advancement	10
International work opportunities	11
Other (please specify)	12

2. How important are the following to you when considering a potential employer?

		Not at all important	Slightly important	Neutral	Important	Extremely important
Interest value						
1.	Working in an exciting environment	1	2	3	4	5
2.	Innovative employer – new and forward-thinking work practices are continually introduced by the organisation	1	2	3	4	5
3.	The organisation values and makes use of my creativity	1	2	3	4	5
4.	The organisation produces high-quality products and services	1	2	3	4	5
5.	The location of the workplace	1	2	3	4	5
Social value						
6.	A fun work environment	1	2	3	4	5
7.	A happy work environment	1	2	3	4	5
8.	Having a good relationship with my superiors	1	2	3	4	5
9.	Having a good relationship with my colleagues	1	2	3	4	5
10.	Supportive and encouraging colleagues	1	2	3	4	5
11.	An environment that enables me to balance my work and home life easily	1	2	3	4	5
12.	Acceptance and belonging	1	2	3	4	5
Economic value						
13.	Good promotion opportunities within the organisation	1	2	3	4	5
14.	Job security within the organisation	1	2	3	4	5
15.	An above-average basic salary	1	2	3	4	5
16.	An attractive overall compensation package, including benefits	1	2	3	4	5
Development value						
17.	Recognition/Appreciation from management	1	2	3	4	5
18.	Feeling good about myself as a result of working for a particular organisation	1	2	3	4	5
19.	Feeling more self-confident as a result of working for a particular organisation	1	2	3	4	5
20.	Gaining career-enhancing experiences	1	2	3	4	5
21.	A springboard for future employment	1	2	3	4	5
Application value						
22.	Humanitarian organisation – the organisation gives back to the community	1	2	3	4	5
23.	Opportunity to apply what was learned, be it through previous training, short courses or at a tertiary institution	1	2	3	4	5
24.	Opportunity to teach others what I have learned	1	2	3	4	5
25.	Being hands-on (active participation) in other interdepartmental work (work outside my department)	1	2	3	4	5

3. Are there any other factors, in addition to the above, which you believe are important when considering a potential employer? If yes, please mention them. If no, skip to Section C.

SECTION C: EMPLOYEE ENGAGEMENT

This section aims to determine your perceptions regarding factors that affect employee engagement, i.e. having a continual, positive and effective motivational state of fulfilment that is characterised by **vigour** (demonstrated by high energy levels and mental resilience, willingness to place effort in one's work and persistence when faced with challenges), **dedication** (a sense of significance, enthusiasm, inspiration and pride in working for a particular organisation) and **absorption** (a pleasant state of association with one's work) in the workplace.

1. The following 17 statements are about how you feel at work. Please read each statement carefully and decide whether you ever feel this way about your job. If you have never had this feeling, select the "0" (zero) option. If you have had this feeling, indicate how often you felt it by selecting the number (from 1 to 6) that best describes how frequently you feel that way.

		Almost never or a few times a year or less	Rarely or once a month or less	Sometimes or a few times a month	Often or once a week	Very often or a few times a week
1.	At my work, I feel bursting with energy	1	2	3	4	5
2.	I find the work that I do full of meaning and purpose	1	2	3	4	5
3.	Time flies when I am working	1	2	3	4	5
4.	At my job, I feel strong and vigorous (highly energetic)	1	2	3	4	5
5.	I am enthusiastic about my job	1	2	3	4	5
6.	When I am working, I forget everything else around me	1	2	3	4	5
7.	My job inspires me	1	2	3	4	5
8.	When I get up in the morning, I feel like going to work	1	2	3	4	5
9.	I feel happy when I am working	1	2	3	4	5
10.	I am proud of the work that I do	1	2	3	4	5
11.	I am immersed (deeply involved) in my work	1	2	3	4	5
12.	I can continue working for very long periods at a time	1	2	3	4	5
13.	To me, my job is challenging	1	2	3	4	5
14.	I get carried away when I am working	1	2	3	4	5
15.	At my job, I am very resilient mentally	1	2	3	4	5
16.	It is difficult to detach myself from my job	1	2	3	4	5
17.	At my work, I always persevere, even when things do not go well	1	2	3	4	5

SECTION D: RETENTION

This section aims to determine your perceptions regarding factors that affect the retention of women in the mining industry.

1. On a scale of 1 to 5, where 1 is strongly disagree and 5 is strongly agree, please state your level of agreement with the following statements:

		Strongly disagree	Disagree	Neutral	Agree	Strongly agree
1.	This organisation has a great deal of personal meaning for me	1	2	3	4	5
2.	Right now, staying with my organisation is a matter of necessity	1	2	3	4	5
3.	I owe a great deal to my organisation	1	2	3	4	5
4.	It would be very hard for me to leave my organisation right now, even if I wanted to	1	2	3	4	5
5.	I feel that I have too few options to consider leaving this organisation	1	2	3	4	5
6.	I do not feel 'emotionally' attached to this organisation	1	2	3	4	5
7.	I would feel guilty if I leave my organisation now	1	2	3	4	5
8.	I really feel as if this organisation's problems are my own	1	2	3	4	5
9.	One of the few negative consequences of leaving this organisation would be the scarcity of other job opportunities	1	2	3	4	5
10.	I would be very happy to spend the rest of my career with this organisation	1	2	3	4	5
11.	If I had not already put so much of myself into this organisation, I might consider working elsewhere	1	2	3	4	5

2. The statements below describe various aspects of your compensation (pay, benefits, etc.). For each statement, decide how satisfied or dissatisfied you feel about your compensation. Using the scale provided below, where 1 is very dissatisfied and 5 is very satisfied, please state your level of satisfaction with your compensation.

		Very dissatisfied	Dissatisfied	Neutral	Satisfied	Very satisfied
1.	My benefits package	1	2	3	4	5
2.	My current total salary package	1	2	3	4	5
3.	Influence my supervisor has on my pay	1	2	3	4	5
4.	The organisation's pay policies	1	2	3	4	5
5.	How the organisation administers pay	1	2	3	4	5
6.	How my raises are determined	1	2	3	4	5

3. Please respond to the following questions related to the characteristics of your job, training, career development and views regarding your supervisor. Use the scale provided below to reflect your view. On a scale of 1 to 5, where 1 is strongly disagree and 5 is strongly agree, to what extent do you agree or disagree with the following statements?

		Strongly disagree	Disagree	Neutral	Agree	Strongly agree
1.	The job requires me to use a number of complex or high-level skills	1	2	3	4	5
2.	The job denies me any chance to use my personal initiative or judgement in carrying out the work	1	2	3	4	5
3.	The job is quite simple and repetitive	1	2	3	4	5
4.	The job gives me considerable opportunity for independence and freedom in how I do the work	1	2	3	4	5
5.	There are enough career development opportunities for me in this organisation	1	2	3	4	5
6.	I can apply the training I receive in this organisation	1	2	3	4	5
7.	Sufficient money is allocated for product and solution training	1	2	3	4	5
8.	My chances for being promoted are good	1	2	3	4	5
9.	It would be easy to find a job in another department	1	2	3	4	5
10.	An employee who applies for another job at this organisation has a better chance of getting that job than someone from outside this organisation who applies for the job	1	2	3	4	5
11.	My supervisor looks for opportunities to praise positive employee performance, both privately and in front of others	1	2	3	4	5
12.	I feel undervalued by my supervisor	1	2	3	4	5
13.	My supervisor rewards a good idea by implementing it and giving the responsible employee(s) credit	1	2	3	4	5

4. Please respond to the following questions on your balance between work and life. On a scale of 1 to 5, where 1 is strongly disagree and 5 is strongly agree, please state your level of agreement with the following statements:

		Strongly disagree	Disagree	Neutral	Agree	Strongly agree
1.	I often feel like there is too much work to do	1	2	3	4	5
2.	My work schedule is often in conflict with my personal life	1	2	3	4	5
3.	My job affects my role as a spouse and/or a parent	1	2	3	4	5
4.	My job has negative effects on my personal life	1	2	3	4	5

5. Please respond to the following questions on your commitment to the organisation:

1.	How would you rate your chances of still working at this organisation a year from now?	**Not likely at all**	**Barely likely**	**Somewhat likely**	**Quite likely**	**Very likely**
		1	2	3	4	5
2.	Do you intend to leave this organisation voluntarily in the near future?	**Will definitely leave**	**Chances are quite good**	**Situation is quite uncertain**	**Chances are very slight**	**Definitely will not leave**
		1	2	3	4	5
3.	What are your plans for staying with this organisation?	**I intend to leave as soon as possible**	**I will leave if something better turns up**	**I will leave only if something considerably better turns up**	**I will leave only if something much better turns up**	**I intend to stay until I retire**
		1	2	3	4	5

6. Overall, how important are the following factors in attracting, engaging and retaining you in your workplace?

		Not at all important	**Slightly important**	**No opinion**	**Important**	**Extremely important**
1.	An above-average basic salary	1	2	3	4	5
2.	An attractive overall compensation package, including benefits	1	2	3	4	5
3.	Career development opportunities	1	2	3	4	5
4.	Working in work locations close to home	1	2	3	4	5
5.	Working in a gender-balanced environment	1	2	3	4	5
6.	Working in an environment that prioritises my health and safety	1	2	3	4	5
7.	The provision of adequate personal protective equipment	1	2	3	4	5
8.	Having appropriate ablution facilities	1	2	3	4	5
9.	A work environment free from gender discrimination	1	2	3	4	5
10.	Having supportive management	1	2	3	4	5
11.	Having supportive colleagues	1	2	3	4	5
12.	Other	Specify:				

7. On a scale of 0 to 10, where 0 is 'not recommend at all' and 10 is 'highly recommend', how would you recommend a job in the mining industry to WOMEN who are looking for employment?

0	1	2	3	4	5	6	7	8	9	10

Thank you for taking the time to complete this survey.

ANNEXURE B: INTERVIEW SCHEDULE INVESTIGATING THE ATTRACTION, ENGAGEMENT AND RETENTION OF WOMEN IN TECHNICAL MINING POSITIONS

A	**INTRODUCTION**	
No.	**Question**	**Response**
1.	**Could you give a brief background of your company as well as your job title and role(s) in the organisation**	

B	**FACTORS INFLUENCING ATTRACTION OF WOMEN IN TECHNICAL MINING POSITIONS** *The purpose of this section is to probe into factors that possibly attract women to technical mining positions and those that may be hindering them from pursuing such careers.*	
No.	**Question**	**Response**
1.	Overall, are there more men or more women who work in technical positions in your organisation?	
	(a) If more men: In your view, what are the reasons that there are more male than female employees in your organisation?	
	(b) If more women: In your view, what are the reasons there are more female than male employees in your organisation?	
2.	Broadly, how would you describe the general experiences of women working in technical mining positions from your observations?	
3.	In general, women are underrepresented in the mining industry and mostly in technical positions, what do you think are the main barriers to the attraction of women to these positions?	

4.	In your opinion, what is the standpoint of your organisation with regards to ensuring gender equality?	
	(a) What examples can you provide that demonstrate the organisational standpoint with regards to ensuring gender equality?	
5.	What do you think should be done to attract more women in technical mining positions?	

C	**THE ENGAGEMENT OF WOMEN EMPLOYED IN TECHNICAL MINING POSITIONS IN THE WORKPLACE** *The purpose of this section is to probe into factors that affect women employed in technical mining positions' engagement in their workplace.*	
No.	**Question**	**Response**
1.	What is your understanding of employee engagement?	
2.	What would you say are the main factors affecting the engagement of women employed in technical positions in mining organisations?	
3.	Do you feel that your organisation is doing enough to support and keep women engaged in their workplace?	
	(a) If yes, in what ways is the organisation keeping its female employees engaged?	
	(b) If no, in what ways is the company failing to keep its female employees engaged?	

D	FACTORS INFLUENCING RETENTION OF WOMEN EMPLOYED IN TECHNICAL MINING POSITIONS *The purpose of this section is to probe on factors that affect the retention of women employed in technical mining positions.*	
No.	**Question**	**Response**
1.	In general, what is the average tenure of female employees employed in technical mining positions versus males in your organisation?	
2.	In your opinion, what factors do you think are important to implement to retain these women in the mining industry?	
3.	What measures are in place within your organisation to retain females in technical positions?	
	(a) How effective have those measures been?	
4.	Are women encouraged to progress specifically into senior positions within your organisation? Please explain your response	
5.	What needs to be done to help retain women in technical positions in the mining industry?	
6.	Would you encourage more women to pursue careers in technical mining positions? Why/Why not?	

E	CLOSING	
No.	**Question**	**Response**
1.	What other remarks would you like to make regarding the attraction, engagement and retention of women in technical mining positions?	

Thank you for taking the time to participate in this discussion.