TRACER STUDY OF THE PLACEMENT OF BOILERMAKER GRADUATES IN THE LABOUR MARKET

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Abstract

This tracer study was designed to track the placement of boilermaker graduates in South Africa. The mining skills sector plan identifies amongst others the boilermaker trade as in short supply. To respond to the scarcity of boilermakers in the mining industry, the Mining Qualifications Authority (MQA) deployed funding to various mining companies to equip potential individuals with boilermaker skills. The skills development interventions (training of boilermakers) funded by the MQA aims to enhance the existing skills base of the South African mining sector and to develop a supply of graduates for the sector's future skills needs. Against this background, a tracer study was conducted to determine the effects of MQA funding on boilermaker skills development interventions. The research was conducted to answer the following primary research question: What is the placement profile of the boilermaker graduates in the labour market?

The study employed mixed research methods to collect and analyse data. Semi structured interviews were used to collect qualitative data from the potential employers. Questionnaires were used to collect quantitative data from the boilermaker graduates. The study was based on the 2014 to 2016 learnership cohort supported by the MQA. The analysis of the quantitative data from the boilermaker graduates played a significant role in assisting the researcher to answer the primary research question and subsequently deal with the primary research objective which was to track the placement of boilermaker graduates in the labour market. The findings show a positive trend in terms of boilermaker graduates' shift from the learning environment to the world of employment noting that out of 40 respondents, 27 were employed and 17 of these graduates were employed as boilermakers. Furthermore, it took less than six months for all 17 individuals to find boilermaker employment.

The findings point to three key themes influencing the employment prospects of boilermaker graduates which include the nature of the qualification, government legislation, and graduate attributes. The study discovered that employer representatives favoured boilermaker graduates who had more exposure to practical knowledge and experience particularly those with the Section 28 certification, as opposed to those with a TVET college qualification. The cohort of boilermaker graduates and the study sample was dominated by black male individuals which correlates with one of the key aims of the Skills Development Act (SDA) and related legislation to improve the employment prospects of previously disadvantaged groups through training and education. The study further revealed that employers tend to prefer boilermaker graduates with skills and attributes such as technical competency, lifelong technological learning tendencies, good work ethics and honesty.

Declaration

I, Ms. Dolly Hlophe (Student number: 1258109) am a student registered for the Master of Management (in the field of Monitoring and Evaluation) in the year 2020.

I hereby declare the following:

I confirm this thesis is my own unaided work. I have followed the required conventions in referencing the thoughts and ideas of others. I am aware that the correct method for referencing material and a discussion on what plagiarism is explained in the Wits School of Governance Style Guide and these issues have been discussed in class during Orientation. I am aware that plagiarism (the use of someone else's work without their permission and/or without acknowledging the original source) is wrong. I understand that the University of the Witwatersrand may take disciplinary action against me if there is a belief that this is not my own unaided work or that I have failed to correctly acknowledge the source of the ideas or words in my writing.

Signature: _____

Signature Date: **15 September 2020**

Dedication

To my husband, who never tired of learning new things and living new experiences, thank you for exposing us to a life out of the ordinary.

Acknowledgements

The completion of this research project symbolises yet another breakthrough in my life. Many people contributed to the successful completion of this milestone and I would like to thank them for their contributions. However, the contribution of the following named individuals was crucial in the research. First, my sincere appreciation and gratitude go to Ms. Hermine Engel and Professor Pundy Pillay whose guidance, insight and interest in the research area gave me strength to continue with this research. Their support during the research process is unquantifiable. All research participants who shared their knowledge and experiences are greatly appreciated; had it not been for them my quest to complete this project would not have succeeded.

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Table of Contents

Abstract i
Declaration ii
Dedication iii
Acknowledgements iv
Acronyms and abbreviations vii
CHAPTER 1: INTRODUCTION 1
1.1. Introduction 1
1.2. Background 1
1.2.1 The artisan development learnership programme 2
1.2.2 Understanding the boilermaker functions 3
1.2.3 Demographic profile of artisans in South Africa 4
1.3. Policy and legislation affecting the placement of graduates 5
1.3.1 Skills Development Act 5
1.3.2 Employment Equity Act 7
1.3.3 Employment Services Act, No. 4 of 2014 7
1.3.4 National Development Plan (Vision 2030) 8
1.4 Problem statement 10
1.5 Research objectives 10
1.6 Research questions 10
1.7 Research outline 11
CHAPTER 2: LITERATURE REVIEW 13
2.1 Introduction 13
2.2 Qualifications mismatch 13
2.3 Gender inequality within artisan employment 14
2.4 Graduate employment and the changing labour market 15
2.4.1 International perspective on graduate employment 15
2.4.2 Artisan Employment trends in South Africa 17
2.4.3 Employers' expectations of graduates in South Africa 20
2.5 Theories applicable to employment trends 22
2.5.1 Human capital theory 22
2.5.2 Job market signalling (screening) theory 23
2.5.3 Skills mismatch theory 24
2.6 Conclusion 25
CHAPTER 3: RESEARCH METHODOLOGY 26
3.1. Introduction 26
3.2. Research design 26
3.3. Research methods 27

3.3.1 **Qualitative approach** 28
3.3.2 **Quantitative approach** 29
3.4. Data collection procedure 29
3.5. Sampling design 31
3.6. Data analysis 33
3.7. Ethical considerations 34
3.8. Limitation and advantage of the study 36
3.9. Conclusion 36
CHAPTER 4: ANALYSIS OF THE FINDINGS 37
4.1. Introduction 37
4.2. Findings from the boilermaker graduates survey 37
4.2.1 **Demographics of the boilermaker graduates** 37
4.2.2 **Boilermaker graduates' placement situation** 39
4.3. Presentation and discussion of the employer representatives 44
4.3.1 **Demographic characteristics of the respondents** 44
4.4. Conclusion 53
CHAPTER 5: CONCLUSION AND RECOMMENDATION 55
5.1. Introduction 55
5.1.1 **Integrating the literature review and data analysis** 55
5.1.2 **Answering the primary research question:** What is the placement profile of the boilermaker graduates in the labour market? 57
5.1.3 **Answering the secondary research questions:** What are the factors that hinder or enhance the employment prospects of boilermaker graduates? 58
5.2. Concluding remarks 59
5.3. Recommendations 60
5.4. Suggestions for future research 60
REFERENCES 62
APPENDICES 67
APPENDIX A: QUESTIONNAIRE FOR BOILER-MAKER GRADUATES 67
APPENDIX B: INTERVIEW SCHEDULE FOR THE POTENTIAL EMPLOYERS 70
APPENDIX C: PARTICIPANT INFORMATION SHEET 72

Acronyms and abbreviations

DHET	Department of Higher Education and Training
FET	Further Education and Training
HSRC	Human Sciences Research Council
MQA	Mining Qualifications Authority
NAMB	National Artisan Moderation Body
NQF	National Qualifications Framework
SAQA	South African Qualifications Authority
SDA	Skills Development Act
SETA	Sector Education and Training Authority
OIHD	Occupations in High Demand
TVET	Technical Vocational Education and Training

List of tables

Table 1	Age distribution of Craft and related trades workers (1996 – 2005)	Page 4
Table 2	Skills Development Act no. 97 of 1998	Page 6
Table 3	Top 15 Trades distribution	Page 19
Table 4	Employers' rating of the quality and importance of attributes associated with basic skills and understanding	Page 21
Table 5	Employer representatives	Page 32
Table 6	Demographics of potential employer representatives	Page 45
Table 7	Coding process	Page 46
Table 8	Composition of graduate attribute theme	Page 48
Table 9	Composition of government policy and legislation theme	Page 50
Table 10	Composition of nature of qualification theme	Page 53

List of figures

Figure 1	Labour Force Survey 2019: Quarter 3	Page 9
Figure 2	The incidence of perceived qualification mismatch	Page 14
Figure 3	Dual Economy	Page 18
Figure 4	Four categories of skills expected by employers	Page 21
Figure 5	The convergent parallel design	Page 28
Figure 6	Gender distribution of the respondents	Page 37
Figure 7	Age distribution of the respondents	Page 38
Figure 8	Race profile of the respondents	Page 38
Figure 9	Employment status of boilermaker graduates	Page 39
Figure 10	Employed on a permanent/ temporary/ contract employment	Page 40
Figure 11	Employment related and relevant to the boilermaker qualification	Page 41
Figure 12	Boilermakers' qualification is the quality certificate favoured by potential employers.	Page 41
Figure 13	Section 28 vs TVET placement in the study sample	Page 43
Figure 14	Type of methods used to search for employment	Page 43
Figure 15	The time it took to find employment after graduation	Page 44

CHAPTER 1: INTRODUCTION

1.1. Introduction

The National Development Plan of South Africa points out the importance of skills development in eliminating poverty and inequality to stimulate inclusive economic growth and employment (NDP, 2030). The task of investing in skills development tends to give both public and private sector the competitive edge in the global market (Lengnick-Hall, 2003). Projects, strategies and technologically advanced machines can be procured to improve companies' operations, but suitably qualified people are required to execute such plans and operate machines. In terms of the Occupations in High Demand (OIHD) of 2018 which was gazetted by the Department of Higher Education and Training (DHET), amongst others, the boilermaker trade is identified as a critical skill in the South African economy. The OIHD aims to "improve the responsiveness of the post-school education and training system to the needs of the economy and to the broader developmental objectives of the country" (OIHD, 2018: p4).

The Mining Qualifications Authority (MQA) is responsible for funding and facilitating technical skills provision in the mining sector. The MQA funds amongst others the learnership programme that focusses on producing boilermaker professionals. By examining the placement of boilermaker graduates in the labour market and the related dynamics, this study aims to contribute towards a better understanding of the value of the training investment by the MQA and its potential contribution towards the goals of the National Development Plan (NDP), and to shed light on ways in which such an investment could be improved (National Planning Commission, 2011). This is in line with the thinking of scholars such as Schomburg (2003) who suggest that tracer studies enable various training institutions to acquire relevant information on possible deficits in a given training program that might hinder the placement of students in the labour market.

1.2. Background

Skills shortages in South Africa has its roots in the colonial era and apartheid regime laws. Government policies and education systems in the era of both colonial and apartheid dominance were designed to create imbalances in terms of economic development and to elevate the white minority to the status of dominance in the labour market (Chelechele, 2009). This phenomenon led to a pool of unskilled labour amongst the black population. Mhone (2000), extends this discussion by suggesting that much of the labour force in Southern Africa

is situated in the informal sector of the economy. The minority labour force possessing the appropriate skills needed by the economy is situated in the formal sector of the economy. Mhone (2000) described this type of economic complexity as an enclaved economy (to be discussed further in chapter two under the literature review).

The introduction of the Skills Development Act (SDA) No. 97 of 1998 (now Skills Development Amendment Act No. 37 of 2008), was regarded as an imperative legislative reform that would enable the adoption of new skills development systems. Through the adoption of the Skills Development Act (explained in more detail in section 1.3.1.), government proposed training programmes such as learnerships to give previously disadvantaged individuals the chance to participate in training that would translate into recognised qualifications and work experience. The first initiative that was introduced by the government post 1994 (emanating from the SDA) was the learnership system. The learnership system was aimed at dealing with the skills shortage and to maximise the prospect of employment in the market through Sector Education and Training Authorities (SETAs). Against this background, the study intended to trace the employment of artisan graduates (specifically boilermaker graduates) funded by the Mining Qualifications Authority.

1.2.1 The artisan development learnership programme

The artisan development learnership programme was introduced in South Africa to address a major gap in the labour market at the intermediate skills level (Department of Labour, 2008). An artisan can be defined as any person certified as competent to perform a listed trade in accordance with the Skills Development Act of 1998. These trades are inclusive of fitter and turner, electrician, boilermaker and diesel mechanic etc. and these trades play a key role in driving the mining economy. The National Artisan Development Learnership Programme is the official name of the MQA artisan skills development programme. The objective of the National Artisan Development Learnership Programme is to facilitate the development of scarce artisan occupational skills in the Mining Mineral Sector (MQA Strategic Plan, 2015).

In the year 2008, the Skills Development Act of 1998 was amended to allow for the establishment of the National Artisan Moderation Body (NAMB). The NAMB was created to coordinate artisan development in the country. The Department of Higher Education and Training (DHET) in partnership with NAMB developed seven practical steps on how to become a qualified artisan. The steps are summarised in the following manner:

- Step 1 - Career guidance and management;
- Step 2 - General / vocational / fundamental knowledge;
- Step 3 - Learner agreement registration and contracting;
- Step 4 - Occupational knowledge and practical learning;
- Step 5 - Workplace learning;
- Step 6 - Trade testing and Recognition of Prior Learning;

The National Trade Test Regulations of 2015 specify that for a learner to write the trade test he or she must possess the following requirements:

- N2 Certificate including the four relevant subjects of maths, engineering science, language and a fourth subject as required by the trade; or
- Technical trade theory programs quality assured by a SETA deemed to be equivalent to NQF level 3; or
- Relevant Engineering NCV Certificate with seven subjects at NQF level 3; and
- Satisfied the requirements of the structured workplace, on the job, learning for a minimum period of 12 months verifiable through a workplace learning record (e.g. logbook)
- Step 7 – The culmination of the process, certificate and quality assurance

The table below shows the entry level requirements of becoming a qualified artisan.

Entry level requirements to become an artisan	
Section 28	**TVET**
▪ No qualification: six years' experience ▪ Only N2 trade theory: 5 years' experience ▪ Full N2 qualification: 4 years' experience	▪ Grade 12 with mathematics and science. No experience required.
Subjects that make up both entry levels: ▪ Mathematics N3 ▪ Engineering Science N3 ▪ Mechanotechnology N3 ▪ Plating and Structural Steel Drawing N3	

Source: Adapted from Department of Higher Education and Training: Artisanship in South Africa, 2013

1.2.2 Understanding the boilermaker functions

Boilermakers are responsible for the following functions:

- plate and piping ranging from boilers for steam engines to mine headgears; and
- build and repair structures of steel.

Boilermakers are highly skilled personnel that drive operations of companies by installing boilers and other large containers that house gases or liquids such as oil. Functions of a boilermaker include casting plates and bending them into shape, and welding or bolting plates together (Bureau of Labour Statistics, 2018). The work of boilermakers requires a high level of attentiveness since the plates or containers they repair are used under high heat and pressure. In addition to repairing and building steel plates, boilermakers are also responsible for making certain that constructed plates are installed properly on site (Bureau of Labour Statistics, 2018).

1.2.3 Demographic profile of artisans in South Africa

In South Africa, the employment of artisans is overwhelmingly male dominated (DTI, 2013). The number of female artisans employed by the industry increased slightly from 34% in 2002 to 35.1% in 2013 (Mukora, 2008). In addition, the nature of artisan work has changed over the years and is becoming more reliant on the use of Information and Communication Technology (ICT). This implies that artisan work nowadays rely less on hard labour as compared to the past hence the confusion about the slow employment rate of female artisan graduates. In terms of race, the number of white artisans employed by the industry decreased from 14.5% in 2002 to 12.1% in 2013 (Mukora, 2008).

The employment of black artisans increased substantially from 68.5% in 2002 to 72.5% in 2013 (Mukora, 2008). The artisan employment domain is largely dominated by Africans. Policy initiatives such as affirmative action can be classified as one of the major contributing factors for the larger number of black artisans in South Africa (Mukora, 2008). Chapters two and four of this report will discuss the reasons for the dominance of black artisans in South Africa. Table 1 illustrates the age profile of the artisans for the period of 1996 to 2005.

Table 1: Age distribution of Craft and related trades workers (1996 – 2005)

Age between	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
15 and 19	1.24	0.98	1.64	1.80	1.16	1.35	1.51	1.76	0.97	1.52
20 and 24	10.06	9.07	8.70	9.12	8.72	7.78	8.56	7.75	9.75	10.37
25 and 29	14.82	14.85	17.53	14.83	14.40	13.74	14.56	13.68	14.85	15.25
30 and 34	18.17	18.97	18.21	17.36	16.20	16.84	16.32	15.55	18.27	19.37
35 and 39	16.23	17.34	17.20	18.65	17.27	17.03	17.61	17.08	14.33	13.71
40 and 44	13.02	15.26	14.20	13.91	14.79	14.53	15.46	15.43	13.08	12.22
45 and 49	11.46	10.37	9.88	10.77	11.78	12.83	11.72	12.78	10.79	10.87
50 and 54	7.02	6.98	6.53	6.39	7.91	7.77	7.13	7.58	9.54	7.36
55 and 59	4.60	3.87	3.93	4.22	4.78	4.25	4.07	4.83	4.79	5.13
60 and 64	2.11	1.34	1.28	1.54	1.87	2.49	1.82	2.69	2.15	2.43
65 and 69	0.84	0.87	0.51	0.67	0.69	0.72	0.62	0.41	0.98	0.92

Table 1: Age distribution of Craft and related trades workers (1996 – 2005)										
Age between	**1996**	**1997**	**1998**	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**
70 and older	0.44	0.11	0.39	0.44	0.33	0.51	0.34	0.42	0.34	0.49
Unspecified	0.00	0.00	0.00	0.30	0.12	0.18	0.28	0.05	0.15	0.35
Total	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**

Source: Department of Labour, 2008

Table 1 shows that the absorption of artisans is more on age category 30 – 34 in year 2005 followed by age cage category 25 -29. The National Youth Policy of 2015 defines youth as any person between the ages of 14 to 35. The Apprenticeship or learnership system as a structured workplace learning often requires young adults straight out of high school to work and learn under the supervision of older and well experienced persons (Cunningham et al.; 2004). Data from Statistics South Africa shows that the youth aged 15 – 24 suffer the plight of a high unemployment rate in the South African labour market. The Labour Force Survey released by Statistics South Africa confirms that the unemployment rate for the youth aged 15-24 years was at 55.2% for the 1st quarter of 2019. The Labour Force Survey (2019) further showed that youth graduates aged 15 – 24 also experienced unemployment rate of 31.0%

1.3. Policy and legislation affecting the placement of graduates

1.3.1 Skills Development Act

To enhance economic growth in a sustainable manner it was essential for the new political regime post 1994 to initiate skills development mechanisms that would place South Africa in a position to meet its developmental objectives to address unemployment, poverty and inequality. As a response to skills development challenges within the country, the government enacted the Skills Development Act (SDA) in 1998. The Skills Development Act was introduced to create an enabling environment for the development of the South African workforce. Among others, the Skills Development Act of 1998 was developed to achieve the following aims:

- to increase the levels of investment in education and training and to improve the return on that investment in the labour market,

- to improve the employment prospects of previously disadvantaged groups by unfair discrimination and to redress those disadvantages through training and education,

- to ensure good quality of learning in and for the workplace,

- to encourage employers to use the workplace as an active learning environment by providing opportunities to employees to acquire new skills.

The introduction of the Skills Development Act in 1998 prompted the legislative change pertaining to artisan development and trade testing in the country. This refers to changes in the artisan qualification –with section 13(12) and section 28 which was previously regulated by the Manpower Training Act no. 56 of 1981 replaced by section 26 (D) of the Skills Development Act no. 97 of 1998 (the differences are clarified in the 2 table). In addition, the task of skills development within the country was moved from the Department of Labour to the Department of Higher Education and Training. The Skills Development Act of 1998 provides that competence building and the evaluation of trade testing procedures be performed in the following manner:

Table 2: Skills Development Act no. 97 of 1998

Section type	Description
Section 13	The clause made provision for persons who had received the institutional training and had completed an apprenticeship/learnership within the set timeframe. The persons should pass a final trade test to receive the section 13 certificate better known as 'Red Seal certificate' issued by relevant Sectors of Education and Training Authority. Section 13 also refers to a contracted learner on an apprenticeship/learnership. Section 13 is mainly applicable to TVET learners.
Section 28	The clause made provision for persons who had never started or finished an apprenticeship/learnership but who, as a result of years of experience had obtained the necessary knowledge and skill in practice without any formal training (DHET, 2017).
Section 26	The clause made provision for a person to apply to undergo a trade test if that person has completed a learnership relevant to that trade or that person has satisfied the relevant requirements of an apprenticeship/learnership. All current trade tested learners contracted as an apprentice/learnership or non-contracted learners that have completed a national trade test will now receive a National Trade Test Certificate (Red Seal) under Section 26 (D) of the Skills Development Act.

Source: Adapted from Dr Jeffy Mukora, Human Science Research Council, 2008

It is important to acknowledge that the former Minister of Higher Education and Training Ms Naledi Pandor pointed out during the launch of the Artisan Development Centres of Specialisation in March 2019 that "although the programmes offered at TVET colleges were still formally set as required component of an apprenticeship, the reality was that their content was seriously out of date and employers who did training were forced to teach trade theory again at their own expense" (Cape Argus, 2019: p.1).

1.3.2 Employment Equity Act

The apartheid legacy continued post 1994 to distort resource allocation in the labour market. The Employment Equity Act therefore emanated from the need to correct the imbalances of the past in the workplace. This was achieved by introducing the Employment Equity Act which emphasised the eradication of unfair discrimination practices in the workplace and the promotion of equal opportunities for all employees and potential employees. The Employment Equity Act of 1998 was legislated to "ensure affirmative action measures are implemented 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" (Employment Equity Act, 1998: p.3).

The Employment Equity Act influences the placement of graduates in South Africa by addressing disparities in the workplace manifested through the exclusion of previously disadvantaged and marginalised, vulnerable groups (women, people with disabilities, black people, and young people). Companies are required to take certain affirmative action measures to achieve employment equity in the workplace. The Department of Labour's Annual Report (2017) states that public sector has managed to transform in a satisfactory manner in terms of employment equity. On the other hand, the private sector is reported to be dominated by white males in senior positions with an army of black workers at the base. The report released by the Department of Labour (2017) states that Employment Equity Act compliance is necessary to help South Africa to achieve inclusive economic growth that is necessary for sustainable growth and future returns.

1.3.3 Employment Services Act, No. 4 of 2014

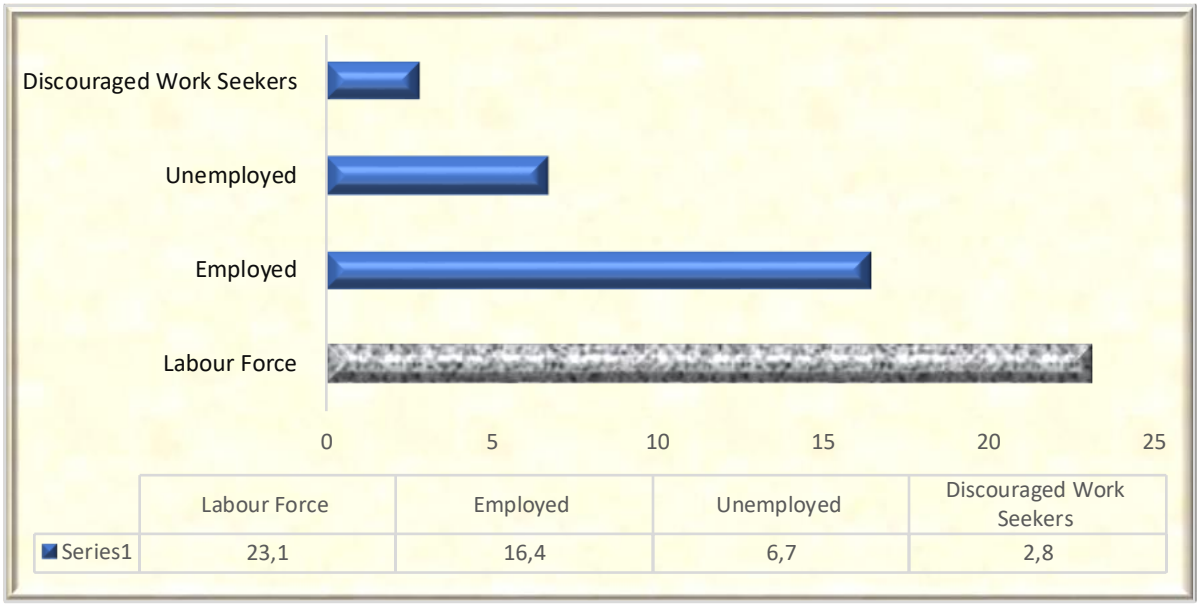
The Employment Services Act (ESA) was enacted in 2014 to "provide for the establishment of schemes to promote the employment of young work seekers and other vulnerable persons; to provide for schemes to assist employees in distressed companies to retain employment"

(Employment Services Act, 2014: p. 2). To achieve the aims of the Employment Services Act, it was decided that the public employment service should be established to provide unemployed job seekers with state assistance (ESA, 2014). In addition, the Employment Services Act provides mechanisms to assist the employees of companies in distress to retain employment and avoid retrenchment. The Act further addresses the issue of hiring migrants or foreign nationals for employment. The Employment Services Act compels South African companies to use all available mechanisms to verify that no South African citizen within the country with suitable skills is left behind within the context of available vacancies. Lastly, the Act dictates that in the case where a foreigner is employed, the company responsible should initiate the process of skills transfer to a person of South African origin.

1.3.4 National Development Plan (Vision 2030)

The National Development Plan (NDP) 2030 is an essential policy document produced by the South African government which aims to reduce poverty and inequality by 2030. This plan is rooted in the premise that South Africa as a country can achieve both goals of eliminating poverty and inequality by drawing on the capabilities of its people to stimulate inclusive economic growth and consequently create employment (NDP 2030, 2012). The Labour Force Survey 2019 (Quarter 3) produced by the Statistics South Africa shows that the unemployment rate increased by 0.1 of a percentage point to 29.1% in quarter 3 of 2019. Statistics South Africa stated that this type of unemployment rate is the highest since the inception of the labour force survey in 2008. Figure 1 shows that the number of discouraged work seekers is 2.8 million in quarter 3 of 2019 while the number of unemployed persons is at 16.4 million.

Figure 1: Labour Force Survey 2019: Quarter 3



Source: Adapted from Statistics South Africa, 2019

Against this background, the NDP aims to raise employment by focussing on economic growth that is aligned to quality education, innovation and skills development. Such a priority requires the government to proactively respond to South Africa's skills needs. The Labour Market Intelligence Partnership (LMIP) a consortium led by the Human Science Research Council (HSRC) points out that prior to 2012, skills planning in South Africa was disjointed and uncoordinated (HSRC, 2016). To rectify this situation, the Department of Higher Education and Training (DHET) initiated a systematic method to enhance data collection and data quality on training and education supply by private training providers, universities and colleges (HSRC review, 2016). Nevertheless, the DHET still lacked quality data on labour market demand. To address the challenge of acquiring data on labour market demand, the LMIP provides data on mismatches between the supply of skills and the labour market demand (HSRC, 2016).

The establishment of a reliable skills planning mechanism for South Africa is essential to bring the country closer to the realisation of NDP goals (Reddy et al., 2016). A reliable skill planning mechanism for South Africa is important to aid both the public and private sectors to better understand the supply and demand of skills at intermediate and advance levels. Skills planning is further viewed as an instrument that could assist government to focus its resources on skills areas that are in need to consequently deal with skills shortages. Lastly, the skills planning mechanism offers an opportunity for credible information to be collected to direct state resources at those skills areas that are likely to help unemployed people to find employment (Reddy et al., 2016).

1.4 Problem statement

The artisan development learnership programme is a critical skills development initiative introduced by the South African government to supply the economy with much needed skills. The mining skills sector plan identifies amongst others the boilermaker trade as in short supply. To respond to the scarcity of boilermaker skills in the mining industry, the MQA has deployed monetary resources to various mining companies to equip potential individuals with boiler maker skills. The skills development interventions that the MQA has funded aim to enhance the existing skills base of the South African mining sector and to develop a massive supply for the sector's future skills needs. Against this background, a tracer study can be useful in ascertaining the effects of MQA funded skills development interventions on employment prospects for boilermaker graduates.

1.5 Research objectives

a) The primary objective of the study is to track the placement of boilermaker graduates in the labour market.

b) The secondary objective of the study is to examine the factors that hinder or enhance the placement of boilermaker graduates in the labour market.

1.6 Research questions

a) The *primary research question* that the study seeks to answer is:

- What is the placement profile of the boilermaker graduates in the labour market?

b) The study will further be informed by the following *secondary research questions*:

- What are the factors that hinder the employment prospects of boilermaker graduates?

- What are the factors that enhance the employment prospects of boilermaker graduates?

1.7 Research outline

This research report is structured in five chapters as follows:

Chapter one: Introduction

This is the introductory chapter that aims to describe the background to the study. It further discusses the research objectives, problem statement and research questions.

Chapter two: Literature review and theoretical framework

This chapter presents information on relevant trends, debates and theoretical frameworks related to the placement of boilermaker graduates in the labour market. The theoretical framework highlights three theories pertaining to the placement of graduates. The chapter commences with an orientation to qualifications mismatch in the South African labour market. The literature further discusses issues such as gender inequality within the artisan employment and the dynamics associated with graduate employment in the labour market. Such information is presented to position the mind of the reader to the complexities surrounding the placement of boilermaker graduates in the labour market. The chapter also discusses studies related to the placement of boilermaker graduates in previous years.

Chapter three: Research methodology

This chapter details the methodological choices made in this research project. The chapter outlines the research design that pulls the research together. Several mechanics of the research project are included in this chapter and consist of data collection techniques, sampling method, data analysis and ethical consideration.

Chapter four: Findings and discussion of findings

This chapter provides the first observation of the data collected through questionnaires and semi-structured interviews. The data collected is then discussed against the literature review presented in chapter two.

Chapter five: Conclusion and recommendations

This chapter concludes the research report by presenting the main findings and recommendations.

CHAPTER 2: LITERATURE REVIEW

2.1 Introduction

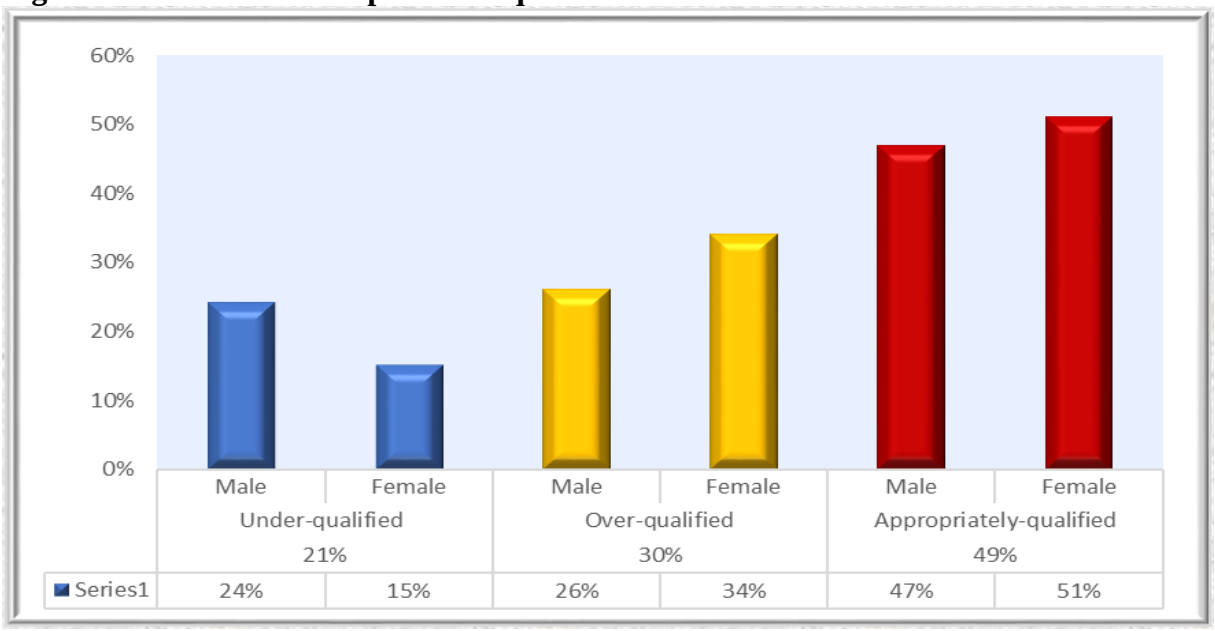
This chapter presents the literature review in relation to the placement of boilermaker graduates in the labour market. A literature review is essential in any research study because of its strength in terms of empowering the researcher to understand previous research studies, theoretical frameworks and to locate the study within the existing body of knowledge (Badenhorst, 2007). In this study, the literature review was performed to identify the existing trends on the subject matter which is the placement of boilermaker graduates and goes beyond by identifying related employment trends. In addition, the literature review contextualises the study by offering background information in relation to skills development and artisan employment trends in South Africa, also discussing studies related to boilermaker placements in previous years. The second part of the chapter includes a discussion of the relevant theories related to employment trends. The issues discussed under the literature review chapter are provided to position the mind of the reader to the complexities surrounding the placement of boilermaker graduates in the labour market.

2.2 Qualifications mismatch

One of the key features in the skills development debate is the mismatch between the supply and demand of skills (Reddy et al.; 2016). It is therefore crucial for the skills development practitioners to understand the perceived qualification mismatch in the South African labour market as highlighted by the Labour Market Intelligence Partnership report (LMIP, 2016). The South African Social Attitudes Survey (SASAS) conducted by the HSRC in 2016 provides a useful analysis of the qualification mismatch. Based on the sample of 2 884 households, more than half of the workers (amounting to 51%) were reported to have experienced job qualification mismatch. The element of over-qualification is more widespread than under-qualification (see figure 2).

The higher level of reporting on over-qualification (see figure 2) can be viewed as an indication of escalating educational levels among South Africans. According to the study, this trend implies that South African workers tend to have good qualifications but despite this, they experience difficulties securing relevant and appropriately matched jobs in the labour market (SASAS, 2013).

Figure 2: The incidence of perceived qualification mismatches



Source: Adapted from South African Social Attitudes Survey, 2013

Figure 2 also illustrates that women are more likely to report over-qualification (34%) due to the tendency that women are more likely to accept employment offers for which they are overqualified (SASAS, 2013). Twenty-one percent (21%) of the respondents in the survey indicated that they are under-qualified whereas 49% specified that they are appropriately qualified.

2.3 Gender inequality within artisan employment

The literature review shows that gender inequality persists in the apprenticeship occupations regardless of the equality laws implemented around the world (Teti, 2016). The artisan development tracer study that was conducted by the Mining Qualifications Authority in 2016 suggests that gender inequality in artisan employment persists as men continue to outnumber females in artisan employment in South Africa. The research study that was conducted by the American Association of University Women and cited by the Hill, Corbert and St Rose (2010) states that females suffer the plight of the double bind in extremely gendered occupation and workplaces.

The notion of a double bind can be translated to an understanding that women in the workplace can either be competent or likable, but not both. Not being likable in the workplace affects women's ability to form critical bonds to enhance their support system. After graduating, it is therefore challenging for the females to enjoy sound employment referrals (Hill, Corbert & St Rose, 2010). The literature suggests that both attributes [being competent and likeable] are essential for advancement in the workplace (Hill et al.; 2010). Although this study was not sector specific and was only focussing on female artisans in the United States of America, the

study is useful in terms of providing an in-depth understanding on the nature and the extent to which female artisans are absorbed and treated in the workplace globally.

Scholars such as Semali and Shakespeare (2014) extend the discussion by stating that gender inequalities in the workplace must be viewed within the context of patriarchy. According to Semali and Shakespeare (2014), gender should not be reduced to sexual or biological differences, but it must rather be observed as a contesting boundary of authority. This type of thinking tends to promote and enforce workforce-based privileges for males in highly gendered male workplaces. It is further argued that gender discrimination that is condoned through the natural difference between males and female tends to be socially acceptable despite existing laws rejecting gender discrimination (Semali & Shakespeare, 2014).

2.4 Graduate employment and the changing labour market

2.4.1 International perspective on graduate employment

Labour markets are not stable globally. A report that was prepared by the World Economic Forum (2016) points out that the continuous disruptive alteration of business models will create unintended consequences on the employment landscape over the coming years. The report highlights the drivers of change in the labour market by emphasising the 'Fourth Industrial Revolution' with its technological advances. Brynjolfsson and McAfee (2014) also refer to the 4th industrial revolution as the *'second machine age'* arguing that the second machine age differs from the previous industrial revolutions in a sense that it is no longer aimed at replacing physical labour and supporting humans in doing their work, but rather at replacing cognitive work and human workers altogether. Certain scholars such as Jeanne, David and Hi Kim (2018) argue that 4th industrial revolution offers opportunities for economic growth while also posing a threat to many kinds of employment. Through artificial intelligence many existing work activities would be automated thus enabling companies to save a huge amount of money and to create new types of jobs. For example, driverless cars may modestly replace meter taxis and Uber operators.

The report further raises vital concerns for employment opportunities noting that "while these impending changes hold great promise for future prosperity and job creation, many of them also pose major challenges requiring proactive adaptation by corporations, governments, societies and individuals. As whole industries adjust and new ones are born, many occupations will undergo a fundamental transformation" (World Economic Forum 2016: p.8). The report paints a gloomy picture about the nature of labour markets around the world. Labour markets

around the globe are subjected to significant alterations in terms of the nature of work and availability of vacancies. It is therefore apparent that the nature of change triggered by the Fourth Industrial Revolution on employment, education and training will have major consequences for higher education institutions since they are responsible for furnishing highly skilled workers also known as knowledge workers. In recent times, knowledge workers have an obligation to supply and manage their knowledge within the context of the labour market to add value to the knowledge driven economy. Artisans as knowledge workers will also be affected by the arrival of the 4th industrial revolution due to transformation of work processes.

Several scholars tend to attach different meanings to the notion of a knowledge worker. It is argued that defining a knowledge worker is difficult as much it is difficult to define knowledge itself (Emanoil et al.; 2015). Certain scholars tend to use the concepts of knowledge worker and information worker interchangeably. To better understand the concept of knowledge worker it is advisable to differentiate the meaning of information and knowledge concept. Emanoil et al (2015) attempted to differentiate by arguing that knowledge empowers individuals with the cognitive or intellectual capacity. On the other hand, information is viewed as something that can be interpreted and brought to life in the form of knowledge (Emanoil et al.; 2015). A knowledge worker can be understood as a person who has the capacity and responsibility of exploring and generating ideas and concepts as opposed to managing existing business operations. It is argued here that knowledge workers exist to create and distribute knowledge (Emanoil et al.; 2015). The ensuing paragraph will attempt to provide a different interpretation of a knowledge worker.

Scholars such as Chipunza and Kabungaidze (2012) define knowledge workers as "employees with much needed qualifications and the ability to acquire and apply theoretical and analytical knowledge" (page. 138). Knowledge workers use intellectual capital as a powerful resource to add value to the operations of the organisation. A knowledge worker can be classified as any person who performs tasks that are inclusive of planning, acquiring, analysing, programming, organising, storing, marketing or else contributing to the transformation of information and using knowledge so produced (Chipunza and Kabungaidze, 2012). What differentiates knowledge workers from other employees' descriptions is that their work is results orientated and non-repetitive. Knowledge workers further use continuous learning and traditional scientific methods in executing their daily activities. Knowledge workers tend to possess skills that are high in demand (Chipunza and Kabungaidze, 2012). The literature suggests that certain professions such as engineers, technicians, artisans, accountants, information technology specialists and production specialists fit the description of knowledge workers as discussed above (Chipunza and Kabungaidze, 2012).

Other scholars such as Brown and Hesketh (2004) argue against the notion that the labour markets which are knowledge-driven are a universal phenomenon. The argument here is that the focus on knowledge workers is twisted since not all jobs requires a degree or tertiary qualification. The critics of knowledge workers further argue that the supply of knowledge workers surpasses the need. Despite criticisms of knowledge workers, the widespread acceptance that the labour market is influenced by a knowledge-driven economy continues to stimulate employers' perspectives on the role of higher education institutions as the prime ingredient to a more equitable society with better living conditions for all. Such justification necessitates the need to use the transformative potential of higher education as a base for development in both developed and developing economies.

In addition, higher education is also crucial in producing advanced technological capacity through research (McCowan, 2016). The field of boilermaking is not immune to the global technological changes. The advent of technologically advanced machinery in the field of boilermaking may necessitate the need for change in how boilermaker learners are trained. It should be mentioned that the boilermaker profession has a two-option advantage in terms of producing knowledge workers. TVET colleges as higher education institutions equip learners with artisanal skills while the Section 28 route is also available to equip learners with artisanal skills.

2.4.2 Artisan Employment trends in South Africa

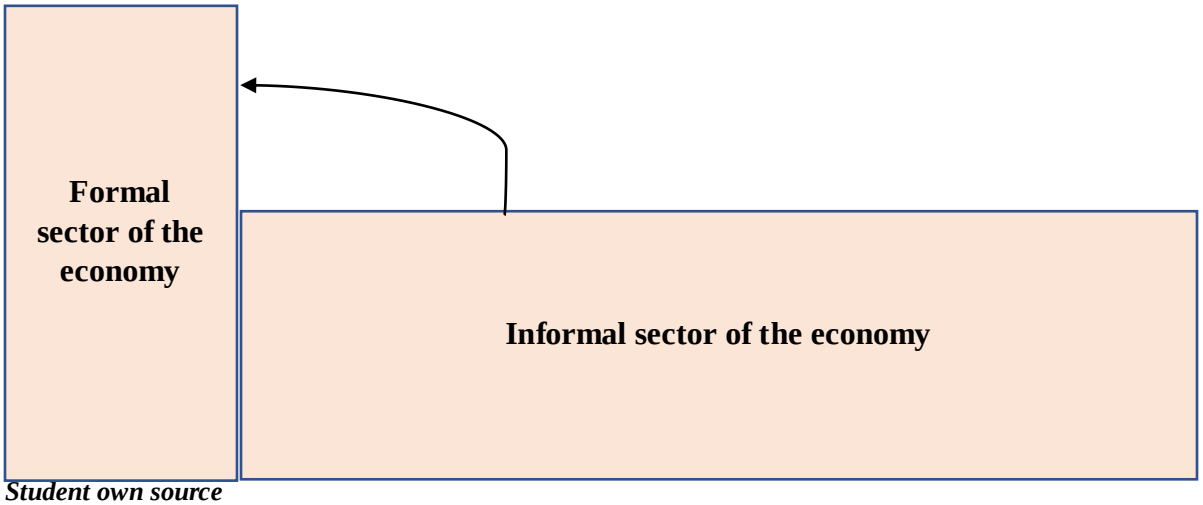
The African labour market is also affected amongst others, by the continuing inequalities emanating from political imbalances of the past, slow economic growth and high unemployment rates. The report prepared by the World Economic Forum on Africa (2017) points to inadequately skilled workforce as the main limitation for the success of businesses in Africa. The report identifies, amongst others, the following countries with inadequately skilled workforce in Africa:

- 41% of all firms in Tanzania
- 30% of all firms in Kenya
- 9% of all firms in South Africa
- 6% of all firms in Nigeria

The report further suggests that 39% of core skills required across occupations in South Africa would have changed by 2020 (World Economic Forum, 2017). The changing nature of the labour market in Africa which is also triggered by the Fourth Industrial Revolution may be

associated with the intense use of digital technologies. For the last decade, South Africa alone experienced the rise of technologically orientated jobs by 26%. The former South African president Mr Thabo Mbeki introduced the notion of South Africa being characterised by the first economy and second economy which is commonly known as a dual economy (Mbeki, 2003). The second economy is mainly characterised by underdevelopment and consists of a large percentage of the South African population situated in rural and urban poor areas.

Figure 3: Dual economy



Student own source

The second economy suffers from economic inactivity and inability to self-generate growth and development (Mbeki, 2003). Mhone (2002) point out that the dual economy in Southern Africa is a consequence of colonialism and the apartheid regime in South Africa. The indigenous African population concentrated in the second economy suffers from inadequate education and poor material resources (Mhone, 2002). The surplus labour located in the informal sector of the economy can be absorbed at a wage rate which is much lower than the marginal productivity of this labour in the formal sector. It is reported that the 65% of the labour force located in the informal sector of the economy earn less than R 2 500 per month and 50% earn less than R 1 500 per month (Altman, 2005). The labour force survey (3rd quarter of 2019) also shows that the unemployment rate increased by 0,1 of a percentage point to 29,1% as compared to quarter 3 of 2018. It is further stated that the number of employed persons increased by 62 000 while the number of unemployed persons increased by 78 000 resulting in an increase of 141 000 in the labour force (Labour Force Survey, 2019).

The South African government initiated amongst others, the learnership programmes to migrate individuals from the informal sector of the economy to the formal sector of the economy (figure 3). Learnership programmes were designed to empower individuals from the informal sector of the economy with relevant artisan skills. In addition to learnership

programmes, the South African government also provides a comprehensive social welfare net (e.g. social grants) to the informal sector of the economy despite criticisms of only treating the symptoms of poverty (Hanlon et al., 2010). During the 2019 budget speech, the South African finance minister Mr Tito Mboweni indicated an allocation of R 567 billion to social grants payment (Budget Speech, 2019). Learning and culture which is inclusive of basic education, university transfers, skills development levy institutions, TVET and National Students Financial Aid Scheme received the total amount of R 386.4 billion.

Scholars such as Binaben (2017) argue that the research studies focusing on artisan professions are scarce in South Africa and in most developing countries. Such claims are attributed to the research methodology that is strenuous and requires a well organised Management Information System (MIS) regarding artisan graduates. Binaben (2017) further argues that such MISs are not updated with the necessary regularity in most developing countries' education systems. Despite the limited literature available, there are some notable examples that are useful in providing a better understanding of the employment trends of artisan graduates. One such study was conducted by Swiss South African Cooperation Initiative (SSACI), in conjunction with National Artisan Development Support Centre (NADSC) between 2015 and 2016 and was based on a sample of 1 628 artisans (focussing only South Africa) with a distribution of trades in the following manner:

Table 3: Top 15 distribution of trades

Trade	Interviewed sample
1. Millwrights	27
2. Toolmakers	3
3. Boilermakers	177
4. Fitters & turners	39
5. Carpenters & joiners	13
6. Welders	115
7. Plumbers	129
8. Motor (petrol) mechanics	11
9. Diesel mechanics	88
10. Instrument technicians	10
11. Metal fabricators / sheet metalworkers	0
12. Air-conditioning & refrigeration technicians	1
13. Auto electricians	0
14. Riggers	22
15. Electricians	735
Total top 15 trades	1370
Total interviewed	1628
% interviewed in Top 15 trades	84%

Student own source

The table shows the significant number (177) of boilermaker graduates who were included in the study. At the time of the study, 1183 individuals interviewed 73% mentioned that they were

employed by a company whereas 6% indicated that they were self-employed (Binaben, 2017). Twenty-one percent (21%) of the individuals mentioned that they were unemployed. Forty percent (40%) of the employed individuals indicated that they were employed by the same company where they did their apprenticeship (Binaben, 2017).

The study furnished several explanations as to why certain individuals were not employed by the same company that offered training or apprenticeships to them: certain companies did not offer jobs to the individuals, and other companies relocated or closed (Binaben, 2017). The other 60% of the employed individuals who were not employed by the same companies that offered training to them cited that they got their current employment through:

- employment agencies
- job advertisements
- personal contacts

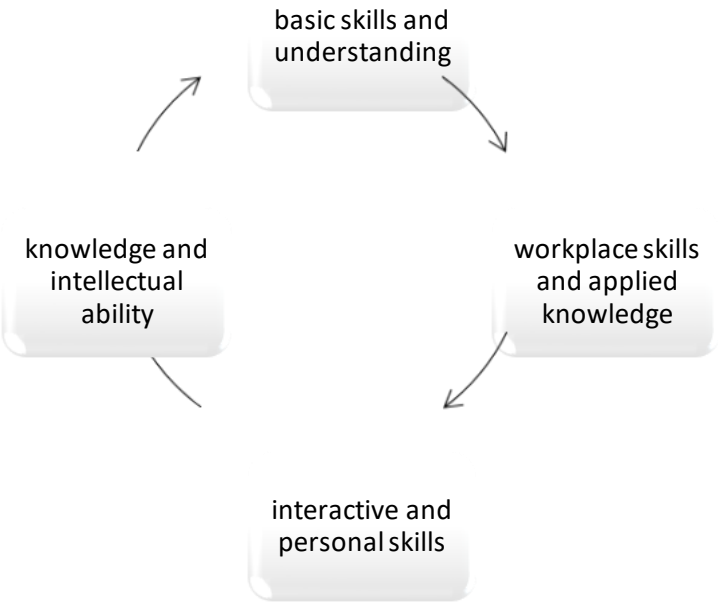
The study also revealed that 43% of the individuals searched for work over a period of three months. Ninety percent (90%) of the employed individuals in the study indicated that they are doing a job in the field that they studied. In terms of remuneration, 66% of the employed artisans indicated that they earn R 15 000 per month before tax.

The tracer study (2015-2016) conducted by Swiss South African Cooperation Initiative (SSACI), in conjunction with National Artisan Development Support Centre (NADSC) gives a comprehensive picture of the employment profile of artisans in South Africa. The study further reveals the dynamics associated with the transition from post training to labour market. The study therefore provides important base information to understand and compare the specific employment profile of boilermaker graduates in the South African labour market.

2.4.3 Employers' expectations of graduates in South Africa

Employers tend to have diverse perspectives on what they expect from graduates. Griesel and Parker (2009) argue that potential employers in the South African context tend to expect graduates to possess four categories of skills as per figure 4:

Figure 4: Four categories of skills expected by employers



Source: Griesel and Parker (2009)

Griesel and Parker (2009) also stated that the perceived gap between what employers expect and what training institutions offer is minor in comparison to the expected gap. Table 2 below illustrates the employers' rating of the skills graduates gain from learning institutions in relation to the skills they expect from graduates. Employers, in the main, indicate that the graduates they encounter have less skills than what they expect. The biggest gap relates to the "ability to find and access information" and this attribute is also rated as the most essential.

Table 4: Employers' rating of the quality and importance of attributes associated with basic skills and understanding

Attribute	Satisfaction rating "what you get"	Importance rating "what you expect"	GAP
Ability to find & access information	3.5	5.0	1.45
Written communication skills	3.2	4.5	1.34
Ability to use information	3.4	4.6	1.23
Oral presentation skills	3.1	4.3	1.20
Ability to handle large amounts of information	3.4	4.5	1.17
Technical ability	3.3	4.4	1.08
Numeracy or quantitative literacy	3.5	4.5	1.01
Ability to use new information	3.5	4.5	0.99
Computer literacy	3.6	4.6	0.99
Proficiency in English	3.5	4.4	0.98
Prior exposure to the work	3.0	3.8	0.81
Knowing the organisation	3.1	3.8	0.77

Source: Griesel and Parker, 2009

There are other in studies in South Africa that contrast what Griesel and Parker suggest. The study that was conducted by the South African Qualifications Authority (SAQA) and quoted by Walker and Fongwa (2016) suggests that there is a significant gap between what employers

expect and what graduates offer. Another study that was conducted by the Nelson Mandela Metropolitan University (2010) focussing on graduates from all academic fields between 2005 and 2008, pointed out the divergence between the theoretical knowledge of the graduates and their ability to apply theory in the workplace environment. These fluctuating perspectives stress the need for more research to be conducted on what employers expect from the potential employees.

2.5 Theories applicable to employment trends

This section focuses on three theories that are applicable to the employment trends, namely Human Capital theory, Job Market Signalling (screening) theory, and Skills Mismatch theory.

2.5.1 Human capital theory

Human capital theory is built on the premise that education increases an individual's productivity which consequently improves occupation performance. It is assumed under human capital theory that both education and training provide graduates with abilities and marketable skills relevant to the job performance. An assumption is made here that highly educated individuals are likely to succeed in the labour market in terms of both work opportunities and income (Chiswick and Miller, 2003). The proponents of human capital theory also argue that certain aspects of human capital such as cultural skills, professional skills and language adapted to specific industry are useful in the labour market (Wiers-Jenssen, 2008).

Scholars such as Schultz (1961) devoted a huge amount of time expanding the knowledge base that elucidated the human capital theory. In his analysis, Schultz (1961) pointed out knowledge and skills as the vital ingredients in developing human resources. He asserted that the amalgamation of education and training will consequently empower individuals with useful knowledge and skills as a form of capital. He further held the view that education tends to invite the range of opportunities available in the labour market such as higher wages. He also emphasised the notion that education and training must be viewed as investments that produce returns in the development of the workforce. It is also argued that education and training tend to offer long term monetary benefits through higher incomes (Barker, 2007). Ehrenberg and Smith (2009) also suggest that more educated individuals tend to start their career with lower wages but later in their career overtake the less educated individuals by enjoying higher wages. Therefore, the investment in education is associated with increased job satisfaction over an individuals' lifetime (Barker, 2007). The human capital theory assumes that skilled workers

will be absorbed in the job market at the wage which rewards them for the costs of acquiring those skills (Ehrenberg & Smith, 2009).

The opponents of human capital theory argue that the task of measuring human capital is extremely challenging. The amount of years invested in acquiring education cannot be used as an indicator of the quality of education (Barker, 2007). In addition, it is currently challenging to measure both future incomes associated with the respective career and worker productivity. It is argued here that an individual may be relatively poorly educated within the context of the job market especially if the individuals' skills are outdated. Another issue raised by the critics of human capital theory relates to the notion that increased years of education do not necessarily translate to improved levels of productivity in the workplace (Darwin 2010). Another concerning factor raised about human capital theory relates to graduate abilities. Individuals with the required abilities tend to get higher educational qualifications. This implies that it is the ability (not educational qualification) which is rewarded with higher wages (Barker, 2007). In simple terms, the intensification in educational spending would not automatically result into increases in productivity and higher wages over an individual's lifetime.

Despite the number of critiques forwarded by the opponents of human capital theory, the use of this theory in this research study will add value by helping the researcher to better understand the boilermaker training complications.

2.5.2 Job market signalling (screening) theory

The job market signalling theory is characterised by an environment where disproportionateness of information occurs. Disproportionateness of information in this context occurs when employers do not have enough information about graduates and so rely on signals conveyed by graduates to make recruitment decisions. This theory was introduced in 1972 by Michael Spence from Harvard University and gained popularity in describing the labour market in the field of economics over the years. This theory will be used to help us understand the perspective of employers in the job market concerning the hiring of boilermaker artisans. This theory holds the belief that to employ someone is an investment for the company or organization. Employers are expected to make employee hiring decisions in conditions of uncertainty. It is argued here that when employers make recruitment decisions, they consider signals conveyed by levels of educational accomplishment or experience (Wiers-Jenssen, 2008).

Job market signalling theory and screening theory are two components of the same theory. Within job market signalling theory, people who are seeking employment normally send signals about their capability level to the potential employers based on educational credentials and experience. Potential employers on the other hand screen the job seekers in line with signals (e.g. educational credentials & job experience) that were transmitted by job seekers. Employers use pre-determined criteria to screen job seekers such as certain qualifications or levels of experience. Therefore, employers rely on educational credentials and years of experience to measure the ability of a job seeker and his or readiness to enter the place of work. The screening or signalling theory is formulated under the assumption that education is homogenous (Wiers-Jenssen, 2008). The tendency by employers to rely on signals may be viewed as deceptive. This is due to the notion that signals do not necessarily reflect the productivity of the graduate (Wiers-Jenssen, 2008). It is argued here that certain graduates may struggle to perform their jobs even though they obtained higher passing marks in learning institutions.

This theory has a role to play in helping the researcher to better understand the employer's rationale in appointing or not appointing boilermaker graduates. The screening or signalling theory will focus the researcher's attention on uncovering whether the type of signals or information conveyed by boilermaker graduates is compatible with what potential employers require.

2.5.3 Skills mismatch theory

This theory is based on the premise that labour markets display a tenacious mismatch between the available jobs and available potential workers (Lise et al.; 2016). Mismatch is likely to be visible in instances where market participants are unable to anticipate labour market imperfections and adjust to these imperfections accordingly (Kubler and Schmedders, 2002). Potential employees tend to attain skills not necessarily required by the labour market. Companies and firms tend to design jobs with specific qualifications which are deemed to be in demand within a specific time (Kubler and Schmedders, 2002). Therefore, potential employees find themselves unemployed due to their inability to acquire qualifications that are relevant to the demand of the labour market. Companies normally do not alter job specifications to accommodate the characteristics of the unemployed individuals. It is suggested that probably acquiring a new skill of relevance to the demand of the market is the best way to attract potential employers (Kubler and Schmedders, 2002).

The literature identifies two types of skills mismatch namely, vertical mismatch and horizontal mismatch (Kim et al.; 2011). Vertical mismatch refers to the mismatch between level of

education and the job. Vertical mismatch can transpire as either under-education or as over-education. Over-education normally occurs when an individual is hired for a vacancy that requires a lower level of education. Under-education on the other hand refers to the tendency whereby an individual has a lower level of education than the required vacancy (Kim et al.; 2011). Horizontal mismatch is understood as a mismatch between a worker's field of study and the activities of his/her job (Verhaest et al., 2017).

The former Deputy Minister of Higher Education, Mduduzi Manana (2018) argued that "school children should obtain artisan qualifications instead of 'useless' degrees from universities, saying that the government was forced to import 1,000 artisans from Thailand due to a shortage of skilled workers locally" (BusinessTech, 2018: p.1). It can be assumed that the Deputy Minister's concern emanates from the existing trend whereby South African universities produce more graduates with skills not required by the economy (Reddy et al., 2016). The skills mismatch theory will be used as a base to understand the dynamics associated with the relevance of boilermaker graduates' skills in the labour market.

2.6 Conclusion

This chapter presented information on relevant trends, debates and the theoretical frameworks related to the employment trends in the labour market. The theoretical framework highlighted three main theories pertaining to the employment trends in general. The more applicable theories for this research study were Skills Mismatch, Human Capital and Job Signalling. These theories were used to provide useful perspectives to analyse the acquired data.

CHAPTER 3: RESEARCH METHODOLOGY

3.1. Introduction

This chapter presents the research methodology that was used to answer the research questions reflected in section 1.5 of this report. The study adopted a tracer study method as the preferred research design. In addition, the mixed research method was applied to enhance the process of data collection. Quantitative data was collected through questionnaires and qualitative data was collected through interviews. The study focussed on the cohort of graduates who enrolled in year 2014 and graduated in year 2016. The sample of respondents in the study consisted of 20 employer representatives and 40 boilermaker graduates. The study examined the possible factors that might hinder or enhance the placement of boilermaker graduates in the labour market. This chapter commences with the description of the applied research design. The chapter will further discuss other variables that were used to construct the research methodology (e.g. such as data collection tools, sampling method and data analysis). The chapter will conclude by delineating the ethical consideration and limitations of the study.

3.2. Research design

The concept of a research design refers to the "blueprint for fulfilling objectives and answering questions" (Cooper Schindler, 2006: p.71). To examine the phenomenon of the placement of boilermaker graduates in the labour market this study opted to use the tracer study design. A tracer study can be defined as a research technique which aims to track the employment profile of students or leaners upon graduating from the educational or training institutions (Latif & Bahroom, 2010). It is an approach that allows the researcher to acquire information about possible deficiencies in the learning process and can be used as a basis for planning education/ training activities in the future. It is further stated that tracer studies enable the contextualisation of graduates of a specific learning institution through a system that is dynamic and reliable in order to determine their life path or movement (Aina & Moahi, 1999). Scholars such as Schomburg (2011) argue that tracer studies should be conducted between one to three years after graduating. Scholars view this period as sufficient enough to allow the learners or students to enter the labour market. The current study focussed on a cohort of graduates who enrolled in year 2014 and graduated in year 2016.

The tracer study can also be classified as one of the mechanisms that can be used to determine the effect (in the form of the transition from training to the world of work) and to better understand the labour market trends. Schomburg (2003), points out that tracer studies are essential in situations where the aim is to find out:

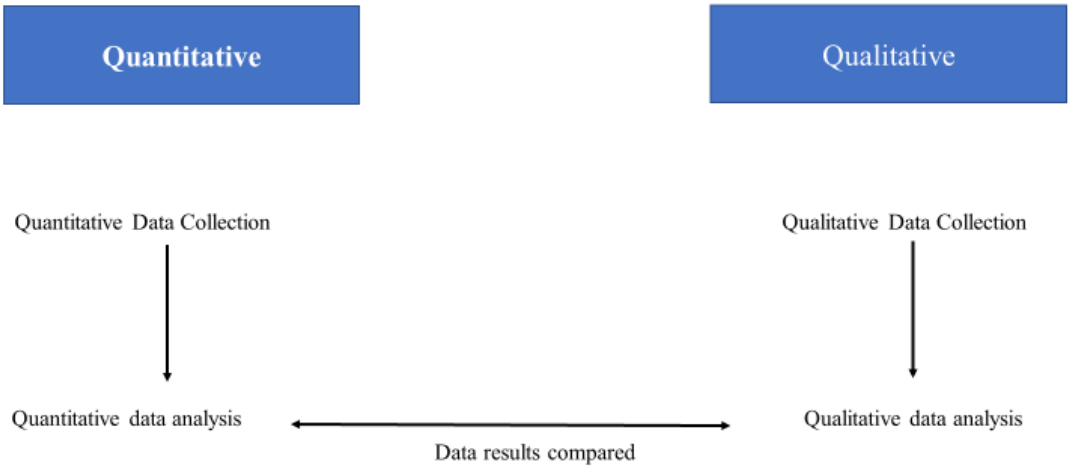
- what happened to graduates after completing their training or studies,
- if graduates use the knowledge and skills they have learned during their studies,
- if they are employed, self-employed or whether they are still looking for a job,
- if their studies prepare them well for the workplace
- how to use graduates' feedback to improve the quality of the study programmes and more specific programmes.

3.3. Research methods

The notion of mixed method studies has emerged from the paradigm of wars between qualitative and quantitative research approaches. Certain social scientists hold the view that no major problem area should be studied exclusively with one research method (Tashakkori & Teddlie, 2008). Such thinking is believed to bring a truce to the conflicts that exist between the qualitative and quantitative paradigm. Tashakkori and Creswell (2007: p. 4) define the mixed methods approach as "research in which the investigator collects and analyses data, integrates the findings and draws inferences using both qualitative and quantitative approaches or methods in a single study." A mixed methods study tends to rely on both qualitative and quantitative dimensions although difficulty may arise on how to relate the two dimensions in a single study (Tashakkori and Creswell, 2007). It is suggested that the discussions associated with mixed methods research should be left open since this paradigm is evolving (Creswell & Plano Clark, 2007).

The use of both the qualitative and quantitative dimensions in this study was informed by the notion that one data source would not be sufficient to help the researcher to deal with research questions reflected in section 1.5 of this report. Therefore, there was a need to use both qualitative and quantitative dimensions for the data collection. The type of research method that was used in this research project within the context of mixed methods research was *convergent parallel design*. Creswell and Pablo-Clark (2011) defines convergent parallel design as a research process that entails the researcher's ability to concurrently conduct the quantitative and qualitative elements in the same phase of the research process (see figure 5).

Figure 5: The convergent parallel design



Source: Steven R. Terrell, Nova South Eastern University, 2012

It is further stated that the convergent parallel design makes it possible for the researcher to analyse the two components (qualitative and quantitative) independently and then combine the results during the overall interpretation (Creswell and Pablo-Clark, 2011).

3.3.1 Qualitative approach

The qualitative approach was applied in this study to measure the familiarity of context and perspectives of potential employers which cannot be predictable. It is exactly this lack of predictability which makes it imperative to talk to the people (Merriam, 2001). The concept of potential employers in this report refers to the companies that were subsidised by the Mining Qualifications Authority to train boilermakers during the period of 2014 to 2016. The qualitative approach can be defined as a "set of non-statistical inquiry techniques and processes used to gather data about social phenomena" (McNabb 2002: p.267). The selection of the qualitative approach was informed by the notion that the reality constructed by the potential employers in their original settings would assist the researcher to gain an understanding of the implicit dynamics associated with the placement of boilermaker graduates. Thus, the qualitative approach was mainly used here to extract and interpret social meanings produced by potential employers within the context of recruiting boilermaker graduates. The use of the qualitative approach was not intended to construct logic as the basis of scientific inquiry and neither to generalise the qualitative findings. The qualitative approach was useful in assisting the researcher to acquire the reality which can only be perceived internally from the companies revealing factors that justify or hinder the employment of boilermaker graduates.

3.3.2 Quantitative approach

The quantitative approach was used in this study to measure the perceptions and current undertakings of the boilermaker graduates. The quantitative approach refers to the approach that is structured since the researcher asks all research participants identical questions in the same order by using fixed response categories or closed-ended questions (Neuman, 2006). The quantitative approach is mainly associated with analysis of numerical data, larger samples and the researcher's objectivity (Saunders, 2003). Scholars who subscribe to the quantitative approach tend to hold the view that the world is external and objective and the use of science must be value free (Neuman, 2006). The quantitative approach was deemed suitable to help the researcher to track the placement of boilermaker graduates because of its ability to discover knowledge by studying relationships between measurable variables.

3.4. Data collection procedure

There are two types of data that can be collected in a research study namely primary and secondary data. The concept of primary data refers to the system of obtaining original information from the research participants (Kothari, 1985). On the other hand, the concept of secondary data refers to the research information that has been previously collected and subjected to the research analysis process (Leedy & Ormrond, 2015). The study collected both primary and secondary data.

- **Semi structured interviews**

Semi-structured interviews were used to collect qualitative data from the employer representatives (see appendix B). Semi-structured telephone interviews were selected for the research study due to their ability to produce rich, specific and relevant replies from the respondents (Neuman, 2011). Semi-structured interviews are widely used to extract opinions, perceptions and beliefs of people. Semi-structured interviews consist of open-ended questions and the researcher has an ability to probe further (Willing, 2008). Since the employer representatives were spread all over the country, the use of semi-structured telephone interviews provided an advantage of quick and high response rate. This was due to the notion that telephone calls are not as easy to ignore as emails or mails. The critics of semi-structured interviews claim that the instrument is not reliable since their subjectivity may mean that the interview questions may lead interviewees to "say" what the interviewer wants to hear (Bryman, 2004). It is therefore essential for the researcher to conduct the research with integrity

through honesty (by avoiding leading questions), impartiality, transparency, open communication and respect.

Semi structured interview questions were organised in a the interview guide. The interviewer adopted a strategy of probing issues specific to the topic on certain questions within a predetermined framework which is referred as interview guide (Appendix B). The aim of the probes in the interview guide was to allow participants being interviewed to be as informative as possible in their responses. The probes can be classified as neutral prompts which encourage extra information (Kvale, 1996). The probes were not used to influence the interviewee to answer in a certain way. The use of the interview guide was fundamental for this study since it paved the way for an efficient and comprehensive interview with the participants regarding specific issues concerning the dynamics associated with the placement of boilermaker graduates. The researcher only allocated 30 minutes for each interview. The first 5 minutes was used by the researcher to familiarise the respondents with the objectives of the study and the ethical principles guiding the study. All respondents were then requested to provide informed consent to participate in the study.

- **Questionnaire**

A specific questionnaire (see appendix A) was designed and used to collect data from the boilermaker graduates. A questionnaire can be defined as a systematic way of asking people to volunteer information about their beliefs, behaviours, opinions and attitudes (Crawford, 1990). When questionnaires are distributed to the respondents, the researcher's control over the environment will be somewhat limited. This loss of control implies that the validity of the results is more dependent on the honesty of the respondent. The literature suggests that questionnaires reduce bias since there is no middle person facilitating the process of answering (Bourque & Fielder, 1995). The use of a questionnaire as the primary tool for collecting data was informed by the desire to collect practical and perceptual data from the boilermaker graduates. The questions were close ended which were later converted into quantitative values and analysed using Microsoft excel.

A draft questionnaire was subjected to a pre-test. It was circulated to five individuals resulting in modifications to the questionnaire in terms of question wording. The structure of the questionnaire consisted of both Likert scale statements and closed questions. A Likert scale requires the research respondents to answer a series of statements that are based on a limited range of possible answers (Trochim & Donnelly, 2017). For example, the respondents are requested to rate their responses on a scale of 1 to 5 as follows;

1 = Strongly Disagree

2 = Disagree

3 = Undecided

4 = Agree

5 = Strongly Agree

- **Secondary data**

In certain instances, a researcher may learn that the required information or data is partially or completely available. The researcher may opt to utilise the already available data in the research project. The use of secondary data is known to be saving cost and time (Finnegan, 2006). The document review process is the popular method for collecting secondary data and refers to the process of using already existing documents which are considered as sources in their own right.

The following documents were used as secondary sources in this study;

- MQA annual reports (2014 – 2016)
- Mining sector skills plan (2016)

The disadvantage of using document reviews is based on the idea that information cannot be classified as objective reflections of reality since they were produced for another purpose (Finnegan, 2006). However, the documents referred to above provide further details relevant to better inform the tracer study.

3.5. Sampling design

The literature defines sampling design as the method chosen to select the sample from the overall population. Paying less attention on sampling design may lead to poor conclusions. The concept of sampling can be defined as a method of collecting data from a representative sample of the population (Howell, 1999). Due to cost and time constraints it is difficult for the researcher to measure every element in the population. Instead, researchers opt to use representative samples.

- **Population**

The term population refers to the group of persons to which the study refers (Durheim & Terre Blanche, 1999). The target population in this research study refers to the total number of

boilermaker graduates who enrolled for the artisan development learnership programme in 2014 and graduated in year 2016. The total number of enrolled boilermaker trainees in 2014 was one hundred and forty-five (145). Only seventy-eight (78) boilermaker trainees graduated in 2016. The total number of graduated boilermakers in 2016 was treated as the target population for this study. All mining companies that signed a memorandum of understanding with the MQA to train learners on boiler-making between 2014 and 2016 were classified as the target population of potential employers.

- **Sample**

A sample can be defined as a subset of the entire population (Durheim & Terre Blanche, 1999). The list of companies who signed a memorandum of understanding with MQA was acquired. This list of companies was treated as the target employer population. The sample of 20 employer representatives was extracted from the target population (see table 5). Creswell (1998) suggests that the recommended sample size for qualitative research is between 20 and 30. The rationale for this figure is based on the notion that the sample sizes should be large enough to help the researcher to acquire sufficient data to describe the unit of analysis and address the research questions (Creswell, 1998).

The total number of 78 boilermaker graduates was selected to participate in the study. Since the total number of graduated boilermakers was small (78), the researcher took the decision to include all graduated boilermakers in the study sample. Scholars such as Israel (1992) suggest that it is appropriate to use the entire population as the sample if the target population is small and easily manageable.

Table 5: Employer representatives

Respondents	Position	Organization
1	Human resource practitioner	African Rainbow Minerals
2	Human resource practitioner	Mafube mine
3	Human resource practitioner	Grootegeluk mine
4	Human resource manager	Leeuwpan mine
5	Technical specialist [technician]	Tshikondeni mine
6	Human resource specialist	Afplats mine
7	Technical specialist [foreman]	Bafokeng mine
8	Human resource practitioner	Impala mine
9	Recruitment leader	Freegold operations
10	Human resource practitioner	Anglo gold Ashanti
11	Human resource practitioner	Rustenburg platinum mine
12	Human resource practitioner	Glencore mine
13	Recruitment leader	Sibanye gold
15	Technical specialist	Ikwezi mine

Respondents	Position	Organization
16	Human resource practitioner	Tronox fairbreeze mine
17	Boilermaker section head	Marula mine
18	Technical specialist [foreman]	Somkhele mine
19	Human resource practitioner	Tendele coal mining
20	Technical specialist [foreman]	Modikwa mine

Student own source

- **Sampling procedure**

The researcher requested the list of boilermaker graduates for the year 2016 from the MQA. The questionnaire was circulated to all 78 boilermaker graduates furnished by MQA human resources. The questionnaire was circulated to the respondents through emails. Each respondent was given seven days to return the completed questionnaire. Only fifty-one (51) questionnaires were returned. Convenience sampling was therefore applied in selecting the boilermaker graduates to be included in the study. Out of 51 returned questionnaires, 9 were spoilt and two questionnaires had too many gaps. Only forty (40) questionnaires were completed in a satisfactory manner. The notion of spoilt questionnaires in this study referred to all blank questionnaires that were returned by the potential respondents. When these respondents were contacted telephonically to fill the blank questionnaires, they reported their unwillingness to participate in the study. All forty (40) completed questionnaires that were returned through emails were used for data analysis in this study.

Distributed questionnaires	Quantity
Number circulated questionnaires	78
Number of returned questionnaires	51
Number of spoilt questionnaires [disqualified]	9
Questionnaires with too many gaps [disqualified]	2
Well completed questionnaires [qualified]	40
TVET college learners out of 40	19
Section 28 learners out of 40	21

Student own source

The list of potential employers was also sourced from the MQA which consisted of 54 employer representatives. Convenience sampling was used to extract 20 readily available employer representatives. The sample of employer representatives consisted of fourteen (14) human resource personnel and six (6) technical specialists.

3.6. Data analysis

Bryman (2012) defines data analysis as the analysis, management and interpretation of data. In this study, the thematic analysis and conceptual framework discussed under the literature

review will be used to interpret the qualitative data collected from the employer representatives. Thematic analysis is better understood as a data analysis technique capable of identifying, analysing, organising, describing and reporting themes found within a data set (Braun & Clarke, 2006). Thematic analysis is often favoured by qualitative researchers since it is easy to learn and apply. In addition, thematic analysis has few prescriptions and procedures (Braun & Clarke, 2006). When a researcher performs thematic data analysis, she or he becomes the instrument for analysis by making rulings about themes, coding and decontextualizing the data. Braun & Clarke (2006) formulated the thematic analysis framework consisting of six stages. Although the thematic analysis framework moves from stage one to the next, the stages do not necessarily assume a linear approach. The framework consists of the following stages:

Step 1: Become familiar with the data.

Step 2: Generate initial codes.

Step 3: Search for themes.

Step 4: Review themes.

Step 5: Define themes

Step 6: Writing-up

To analyse the quantitative data, the Microsoft excel was used to convert raw data into graphical and numerical representation.

3.7. Ethical considerations

It was vital for the researcher to pursue the mission of discovering new information in line with the ethical balance. Ethical balance refers to the idea that researchers must balance their requirements to contribute to the construction of knowledge using fair treatment of every person involved in the knowledge construction (Dane, 1990). Compliance with ethical research practices must always be in the mind of the researcher throughout the process of data collection. Bryman (2012) states that non-compliance with ethical issues when implementing research can lead to serious implications such as loss of reputation, job, and funding for the researcher. It is important to treat the research participants fairly.

Research participants in this study were given a letter of consent prior to the interview session (See appendix C). The researcher ensured that each participant receives detailed information about the background, objectives and purpose of the research study. The researcher further clarified to the participants that their involvement in the research study was voluntary and they

were permitted to terminate their involvement at any time should they feel uncomfortable to proceed. There was no physical or emotional harm associated with the involvement of research participants in the research study. Permission was requested from the participants to record their responses using the digital audio recorder. The researcher explained to the participants that their personal information would not be used in the final research report. This practise ensured anonymity of the participants (Creswell, 2003). Only the researcher and the researcher's supervisors have access to the transcripts and voice recordings. The researcher avoided passing judgements on the research participants. The researcher informed the research participants that they will have access to the final research report which will be located in the library of the University of Witwatersrand.

The researcher requested demographic data such as age, gender and race. This information assisted the researcher to understand the extent to which previously disadvantaged groups are represented in the boilermaker profession. The employment literature in South Africa shows that finding artisan employment varies in terms of gender, race and age (Mining Sector Skills Plan, 2018). Knowing this information about the participants helped the researcher in terms of interpretation of the data. In addition, the Employment Equity Act emphasises the need for inclusivity in the workplace. Employers are required to diversify employees in terms of age, gender and race (as discussed in chapter one). Demographic data therefore aided the researcher to understand the extent to which previously disadvantaged groups are represented in the boilermaker profession. All those research participants who declared that they are in distress due to unemployment, were advised by the researcher to use the following employment support websites to search for jobs;

- Department of Labour Careers Portal – This is a free of charge career guidance service - https://www.careersportal.co.za
- Department of Labour – Employment Services of South Africa - https://essa.labour.gov.za/EssaOnline/WebBeans/

The following two organisations provide employment support services specifically to youth:

- Harambee Youth Employment Accelerator Programme - http://harambee.co.za/about/
- Lulaway - a Youth Employment Engine that has placed over 30,000 job seekers in employment and internship opportunities since 2011. - https://www.lulaway.co.za/our-story/about-us/

3.8. Limitation and advantage of the study

a) The process of administering questionnaires to boilermaker graduates resulted in poor response. It might have been easier for certain respondents to ignore the emailed questionnaire. The researcher opted to use phone calls to make follow ups with an aim of improving the response rate.

b) During the time of conducting the study, the researcher was employed by the MQA which could potentially present a position of bias/ lack of objectivity. The researcher was working in the Monitoring and Evaluation unit which in its nature is objective and independent. Objectivity and independence was therefore maintained throughout the research study. The advantage is that due to familiarity with the MQA organization it was easier for the researcher to access data.

3.9. Conclusion

This chapter outlined the research methodology that was applied in pursuit of establishing the placement profile of boilermaker graduates. This study applied the tracer study through a mixed research methods approach which has been discussed at length. The use of the mixed research methods was based on the perceived value in using both qualitative and quantitative methods together rather than looking at them in isolation.

CHAPTER 4: ANALYSIS OF THE FINDINGS

4.1. Introduction

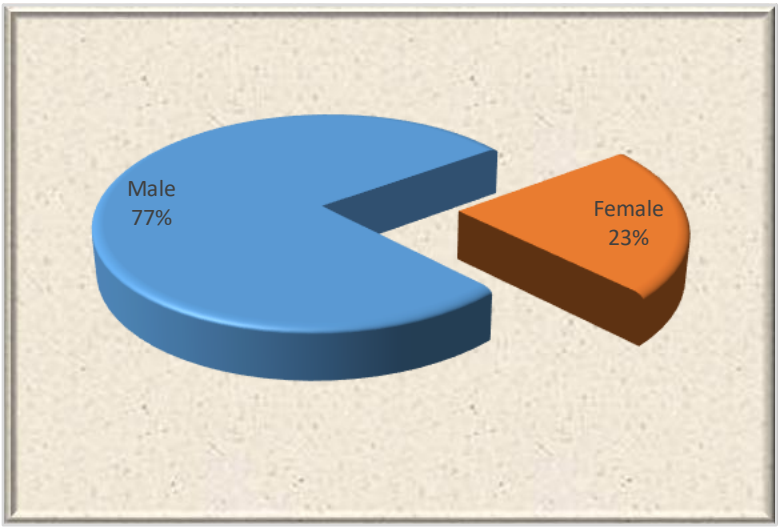
The purpose of this chapter is to present the primary findings of the tracer study carried out to track the placement of boilermaker graduates in the labour market. The chapter will further provide a discussion of the findings aimed at answering the research questions reflected in section 1.5 of this report. This chapter employs the use of tables and graphs to elucidate the meaning of the data presented. Moreover, the chapter presents findings from both qualitative interviews of 20 employer representatives and quantitative survey information of 40 boilermaker graduates. The chapter will commence by discussing the interview findings.

4.2. Findings from the boilermaker graduates survey

4.2.1 Demographics of the boilermaker graduates

This section presents the characteristics of the boilermaker graduates who completed the questionnaires.

Figure 6: Gender distribution of the respondents

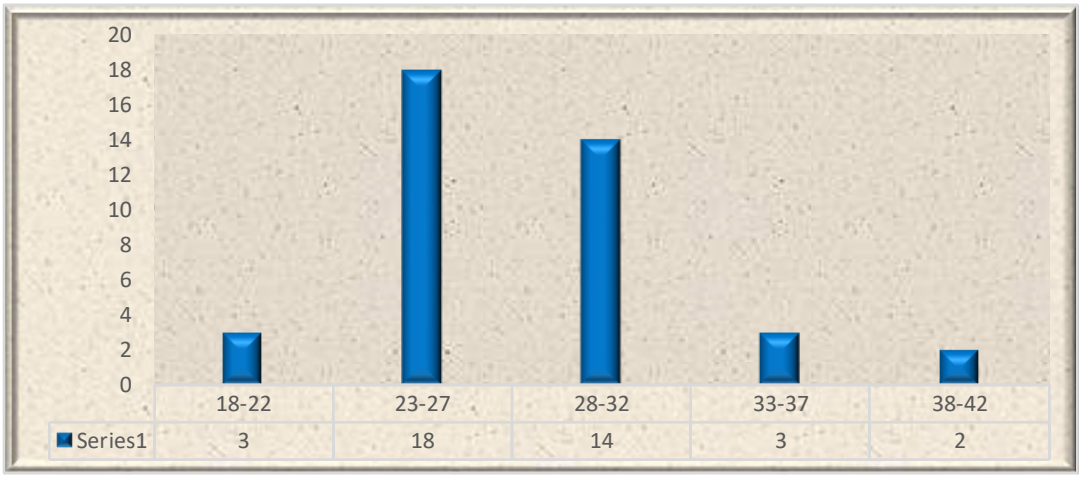


Student own source

The study sample of boilermaker graduates consisted of 31 males and 9 females. Males were more represented in the sample. This observation corresponds to the notion that female boilermakers in South Africa are low in numbers. The Mining Sector Skills Plan (2016: p.50)

clearly states that "Employers struggle to find suitably qualified and able females to fill some of the artisan roles as Boilermaker, Diesel Mechanic, Welder, Rigger and Fitter and Turner. This affects their Employment Equity numbers". The sample configuration which is biased towards the male boilermaker graduates is therefore consistent with the current trend in the mining sector.

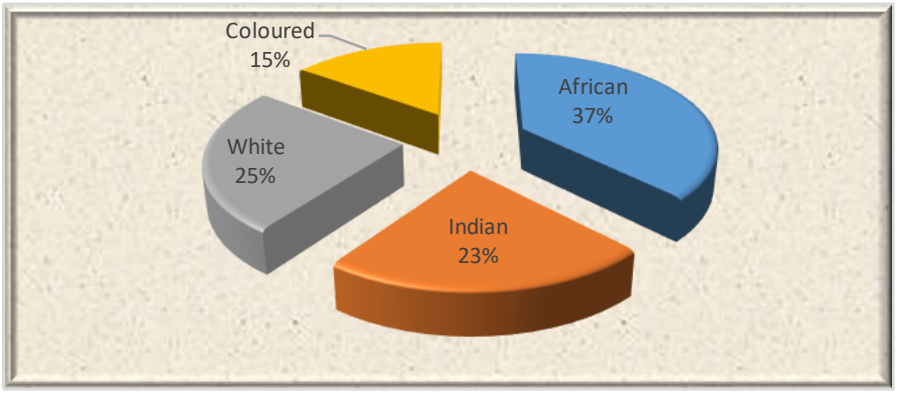
Figure 7: Age distribution of the respondents



Student own source

Forty-five percent (45%) of the respondents fell within the age category of 23-27. Thirty-five percent (35%) of the respondents fell in the age category of 28-32. Most respondents fell in the age category of 23-32 and can be classified as youth according to the National Youth Policy of 2015 which defines youth as any person between the ages of 14 to 35. Unemployment in South Africa is concentrated among the youth and many development initiatives such as the National Development Plan identify youth unemployment as the key area that requires both private and public sector intervention (NDP, 2030). Based on the age distribution of the study sample (Figure 7) it can be assumed that youth development was prioritised in terms of the cohort of 2014 to 2016.

Figure 8: Race profile of the respondents



Student own source

In terms of race profile, the sample consisted of fifteen (15) black respondents. Only 10 white respondents became part of the sample. Coloured respondents represented the lowest number (6) of respondents in the study sample (see figure 8). The categorisation of race used in this research is borrowed from Statistics South Africa (Labour Force Survey, 2019). The Labour Force survey compiled by Statistics South Africa on a quarterly basis categorises race into *Black/African*, *Coloured*, *Indian/Asian* and *White*.

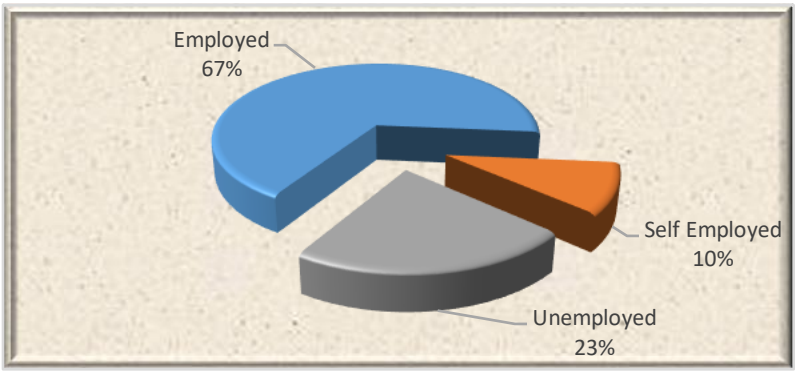
As stated in chapter 1, in year 2014, the number of artisan learners who enrolled with MQA funded institutions was 2600 for all trades in 9 provinces. Out of 2600 artisan learners, 230 artisan learners were enrolled for boiler making and consisted largely of black African individuals (MQA annual report, 2014). Therefore, the dominance of black people in the sample correlates with the recruited artisan learners in 2014. The racial profile of the respondents further corresponds with the Mining Skills Sector Plan (2016) which states that black people dominate the artisan training category followed by whites with coloured people at the bottom of the scale (MQA Annual Report, 2014).

This trend can further be supported by the legislative environment discussed in the literature review. To respond to the requirements of affirmative action and employment equity, the recruitment of artisans for boilermaker training focuses more strongly on attracting black people (MQA Work Skills Plan, 2014). To address the imbalances of the past where the boiler-making profession was mainly populated by white individuals, the affirmative action and employment equity acts offer corrective measures to previously disadvantaged groups such as blacks, coloured, Indians, women and people who live with disabilities.

4.2.2 Boilermaker graduates' placement situation

Figure 9 demonstrates the number of respondents who are either employed, self-employed or unemployed.

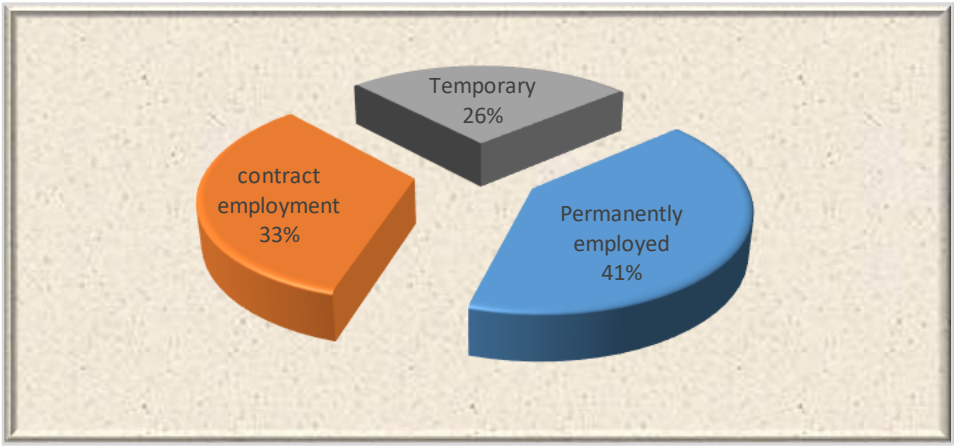
Figure 9: Employment status of boilermaker graduates



Student own source

Four (4) respondents reported that they are self-employed. Only nine (9) respondents mentioned that they are unemployed. The nine unemployed respondents provided numerous reasons for being unemployed. Five respondents out of nine mentioned that their contract with the previous employer expired. Two respondents stated that they are furthering their studies. Two respondents indicated that they have never been employed before due to illness. Twenty-seven (27) respondents indicated that they are currently employed. Figure 10 illustrates the type of employment for the twenty-seven employed respondents. Seven respondents (7) indicated that they are employed on a temporary basis. Nine respondents (9) indicated that they have contract employment. Eleven (11) respondents are permanently employed.

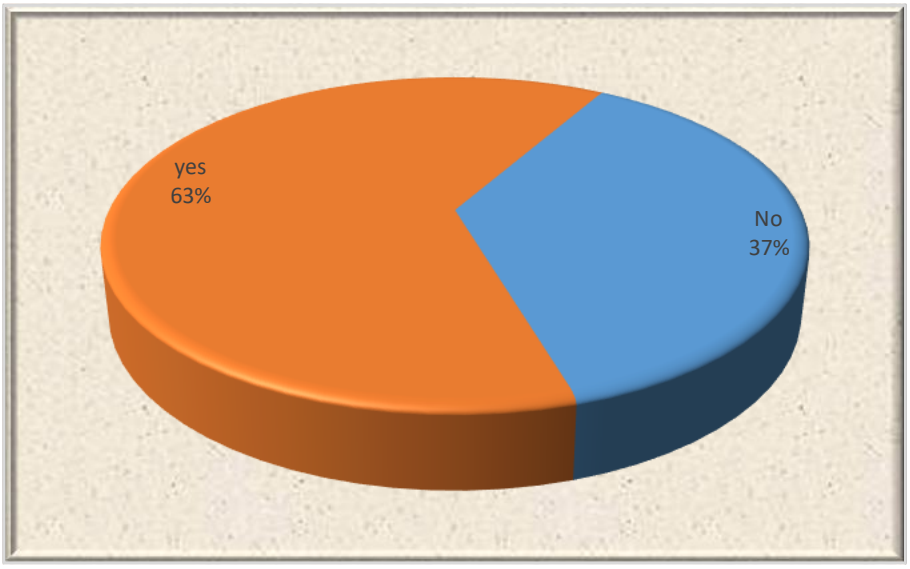
Figure 10: Employed on a permanent/ temporary/ contract employment



Student own Source

The respondents differentiated between contract and temporary employment by indicating that contract employment has a predefined starting and ending date. It must be noted that the literature differentiates between contract and temporal employment. The concept of temporal employment is better understood as a short-term solution to cover for a permanent staff member who is either on leave or sick. Temporal workers tend to enjoy high degree of flexibility and are paid through hourly rate (Fournier, 2019). Temporal workers do not enjoy the employment benefits of permanent or contract employees such as bonuses. Employers have an option to terminate temporal employment without warning. Contract employment on the other hand is set for a predetermined period of time through an employment contract (Fournier, 2019).

Figure 11: Employment related and relevant to the boilermaker qualification



S*tudent own source*

The ten (10) respondents whose employment is not related to the boilermaker qualification indicated that they are performing various jobs in the retail and police environments. Their inability to find boilermaker employment compelled them to seek other employment. Four (4) out of ten (10) of these respondents mentioned that they work as metropolitan police officers. Another four (4) out of ten (10) respondents mentioned that they work as merchandisers for a retail store. Two (2) out of ten (10) respondents mentioned that they received a municipal tender for waste management.

Figure 12: Boilermakers' qualification is the quality certificate favoured by potential employers.

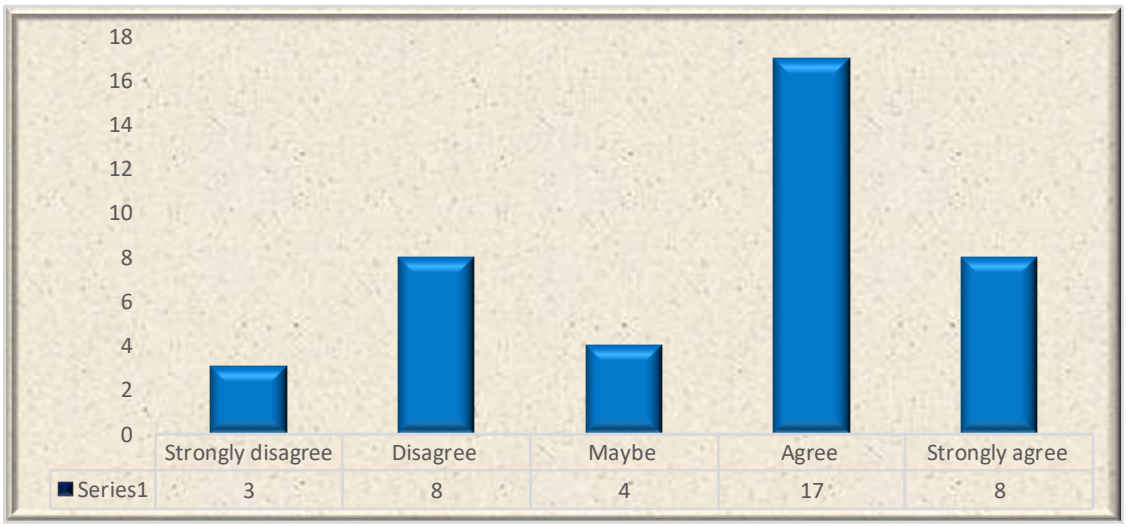


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Figure 12 shows that seventeen (17) respondents held the view that the boilermaker qualification is favoured by employers. As indicated in the introductory chapter, the

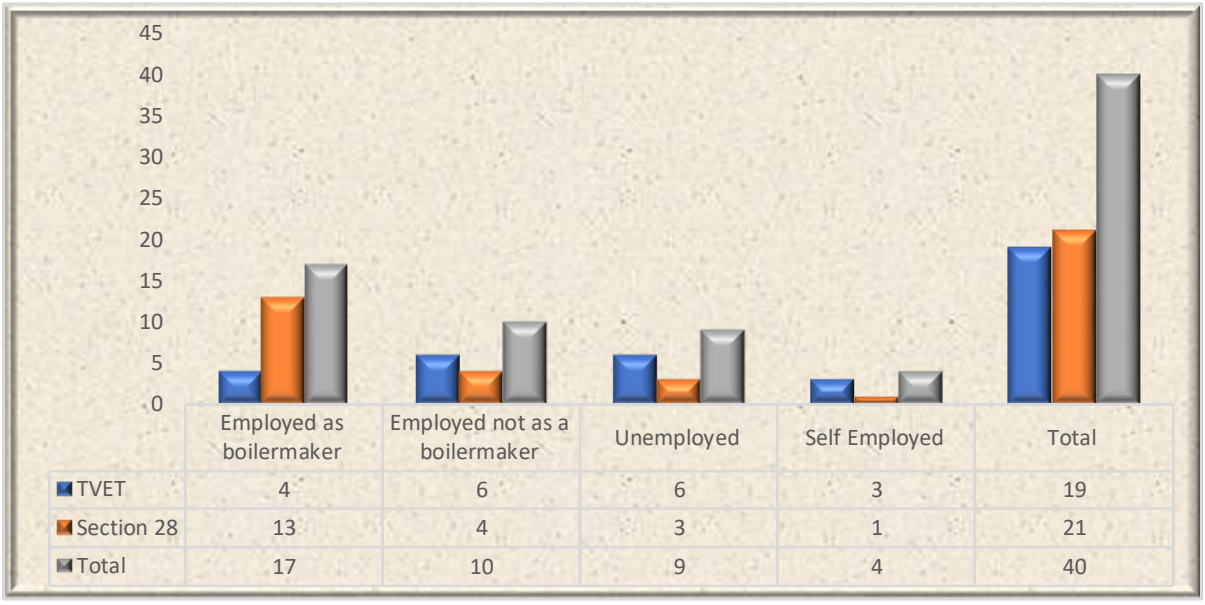
boilermaker qualification can be achieved through the Section 13 (mainly applicable to TVET college learners) and Section 28 (practical experience with no formal training) qualification routes.

These respondents stated that the boilermaker certificate acquired through TVET colleges equipped them with less employment experience as compared to section 28 graduates. The analysis of data revealed that section 28 artisan graduates viewed their boilermaker qualification as a mechanism that makes them more employable in the labour market. The former Minister of the Department of Higher Education and Training also acknowledged that the content taught at TVET colleges for artisan training is out of date (see section 1.3 of this report). It should be noted that section 28 artisan learners enjoyed the MQA learner support in the form of mentoring provided by supervisors in the workplace. All supervisors of section 28 artisan learners receive on-the-job mentoring and coaching activities. On the other hand, TVET college graduates displayed a low level of trust in terms of having acquired the necessary skills to be employable.

A small proportion of respondents (8) felt that the boilermaker qualification is not favoured by the employers. Respondents also cited the inadequacy of institutional support from the MQA. Eleven (11) out of forty (40) respondents mentioned that they struggle in terms of drawing up CV's, cover letters and preparing for interviews. The eleven respondents who claimed that the boilermaker qualification is not favoured by employers further mentioned that the boilermaker qualification does not include effective guidance on how to search for employment. After graduation, all 40 respondents in our study sample indicated that they were expected to find employment on their own.

Figure 13 shows that 17 respondents in the study sample were employed as boilermakers. Thirteen (13) out of the seventeen (17) respondents were classified as section 28 artisan graduates. Despite graduating as boilermakers, ten (10) respondents mentioned that they are not employed as boilermakers. Six out of these ten respondents who were not employed as boilermakers were classified as TVET graduates. In concluding that section 28 artisan graduates were more absorbed by the labour market, it must be noted that the study sample had more section 28 artisan graduates as compared to TVET artisan graduates.

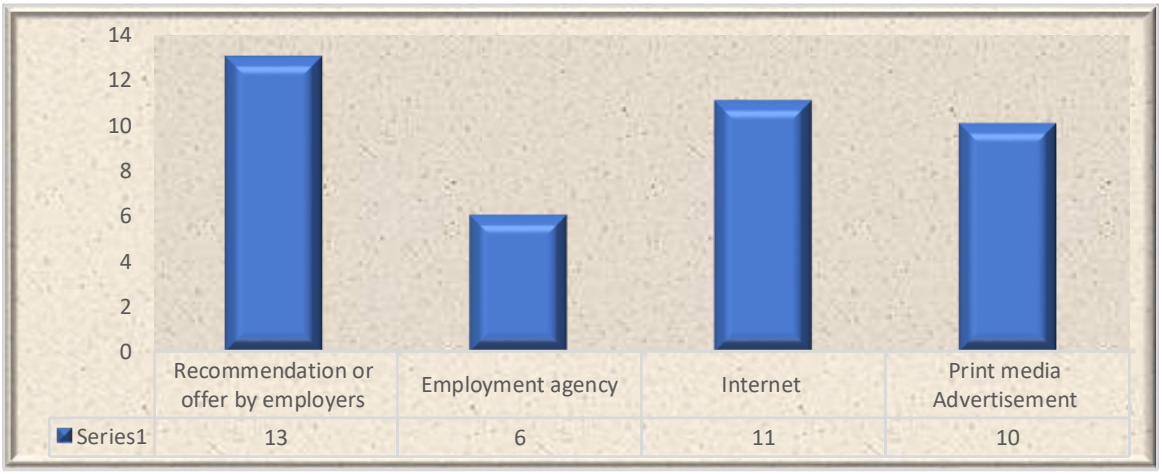
Figure 13: Section 28 vs TVET placement in the study sample



Student own source

Thirteen (13) respondents who were all section 28 artisan graduates cited that they obtained boilermaker employment through recommendations by supervisors (see figure 14). During the artisan learning programme, each learner is usually allocated a qualified artisan or technician for supervision purposes. These types of supervisors tend to play a significant role in helping mining companies to recruit boilermaker graduates. The interaction between supervisors and artisan learners is vital in terms of assisting the supervisors to formulate an informed opinion about the capabilities of artisan learners. Only eleven (11) respondents mentioned that they relied on the internet to search for employment. Only six (6) respondents mentioned employment agency as a source of information for employment opportunities.

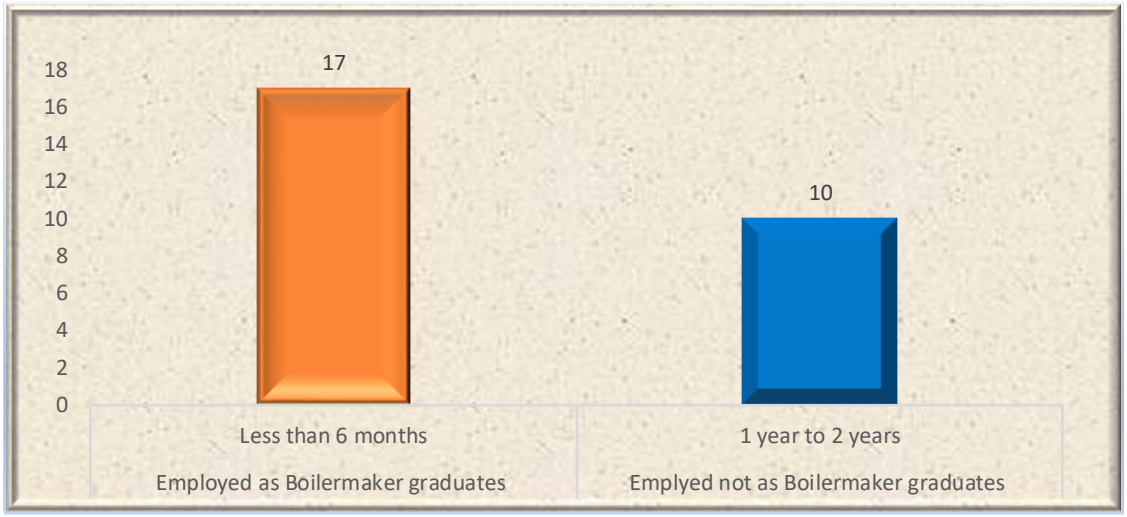
Figure 14: Type of methods used to search for employment



Student own source

Only ten (10) respondents mentioned that they relied on the print media advertisements to look for employment opportunities. Overall, recommendation or offer from the employer was the most popular means of employment search among the study sample.

Figure 15: The time it took to find employment after graduation



It took less than six months for 17 graduates to find employment as boilermakers. It also took one to two years for a further 10 boilermaker graduates to find employment not related to boilermaking.

4.3. Presentation and discussion of the employer representatives

This section presents the data that was collected from the employer representatives. The inclusion of employer representatives in the study emanated from the notion that they are well versed on the issues and dynamics associated with the placement or recruitment of boilermaker graduates in their respective organisations. The participants were asked a set of questions that had been designed to understand the labour market dynamics in relation to the employment of boilermaker graduates. This section begins with the demographic characteristics of the employer representatives in terms of occupation and years of experience.

4.3.1 Demographic characteristics of the respondents

Table 6 reflects the occupation demographics of the employer representatives. Most employer representatives who were interviewed had working experience ranging from 6 to 10 years in the recruitment of employees. Years of experience can be interpreted as an indicator of good organisational memory and experience. Employer representatives with a higher number of years were most useful because they gave rich and detailed information as compared to those

with a smaller number of years. Employer representatives consisted of technical specialists in boiler making and human resources personnel.

Table 6: Demographics of potential employer representatives

Occupation	Frequency
Technical Specialist	6
Human Resource Practitioner	10
Human Resource Specialist	1
Human Resource Leader	2
Human Resource Manager	1
Years of Experience	**Frequency**
1-5	7
6-10	10
11-15	2
16-20	1

Student own source

The employer representatives displayed in-depth knowledge of the labour market in relation to the boilermaker profession. Years of experience in the mining industry, particularly in the engineering sector equipped the employer representative respondents with relevant information necessary for the study.

Coding

Coding is defined as a process of reducing data without losing its meaning (Trochim, 2006). Manual coding was selected since the data were limited to only 20 respondents and the length of each transcribed interview document was five pages' maximum. The only challenge with manual coding is that it is time consuming and labour intensive. Coding was executed to clarify and analyse the connection between the data collected and the stated research questions. The coding process was applied using a specific linear approach borrowed from the scholar Trochim (2006). The first stage in our coding process involved the task of assigning labels to the research questions. These labels were later named anchor codes.

Research question	Label	Anchor code
What is the placement profile of the boilermaker graduates in the labour market?	Profile	Placement Profile
What possible factors might hinder the employment prospects of boilermaker graduates?	Hindrance	Employment hindrance

Research question	Label	Anchor code
What possible factors might enhance the employment prospects of boilermaker graduates?	Enhancers	Employment enhancers

Student own source

The second stage entailed the process of reading the transcribed documents and allocating a relevant code to related statements. Each new code was linked to the relevant anchor code (see table 7). The second stage was essential in terms of aligning each created code with the relevant research question.

Stage three of our coding process focussed on compiling the list of all initial codes. Stage four concentrated on grouping codes into their respective anchor codes. In stage five the researcher tallied the frequency for each code. Stage six was all about creating categories from the list of identified codes. In stage seven, the researcher examined categories to create themes. In stage eight, the researcher used the created themes to address the research questions.

Table 7: Coding process

Anchor code	Code	Categories	Theme
Placement profile	▪ Professionalism ▪ Technical competency ▪ Work ethics ▪ Honesty & trustworthiness ▪ Reliability ▪ Life-long technological learning	Graduates attributes	Graduate attributes
Employment hindrance	▪ Section 28 vs TVET qualification	Qualification types	Nature of qualification
	▪ Inability to work in a team environment ▪ Lack of communication skills	Interpersonal skills	
Employment enhancers	▪ Elimination of unfair discrimination ▪ Promotion of diversity ▪ Implementation of affirmation action ▪ Involvement of organised labour ▪ Section 28 vs TVET qualification	Government policy and legislation	Government policy and legislation

Student own source, 2019

The employer representatives revealed the key hiring components that defined their recruitment processes. Most employer representatives displayed a preference for section 28 artisans. Under section 28, learners are admitted to the artisan learnership programme based on recognition of prior learning. Artisan learners under section 28 are required to possess six years of experience in the engineering environment assisting qualified artisans or technicians. They can further be accepted as artisan learners only if they hold the N2 theory qualification and have five years' experience.

Section 28 boilermaker graduates are perceived to have more practical experience as compared to TVET boilermaker graduates hence the preference of employers to employ these graduates. The employer representatives mentioned that mentoring for section 28 boilermaker graduates is not necessary since they hold organizational memory and a wealth of experience. The employer representatives viewed the section 28 route to becoming artisans as more technically empowering as compared to the TVET route. Learners under section 28 are supervised by qualified engineering experts (e.g. artisans and technicians). Employer representatives also mentioned that section 28 learners are exposed to modern and technologically advanced equipment required by the industry. The employer representatives also indicated other key factors that influence the recruitment of boilermaker graduates which are grouped under the theme – graduate attributes (see table 7).

- **Theme one: Graduate attributes**

Fourteen (14) respondents highlighted the importance of personal attributes in hiring employees. It was suggested that the employer measures the graduate's competence not only based on theoretical foundation, but on the variety of personal attributes necessary to perform the job. The fourteen (14) respondents emphasised a variety of preferred personality traits expected from the boilermaker graduates included in table 8 below. The employer representatives argued that the personality traits mentioned in table 8 are not necessarily acquired during theoretical training but rather through the social environment. Table 8 summarises the personal traits mentioned by the respondents:

Table 8: Composition of graduate attributes theme

Categories		Frequency	Theme
1	Technical competency	14	Graduate attributes
2	Reliability	12	
3	Life-long technological learning	14	
4	Professionalism	12	
5	Good work ethics	13	
6	Honesty & trustworthiness	12	
7	Ability to perform within a team	14	

Student own source

The fourteen (14) respondents also argued that the ability to perform within a team appears to be of the upmost importance since organisational structures and the nature of jobs are becoming more complex. The respondents further mentioned that the success of boilermaker employees is largely based on team work. One respondent raised concern about graduates' emphasis on individual technical abilities as opposed to teamwork: "*Most boilermaker graduates do not see team work as an essential attribute in performing their job. They are more concerned about demonstrating their technical knowledge whenever they are interviewed by a technician or senior engineer.*"

Another personality attribute that was highlighted by twelve (12) respondents was reliability. It was mentioned that it is essential for the boilermaker graduates to respond to work assignments and requests in a cooperative manner. The respondents further stated that boilermaker graduates are expected to demonstrate a good work attendance record and must be trusted to meet deadlines. One respondent emphasises the importance of the reliability attribute in the following manner; *"It is important for boilermaker graduates to understand the consequences of being absent at work - it destroys your reputation."*

Effective communication was also stated as a crucial personality trait expected from the boilermaker graduates. Twelve (12) out of twenty (20) respondents emphasised the importance of communication as a mechanism to transmit values and beliefs that shape organizational culture. The respondents argued that the ability to communicate effectively can translate to effective employees. It was mentioned that regular communication builds trust amongst team members. Boilermakers do not always perform their functions surrounded by the people who have the same technical expertise hence the need to develop good communication skills as emphasised in the following words by a respondent: *"boilermaker recruits should take it upon themselves to establish good relations with their colleagues through effective communication."*

Good work ethics was also stated as a key graduate attribute required by the employers. Fourteen (14) out of 20 employer representatives argued that all boilermakers who execute their work responsibilities in a professional manner tend to enhance the integrity of their companies. A good work ethic is believed to strengthen respect and the appreciation of boilermakers involved in any activity. Employer representatives concurred that all boilermakers should be guided by values such as respect, integrity and competence in their work environment. Employer representatives further stated that it was essential for boilermakers not to be involved in any form of relationship that might compromise their good work ethics and which could consequently lead to fraud or corruption. One employer representative clearly said that *"theoretical foundation and work experience must be accompanied by good work ethics for any employee to flourish. No referrals may be placed on an unethical character."*

Life-long technological advancement was also cited as a vital element to consider in the recruitment of boilermaker graduates. Thirteen (13) out of 20 employer representatives held the view that the world of work is not static. Technology associated with boilermaker activities is rapidly changing. Respondents therefore argued that it is essential for boilermakers to invest their energy in career growth by familiarising themselves with new technologies in their environment. Employers mentioned the influence of the fourth industrial revolution as the cause for emphasising continuous learning and adoption of new technologies. One employer stated that *"no training institution can equip a learner with a lifetime technical knowledge. Existing knowledge can be out of date due to new discoveries."*

The narrative generated under theme one provides valuable information which largely relates to the secondary research question - *'what are the factors that enhance the employment prospects of boilermaker graduates?* The employer representatives mentioned various graduate attributes under theme one that enhances the placement likelihood of boilermaker graduates in the labour market. The discussion of theme one is therefore directly linked to the secondary research question stated above.

- **Theme two: Government policy and legislation**

Seventy-five percent (75%) of the employer representatives mentioned the intervention of government in the labour market through legislation and policies as one of the fundamental factors affecting the placement of boilermaker graduates. The South African labour market is still characterised by the imbalances of the past. Various polices were legislated by the South

African government to address the imbalances of the past and provide equal opportunities for every citizen. The boilermaker profession is also subjected to the political restructuring designed to empower previously disadvantaged groups such as females, youth, disabled and Black people.

Table 9: Composition of government policy and legislation theme

Categories	Frequency	Theme
Elimination of unfair discrimination	15	Government policy and legislation
Promotion of diversity	14	
Implementation of affirmation action	15	
Involvement of organised labour	12	

Student own source

Fifteen (15) employer representatives stated the elimination of unfair discrimination in the workplace as the key requirement of the Department of Labour. The employer representatives mentioned that the Employment Equity Act of 1998 dictates that all employers in South Africa are required to put mechanisms in place to prevent unfair discrimination. This implies that the recruitment and selection processes for boilermaker graduates must be subjected to the regulations of the Employment Equity Act. The employer representatives further stated that they are required by law to introduce affirmative action measures to remove barriers to employment access. One employer representative mentioned that *"existing laws requires us to favour women, people with disability and people of African origin in recruitment and selection processes no matter what, otherwise we might be in trouble for non-compliance."* The employer representatives' understanding of the Employment Equity Act of 1998 was also reflected in respondents' responses. The literature review stated that the Employment Equity Act of 1998 had the following key aims:

- to implement affirmative action measures to redress the disadvantages in employment experienced by designated groups in order to ensure their equitable representation in all occupational categories and levels in the workforce.

- to promote equal opportunity and fair treatment in employment through the elimination of unfair discrimination.

Employer representatives mentioned that the Sector Skills Plan for the mining and minerals sector highlight employment equity as the key driver for change in the skills development of the mining sector. The respondents indicated that to alleviate the results of discrimination, those who were affected need to be given special opportunities in terms of education and training. The twelve (12) employer representatives suggested that empowering the victims of

discrimination can rectify results of discrimination. The adoption of affirmative action measures was alleged to help government to ensure the reversal of large-scale inequalities in all occupational categories. Therefore, the placement of boilermaker graduates occurs within the context of affirmative action and the desire by the state to reverse the legacy of inequality as it manifests itself in the workplace.

Twelve (12) employer representatives argued that the involvement of organised labour in recruitment and selection of employees affects the placement of boilermaker graduates. It was stated here that the Labour Relations Act of 1995 allows or permits employees to form or join trade unions. Trade unions in turn ensure that all employers apply fair labour practises and comply with the laws of the country. The twelve (12) employer representatives concurred that organised labour is always invited to play the role of an independent observer. One employer representative stated that *"to ignore trade unions is like digging your own grave. It's better to work with them than to work against them."* Trade unions are invited to participate in the interview process to ensure and promote transparency in recruitment and selection of boilermaker candidates.

Fourteen (14) employer representatives also identified diversity as another key requirement affecting the placement of boilermaker graduates. Under the literature review, the concept of diversity is defined as a process of recognising, understanding and accepting individual difference irrespective of physical ability, race, age, gender, ethnicity and sexual orientation and spiritual practices (Grobler, 2002). The concept of diversity is classified in terms of primary and secondary dimensions. The primary level of diversity denotes differences that are inherent and cannot be altered such as gender, race, age, physical abilities, sexual orientation and ethnicity. The secondary level of diversity includes features that can change or be adapted such as religion, marital status, geographical situation, income, educational background, and work experience (Van der Waldt and Du Toit, 1997).

The employer representatives mentioned that the Employment Equity Act of 1998 requires organizations and companies to value equity and diversity by acknowledging the diverse backgrounds, perspectives and experiences of employees. It was stated by a respondent that *"the company cannot be allowed to discriminate candidates in terms of religion, culture or sex orientation nowadays."* The respondents mentioned that the key requirement for their organisations is to change the composition of the labour force by encouraging diverse work teams. The respondents further claimed that within the context of diversity and equity, women are encouraged to enter the artisan field. The literature review in this report states that gender

inequality in artisan employment persists to be a challenge as men continue to outnumber females in artisan employment. One employer representative further mentioned that *"our recruitment initiative also encourages gays and lesbians to apply for learnership programmes."* This comment from the respondent emphasises the importance of acknowledging people with diverse sexual orientation in the workplace.

The discussion provided under theme two of this research report is linked to the following research question – *What are the factors that enhance the employment prospects of boilermaker graduates?* In terms of race, the legislative environment characterised by the affirmative action tends to favour both the recruitment and placement of Blacks, Coloured and Indian people (previously disadvantaged groups) in the labour market. The study sample had more black individuals as compared to other races for both recruitment and placement of boilermakers in the labour market. However, for the white individuals, affirmation action may be treated as hindrance to employment opportunities. It is therefore wise to conclude that theme two highlights the enabling factors for the recruitment and placement of previously disadvantaged boilermaker graduates in the labour market.

- **Theme three: Nature of qualification**

Seventeen (17) employer representatives emphasised the importance of the nature of the qualification for boilermakers. Employer representatives favoured section 28 boilermaker graduates over the TVET college qualification due to its strength in terms of exposing learners to practical knowledge. Section 28 acknowledges recognition of prior learning for artisan learners. These types of learners have a wealth of technical knowledge and they normally work as an artisan's assistant. To qualify for a trade test, such individuals are required to acquire the N2 certificate and recognition of prior learning letters from their respective employers. Employer representatives argued that section 28 graduates have organizational memory, understanding of internal processes and a wealth of experience. TVET college graduates on the other hand are not exposed enough to practical knowledge and are disconnected from the industry with no or less organisational memory. One of the respondents mentioned that they spend more time in college and in training centres where the focus is for them to practice and pass the trade test.

Table 10: Composition of nature of qualification theme

Categories	Frequency	Theme
Section 28	17	Nature of qualification
TVET college	3	

Student own source

Table 8 shows that most employer representatives favoured section 28 boilermaker graduates over TVET college graduates. Although qualified, TVET college graduates do not have first-hand experience in the boilermaker profession. The discussion under this theme can be connected to both secondary research questions. Most employer representatives disclosed that they prefer section 28 boilermaker graduates over TVET boilermaker graduates. Section 28 qualification can therefore be treated as an enabling factor for securing boilermaker employment. It is vital to note as well that the preference for graduates with a Section 28 qualification is a disadvantage to TVET boilermaker graduates.

4.4. Conclusion

This chapter presented a discussion of the findings that emanated from the responses of 40 boilermaker graduates and 20 employer representatives. The findings provided meaningful information about the placement of boilermaker graduates in the labour market. This chapter uncovered that most employers in the study sample preferred section 28 learners over TVET graduates. The chapter further uncovered that 42.5% (which translates to 17) boilermaker graduates of the cohort of 2014 – 2016 were employed as boilermakers, and it took them less than six months to find employment. This percentage (42.5%) was significantly high and indicates a promising employment trend for boilermaker graduates. Most boilermaker graduates who are employed as boilermakers mainly stated that their supervisor's recommendation played an important role in helping them to secure employment.

Other boilermaker graduates who were either unemployed or not employed as boilermakers blamed the institutions such as TVET colleges for not helping in terms of drafting CV's and searching for boilermaker jobs. Employer representatives mentioned that the key specific attributes that are necessary for the boilermaker graduates in the labour market are reliability, life-long technological learning, professionalism and good work ethics. Based on the study sample, more males were recruited to the boilermaker training as compared to women. Most learners in the study sample were classified as youth (see page 37). Chapter five (5) will recap

the key findings generated within the context of literature review and the research questions of the study that were discussed in chapter one of this report.

CHAPTER 5: CONCLUSION AND RECOMMENDATION

5.1. Introduction

The study was conceptualised to track the placement of boilermaker graduates in the labour market. To respond to the scarcity of boilermaker skills in the mining industry as stated by the Occupations in High Demand (OIHD) of 2018, the study opted to track the transition of boilermaker graduates to the labour market. The research further intended to uncover factors that had the potential to hinder or enhance the employment prospects of the boilermaker graduates in the labour market. This tracer study provided useful findings about the placement of boilermaker graduates (cohort 2014 – 2016) in the labour market. The findings of the study were generated from the perspectives of potential employers, boilermaker graduates and the literature review. The objective of this chapter is to summarise and further analyse the discussion of the findings reflected in chapter four in relation to the literature review. Section 5.1.1 recounts the literature review, particularly the key relevant theories in order to position the research findings accordingly. Sections 5.1.2. and 5.1.3. respectively summarise answers related to both primary and secondary research questions. Section 5.2. concludes by discussing the implications of the findings by addressing the objective of the research study.

5.1.1 Integrating the literature review and data analysis

Among the principle conclusions drawn from the literature review was the finding that the shifting nature of the labour market in Africa which is triggered by the Fourth Industrial Revolution may be associated with the intense use of digital technologies (World Economic Forum, 2016). This type of thinking in the labour market requires employees who are flexible. The knowledge driven economy which is inspired by the 4th industrial revolution has changed the employment landscape in the South African labour market. Employers emphasise continuous learning and an ability to embrace and learn new technological skills. The literature review in this research report further emphasised various drivers of change which shape the labour market. Advances in artificial intelligence and machine learning are altering the nature of work in all professions. Employer representatives in this report alluded to the notion that since they are continuously upgrading their machines in line with technological advancement, it is essential to recruit boilermaker graduates who are prepared for life-long technological learning. This implies that boilermaker graduates should be able to adapt to a forever changing work environment. In terms of the literature survey discussed in chapter 3 of this report, labour

markets are not static anymore. As emphasised by Brynlofsson and McAfee (2014), the advent of the Fourth Industrial Revolution supported by technological advances has triggered various changes in the workplace. In line with this claim from the literature, the employer representatives argued that it is essential to absorb boilermaker graduates who are willing to invest in lifelong technological learning.

The data discussion presented in this report clearly points out that section 28 artisanship is more preferred by employers within the context of boiler-making. Such preference can be ascribed to the basic principles that define human capital theory. Human capital theory is built on the premise that both education and training provide graduates with abilities and marketable skills relevant to the job performance (Chiswick and Miller, 2003). Section 28 boilermaker graduates as the preferred choice of employers, enjoy intensive practical experience as training as stated above. Human capital theory in this research was also viewed within the context of the 4th industrial revolution. Training institutions or tertiary institutions might be playing 'catch up game' to the technological advances thus producing less equipped graduates. TVET institutions do not enjoy the financial ability to acquire the latest technological advancements (Statistics South Africa, 2016). In contrast to the learning institutions that do not enjoy the financial ability to acquire the latest technological advancement, industries have the financial muscle to procure the latest technological advancement. Therefore, section 28 artisan learners tend to be better equipped in terms of training as compared to TVET boilermaker graduates.

Theme two under the qualitative data highlighted the importance of government policy and legislation. By law, all employers are required to seriously consider the issue of equity. The findings from the graduate survey showed that females are less represented in the boilermaker profession (see figure 6). Male Africans are currently dominating the boilermaker profession in the study sample. It was also interesting to observe that many of the respondents fell between the age category of 23 to 32. In terms of the Employment Services Act and National Development Plan of the country, young people seeking work should be prioritised. The findings indicate that skills development initiatives by the MQA therefore conform to the expectations of the Employment Services Act, National Development Plan and Employment Equity Act.

Graduate attributes were also identified as a feature that influences the placement of boilermaker graduates. The identification of graduate attributes corresponds with the narrative provided under literature review. It was stated under literature review of this report that employers tend to expect that graduates to possess the attributes such as interactive and

personal skills; knowledge and intellectual; and workplace skills and applied knowledge. This view, indicated by a large number of employer representatives, corresponds with the view of some graduates that there is inadequate institutional support to effectively develop the preferred attributes. In addition to qualification, employers prefer specific attributes from graduates such as an ability to work in a team, effective communication skills and good work ethics.

In terms of job market signalling theory, potential employers are expected to make employee hiring decisions in conditions of uncertainty. This theory assumes that people who are seeking employment normally send signals about their capability level to the potential employers based on educational credentials. Within the context of our research study, most TVET boilermaker graduates in the study sample attempted to find employment with limited success. Their capabilities were less favoured. Employers tend to have their own expectations about potential candidates and these expectations are then used to measure the ability of a job seeker and his or readiness to enter the place of work (Wiers-Jenssen, 2008). Employers in our study sample preferred Section 28 boilermaker graduates due to their educational credentials and particularly their practical experience. Section 28 boilermaker graduates tend to have organizational memory and are familiar with industry machinery hence their preference.

5.1.2 **Answering the primary research question:** What is the placement profile of the boilermaker graduates in the labour market?

The analysis of quantitative data from the graduate survey played a significant role to assist the researcher to answer the primary research question and subsequently deal with the primary research objective which was to track the placement of boilermaker graduates in the labour market. Most respondents are employed and the majority of these (17) are employed as boilermakers. It took less than six months for all 17 individuals to find boilermaker employment. This finding corresponds with the Swiss research study that was reflected on in the literature review of this report. The Swiss research report indicated that 1183 individuals (artisans) interviewed (73%) mentioned that they were employed by a company whereas 6% indicated that they were self-employed (Binaben, 2017). The current study also shows the positive absorption rate for artisans in the boilermaker profession.

The cohort of 2014 to 2016 learners consisted mainly of black male individuals who are section 28 artisan graduates. The graduate survey data also revealed the under-representation of females in both the skills development programme and the recruitment and placement of boilermaker graduates. The under representation of females may be viewed as a deviation from

the task of rectifying gender inequalities noting that the Labour Force Survey (quarter 3 of 2019) mentioned Black African women as the most vulnerable population group with an unemployment rate of over 30%. Most respondents fell in the age category of 18-32 and can be classified as youth according to the National Youth Policy of 2015 which defines youth as any person between the ages of 14 to 35. Noting that unemployment in South Africa is concentrated among the youth (Statistics South Africa, 2019), it is encouraging that the youth made up the highest number of respondents in the study sample (Figure 7) and by implication many respondents falling in this category were able to secure employment. The Labour Force Survey (quarter 3 of 2019) states that nearly 3,3 million out of 10,3 million young people aged 15-24 years were not in employment, education or training in quarter 3 of 2019 as compared to quarter 3 of 2018.

The mismatch theory discussed in the literature review section of this report can be linked to the 10 respondents who indicated that their current employment was not related to the boilermaker qualification. One type of skills mismatch identified by the literature is vertical mismatch which occurs as either under-education/training or as over-education/training. In our study sample, employer representatives indicated that they prefer section 28 artisan graduates due to their exposure to the field of work. TVET artisan graduates were portrayed as less experienced in the field of work as compared to section 28 artisan graduates. This implies that TVET artisan graduates received under training as compared to section 28 artisan graduates. It was claimed that section 28 artisan graduates enjoyed exposure to technologically advanced machinery. Within the context of mismatch theory, TVET artisan graduates were affected by the vertical mismatch.

5.1.3 **Answering the secondary research questions:** What are the factors that hinder or enhance the employment prospects of boilermaker graduates?

The findings from both the graduate survey and the employer perspectives were useful to assist the researcher to deal with the secondary research questions. Employer representatives and boilermaker graduates highlighted key issues that hinder or enhance the employment prospects of boilermaker graduates. The employer representatives cited amongst others graduate attributes as one of the features that have the potential of enhancing or hindering the employment prospects of boilermaker graduates. The attributes that enhance employment prospects are include technical competency, reliability, and inclination to engage in life-long technological learning.

The findings of the study pointed out the nature of the qualification as one of the key factors that has the potential to hinder or enhance the employment prospects of TVET boilermaker graduates. This observation is rooted in the notion that TVET boilermaker graduates lack exposure to the technologically advanced machinery and therefore the TVET qualification is considered by many of the study respondents as a factor hindering employment prospects. On the other hand, section 28 boilermaker graduates enjoy easy access to technological advanced machinery since their practical learning takes place in mining companies. The employer representatives also mentioned that they prefer employing Section 28 boilermaker artisans as compared to TVET boilermaker artisan graduates due to their exposure to the engineering industry. Thus, the likelihood of getting a job is better for section 28 boilermaker artisans.

In addition, government policy and legislation in the form of affirmative action was illustrated as one of the key features in enhancing the employment prospects of black boilermaker graduates. Affirmative action policies and practices prioritise the skills development opportunities and employment placement of black boilermaker graduates in order to address the imbalances of the past. The qualitative data from the employer representatives was therefore useful to provide insight about the possible factors that have the potential to hinder or enhance the employment prospects of boilermaker graduates.

5.2. Concluding remarks

This tracer study was designed to track the placement of boilermaker graduates in South Africa. This study generated information that could help employers and the MQA to develop interventions that are aimed at producing graduates that are suitable for the labour market. The study revealed that the placement profile of boilermaker graduates (cohort of 2014 to 2016) was mainly dominated by black male individuals. This finding was not a surprise since the recruitment of boilermaker artisan learners in 2014 was skewed in favour of black people due to affirmative action requirements. Various legislative acts related to affirmative action were cited as the mechanism used by mining companies to re-address the imbalances of the past (e.g. apartheid). Overall, the study revealed a positive trend in terms of the absorption rate of boilermaker graduates in the labour market although it is a concern that females remain under-represented in the training and employment of boilermaker graduates. The ensuing section (5.3.) will attempt to recommend possible solutions based on the findings.

5.3. Recommendations

The findings of this research point to key lessons learnt in understanding the transition of boilermaker graduates from the learning environment to the labour market. Although the transition of boilermaker graduates to the labour market includes various complications as outlined in chapter four (4) of this report, this study revealed a positive trend with most of the respondents having secured employment and of those who secured employment, the majority were employed as boilermakers.

Recommendations that are rooted in the major findings regarding the factors that might hinder or enhance placement of boilermaker graduates are indicated below:

- The tendency of employers preferring section 28 graduates over TVET graduates is a worrying factor. The Department of Higher Education and Training (DHET) should correct this unwarranted trend by improving the exposure to practical experience at TVET colleges. The DHET should further ensure that boilermaker training equipment is of similar standard in comparison to the equipment used in the industry itself.

- The Mining Qualifications Authority should initiate or create a forum that consists of employer representatives, training institutions and government. This forum will afford the employer representatives with an opportunity to familiarise training institutions with technological advancement in their environment and possible factors that might hinder or enhance employment prospects. The forum should exist to encourage exchange of information between employer representatives and training institutions.

- The Mining Qualifications Authority should initiate quotas for the inclusion of females in the boilermaker profession. The Mining Qualifications Authority should instruct all its subsidiaries to prioritise female inclusion in the boilermaker profession. Employers on the other hand should also prioritise the employment of female boilermaker graduates in line with the Employment Equity Act.

5.4. Suggestions for future research

The findings of this study have indicated key lessons learnt about the placement of boilermaker graduates in the labour market. To enhance our understanding on how boilermaker artisan

graduates move from the learning institutions to the labour market, future research studies should focus on the following issues:

- determine whether the training or tertiary institutions offer relevant training that is required by the labour market for artisans.

- examine the effects of the 4th industrial revolution on both boilermakers' training and employment prospects.

- expand the scope of research to other trade categories such as electricity and mill wright as determined by the list of occupations in high demand in South Africa.

- examine whether government legislation such as the employment equity act or affirmative action has yielded the intended results in all trade categories as determined by the list of occupations in high demand in South Africa.

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APPENDICES

APPENDIX A: QUESTIONNAIRE FOR BOILER-MAKER GRADUATES

Title of the study

DEMOGRAPHIC PROFILE OF THE LEARNER

Read out the following to the interviewee

1. Gender: Male ☐ Female ☐

2. Age ☐

3. Race

   Please tick an appropriate answer with an X

African	
Coloured	
Asian	
White	

PLACEMENT SITUATION

1. What is your present employment status?

Employed	
Unemployed	
Contract employment	

2. If employed, please specify

Employed in the country	
Employed in a foreign country	
Self-employed	

3. Please explain if you are employed on a permanent/ temporary/ contract employment?

Permanent	
Temporary	
Contract employment	

4. Is your employment related and relevant to the qualification you obtained after completing the Artisan development learning programme?

Yes ☐ No ☐

5. If unemployed, please specify

Never been employed before	
Resigned	
Laid off	
Separated from previous employment	
Pursuing further studies	
Other:	

6. In your opinion, do you think your boiler-makers' qualification is the quality certificate favoured by potential employers?

Strongly disagree	
Disagree	
Maybe	
Agree	
Strongly agree	

7. (If currently employed) How long did it take you to land your first job after graduating from the artisan development learnership programme?

Less than 6 months	
6 months to 1 year	
1 year to 2 years	
More than 2 years	

8. How do you search for employment?

Newspapers	
Internet	
Notice boards	
Other:	

☺ **Thank you very much for taking the time to answer the questionnaire** ☺

APPENDIX B: INTERVIEW SCHEDULE FOR THE POTENTIAL EMPLOYERS

Title of the study

DEMOGRAPHIC PROFILE OF THE EMPLOYER REPRESENTATIVE
Read out the following to the interviewee

1. Company name

2. Occupation

INTERVIEW QUESTIONS TO THE REPRESENTATIVE OF THE EMPLOYER

3. In your experience, how do you recruit graduates? What are the major criteria used by you, as an employer, to recruit boiler-makers graduates?

_____

_____

_____

4. In your opinion, does the boiler-maker training program help learners to acquire relevant skills required by the employer?

No ☐ Yes ☐

5. If your answer is no in question 4 above, please justify your answer

_____

_____

_____

_____

6. If your answer is yes in question 4, please justify your answer

_____

_____

_____

_____

_____

7. How would you suggest that the boiler-maker training program be improved to meet the employer's expectations?

_____

_____

_____

_____

8. Is there any policy (e.g. Affirmative action, employment laws) that supports or challenges you to recruit boiler-makers graduates?

_____

_____

_____

9. Do you have any additional comments and suggestions about graduate's employment and labour market?

_____

_____

_____

APPENDIX C: PARTICIPANT INFORMATION SHEET

WITS SCHOOL OF GOVERNANCE
UNIVERSITY OF THE WITWATERSRAND, JOHANNESBURG

Dear Sir/Madam

My name is Ms Dolly Hlophe and I am a master's student in Monitoring and Evaluation at Wits University in Johannesburg. As part of my studies, I have to undertake a research project that seeks to track the effectiveness of the artisan development learnership program in equipping MQA graduates with the necessary skills to successfully acquire employment. The aim of this research project is to understand the placement of boilermaker graduates in the labour market.

As part of this project I would like to invite you to take part in an interview. This activity will take around 30 minutes. With your permission, I would also like to record the interview using a digital voice recorder device.

You will not receive any direct benefits from participating in this study, and there are no disadvantages or penalties for not participating. You may withdraw at any time or not answer any question if you do not want to. The interview will be completely confidential and anonymous as I will not be asking for your name or any identifying information, and the information you give to me will be held securely and not disclosed to anyone else. I will be using a pseudonym (false name) to represent your participation, in my final research report. If you experience any distress or discomfort, we will stop the interview or resume another time. If you need some support or counselling services following the interview, these are available free of charge.

If you have any questions afterwards about this research, feel free to contact me on the details listed below. This study will be written up as a research report which will be available online through the university library website. If you wish to receive a summary of this report, I will be happy to send it to you upon request. If you have any queries, concerns or complaints regarding the ethical procedures of this study, you are welcome to contact the University Human Research Ethics Committee (non-medical), telephone + 27(0)11 717 1408, email Shaun.Schoeman@wits.ac.za

Yours sincerely,
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Email: dhlophe@gmail.com

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