Sector Skills Plan for the Mining and Minerals Sector Submitted by the Mining Qualifications Authority (MQA) to the Department of Higher Education and Training

Update 2021-22

FINAL SUBMISSION

31 AUGUST 2020

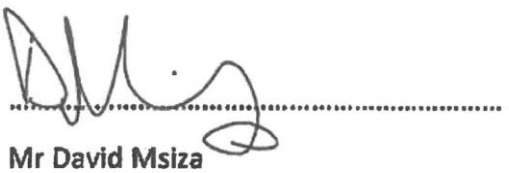
MINING QUALIFICATIONS AUTHORITY

FOREWORD

The Mining Qualifications Authority (MQA) prides itself in ensuring that the Mining and Mineral Sector (MMS) remains at the cutting edge of skills development. In keeping up with this progression, the MQA Board submits to the Department of Higher Education and Training (DHET) the 2020/21 annual update of the 5 year Sector Skills Plan (SSP) for the MMS for the period 2020-2025.

The SSP has been prepared in such a way that its responds to the National Skills Development Plan 2030 and policies for driving the skills transformation agenda, aligned to the expectations of the DHET. This SSP has been presented and endorsed by the Skills Research and Planning Committee and the MQA Board. The improvement of the skills of the MMS workforce is imperative for the economic development of our sector, improvement of our health and safety records and for the growth and wellbeing of all employees.

The main purpose of this SSP is to determine sectoral skills development priorities through an analysis of the skills demand and supply, the influence of key change drivers and legislative tools. This is done with the aim of developing strategies that will inform interventions addressing skills development in the MMS taking into account competencies that are fit for purpose, industry specific and aligned to broader national development priorities. The SSP is informed by a rigorous research process entailing a mixed methods of research design, using both quantitative and qualitative research paradigms. The usage of a mixed methods research design is aimed at ensuring credible research findings that are realisable, specific and generalizable, leading to manageable recommendations that will address skills development in the sector.



Mr David Msiza

Chairperson: MQA Board

31 August 2020

Date

STAKEHOLDER ENDORSEMENT

This is the Sector Skills Plan Annual Update prepared by the Mining Qualifications Authority (MQA) for the Mining and Minerals Sector (2020-25). It is submitted to the Minister of Higher Education and Training in partial compliance with the requirements of the Skills Development Act of 1998 as amended. Sector Skills Plan update is hereby endorsed by duly authorized representatives of the state, employer organisations and organised labour in this national economic sector.

Endorsed by	For	Title	Signature	Date
Mr David Msiza	State: Department of Mineral Resources Trevenna Campus, Building 2 C, Cnr Meintjes and Schoeman Street Sunnyside Pretoria. Private Bag X59 Arcadia 0007	MQA Board: Chairperson Chief Inspector of Mines- DMRE	Type text here	31/08/2020
Mr Amon Teteme	Organised Labour: National Union of Mineworkers (NUM) 7 Rissik Street Johannesburg. P O Box 2424 Johannesburg 2000	MQA Board: Convener – Organised Labour		28/08/2020
Mr Mustak Ally	Employers: Minerals Council South Africa 5 Hollard Street Marshalltown P O Box 61809 Marshalltown 2107	MQA Board: Convener – Employers	M.A. ALLY	28/08/2020
Mr Bethuel Nemagovhani	MQA: 7 Anerley Road Parktown Johannesburg Private Bag X118 Marshalltown, 2017	Acting Chief Executive Officer of the MQA		28/08/20

ACRONYMS

Acronym	Description	Acronym	Description
AET	Adult Education Training	MMP	Mandela Mining Precinct
AgriSETA	Agriculture Sector Education Training Authority	MMS	Mining and Minerals Sector
AI	Artificial Intelligence	MoAs	Memorandum of Agreements
AIDS	Acquired Immune Deficiency Syndrome	MPRDA	Minerals and Petroleum Resources Development Act
APP	Annual Performance Plan	MYPD	Multi Year price determination
APR	Annual Performance Report	M&E	Monitoring & Evaluation
ATR	Annual Training Report	NCV	National Certificate Vocational
BEE	Black Economic Empowerment	NDP	National Development Plan
Bn	Billion	NEMA	National Environmental Management Act
BRICS	Brazil, Russia, India, China, South Africa	NERSA	National Energy Regular of South Africa
CAGR	Compound Annual Growth Rate	NGP	New Growth Path
CET	Community Education And Training	NQF	National Qualifications Framework
CGS	Council for Geoscience	NSDP	National Skills Development Plan
CLAS	Cement, Lime, Aggregates and Sand	NW	North West
CoCs	Certificates of Competency	NYP	National Youth Policy
CSIR	Council for Scientific & Industrial Research	OFO	Organising Framework for Occupations
DBE	Department of Basic Education	PESTEL	Political, Economic, Social, Technological, Environmental and Legal
DHET	Department of Higher Education and Training	PGMs	Platinum Group Metals
DMRE	Department of Mineral Resources and Energy	PIVOTAL	Professional, Vocational, Technical and Academic Learning
DoL	Department of Labour	QCTO	Quality Council for Trades and Occupations
DSBD	Department of Small Business Development	RCA	Regulatory Clearing Account
DST	Department of Science and Technology	RPL	Recognition of Prior Learning
DTI	Department of Trade and Industry	R & D	Research & Development
EMIS	Education Management Information System	SADC	Southern African Development Community
EU	European Union	SAMDA	South African Mining Development
FET	Further Education and Training	SAQA	South African Qualifications Authority
FS	Free State	SATCAP	Successful Application of Technology Centred Around People
GCC	Government Certificate of Competency	SDA	Skills Development Act

Acronym	Description	Acronym	Description
GCIS	Government Communication Information System	SETA	Sector Education and Training Authority
GDP	Gross Domestic Product	SETMIS	Sector Education and Training Management Information System
GP	Gauteng Province	SIC	Standard Industrial Classification
HDI	Historically Disadvantaged Individual	SITM	Services Incidental to Mining
HDP	Historically Disadvantaged Persons	SLA	Service Level Agreement
HDSA	Historically Disadvantaged South African	SLP	Social and Labour Plan
HEMIS	Higher Education Management Information System	SMME	Small, Medium and Micro-sized Enterprises
HET	Higher Education and Training	SSP	Sector Skills Plan
HIV	Human Immunodeficiency Virus	Stats SA	Statistics South Africa
HRD	Human Resource Development	STEM	Science Technology Engineering & Maths
IDP	Integrated Development Plan	TVET	Technical and Vocational Education and Training
IPAP	Industrial Policy Action Plan	UNISA	University of South Africa
IRM	Industrial Raw Materials	UoT	University of Technology
KPIs	Key Performance Indictors	WBL	Work Based Learning
MCSA	Mineral Council South Africa	WSP	Workplace Skills Plan
MDP	Management Development Programme	WC	Western Cape
MerSETA	Manufacturing, Engineering and Related Services Sector Education and Training Authority	WP-PSET	White Paper - Post School Education and Training
MHSA	Mine Health and Safety Act	WSP	Workplace Skills Plan
MHSC	Mine Health and Safety Council	YEA	Youth Employment Accord

Departmental Name Changes	
DMR	Department of Mineral Resources and Energy (DMRE)
DTI	Department of Trade, Industry and Competition (DTIC)
DEA	Department of Environment, Forestry and Fisheries (DEFF)

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EXECUTIVE SUMMARY

1. Introduction and Background

The Sector Education and Training Authority (SETA) for the Mining and Minerals Sector (MMS); the Mining Qualifications Authority (MQA) prepared this 5 year Sector Skills Plan in accordance with the Department of Higher Education and Training (DHET). The main purpose of this SSP is to inform and support skills development initiatives in the sector.

2. Research methodology

A concurrent mixed methods research design, encompassing secondary and primary data were used to develop this SSP. Secondary research involved literature and document review. The data sources included information from the MQA such as the APR and SP, external reports from various institutions such as the DMRE, DHET, DBE, and Minerals Council South Africa (MCSA), e-publications, newspaper articles and press releases. On the other hand, primary research consisted of all studies that the MQA has conducted. One of these studies is the SSP in which data is collected and analysed from April of every year. The SSP focused on the nine subsectors within the MMS to gather both primary and secondary data.

Whilst developing the SSP, a few limitations were encountered. The MQA appointed a new service provider to provide a WSP-ATR system which opened on the 9th May 2020 contrary to previous year's achievements where the WSP-ATR system opened in January. Due to the COVID - 19 breakout and national lockdown, the DHET extended the WSP-ATR submission period to 31 July 2020. This decision provided more time for employers to complete their WSP-ATR submissions. The MQA received 737 WSP-ATRs during the 2020 submission period. Data received in this cycle of submission could not be used for the SSP update due to various concerns that comprised data credibility, such as unavailability of complete datasets from the system provider. The MQA is embarking on legal action to ensure service delivery from the appointed service provider. It is on these basis that the MQA has opted to not use the 2020 WSP-ATRs submission for analysis as this will provide an incorrect picture of labour force, skills priority and pivotal list for the sector. For the purpose of this submission, the 2019 WSP-ATRs have been used.

The above should be taken into consideration when analysing the updated data for the 2019 year. Where possible the 2020 data has been reflected, in all other instances the 2019 data should be taken as the latest available information.

Below are the key findings of the research.

3. Sector Profile

The MMS employs about 3% of 16.2 million employees in the country whose annual earnings is R116.7 billion (DMR, 2016). It is important to note that; Mining companies are inescapably influenced by global developments, with macro-economic growth and international markets strongly influencing both the demand and supply for resources as well as profitability (Lane, et al., 2015).

A five year analysis of the sector reveals a decline in the number of employees from a peak of 525 248 in 2015 to 498551 in 2019, except for 2016 -2017, where the sector recorded a 5.9% increase. As a result, on average over this period there has also been a decrease in the reported number of employees by occupational categories, with the most significant

comprising Professional and Manager Occupations with a -2.9% and -3.3% concurrently. The MMS remains a male dominated sector employing 84% of males. It is important to note that the average growth rate of females employed within the sector over the 5 year period is 2.6%

4. Key Skills Change Drivers

As seen in previous Sector Skills Plans produced by the MQA, Technological transformations spearheaded the key skills change drivers within the sector, however in 2020 the unprecedented global pandemic of COVID - 19 as declared by the World Health Organisation has posed a significant change driver for skills within the MMS.

The COVID - 19 pandemic is one of the key change drivers and has led to numerous sectoral disruptions in 2020. In addition, mining companies are influenced by global developments as they influence the demand and supply for resources and profitability. With the anticipated job losses emanating from the COVID - 19 pandemic, community unrests will be inevitable as the scourge of unemployment will increase. Uncertainty about the length and depth of the crisis are stimulating risks and volatility of financial markets, accompanied by job losses, a decrease in investments as well as production and sales.

Technological transformations can influence the sector's ability to become as safe, healthy, efficient and sustainable as possible. The MMS presents a unique opportunity for a new industrialisation drive and advancement in the economy as a whole. This however, can only be achieved if the sector fully embraces technology and address energy and water issues that are affecting mining operations.

The sector should also incorporate interdisciplinary training that will allow students to develop skills and knowledge in a range of subjects in order to produce a flexible workforce that can adjust to changing skills demands within and outside MMS.

5. Occupational Shortages and Skills Gaps

Analysis of 31 May 2019 MQA WSP-ATR submissions revealed the following hard-to-fill occupations:

Mine Manager	Production Manager	Engineering Manager	Mechanical engineer (Mines)	Mining Engineer
Occupational Hygienist	Mine Overseer (Production)	Diesel Mechanic	Fitter and Turner	Auto Electrician

Further to the above it is important to note the sector identified skills gaps as these also influence the skills demand for the sector.

6. Sector Partnerships

The MQA concluded Memorandum of Agreements (MoAs) with a number of companies for the purpose of placing lecturers for workplace experience. In addition to this, tripartite contract agreements were signed between the MQA, lecturers as well as TVET Colleges. This partnership adds value to the MMS by bridging the gap between education and the workplace. In total the MQA has existing partnership agreements with 26 TVET and 7 CET colleges across all the nine provinces of South Africa.

In its strategic objective to partner with public and private institutions, the MQA has partnered with three institutions for the purpose of conducting research that will improve skills development planning and decision-making within the MMS.

The outbreak of the COVID 19 pandemic ushered a new era, a 'new normal', and a dispensation that requires partnerships that will explore new methods of training delivery in sector.

7. Monitoring and Evaluation

The MQA has developed a Monitoring and Evaluation framework which is used to provide assurance by tracking all the projects that are implemented in line with the SETA's mandate. M&E is an integral part of the MQA's value chain and its contribution towards, amongst others, organisational strategy, planning, monitoring, impact assessment and evaluation, and risk management enables the organisation to track the impact on skills development in the sector.

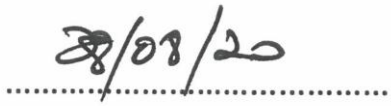
Information yielded by M&E activities should inform research and organisational planning going forward. There is an insufficient pool of learners to recruit from in the supply pipeline and the MQA should develop a comprehensive strategy on how to ensure that there is a sufficient pool for recruiting across programmes.

8. Skills Priority Actions

As a result of the findings in this SSP, the following skills priorities are recommended:

- Priority 1: Facilitate transformation and SMME development of the sector through skills development
- Priority 2: Continue to support interventions to improve mine health and safety through skills development
- Priority 3: Continue to monitor and provide support to interventions responding to technological changes through skills development
- Priority 4: Monitor and support interventions aimed at developing the skills required for minerals beneficiation
- Priority 5: Focus on increasing support to core mining skills and the hard-to-fill occupations in terms of skills development in the MMS
- Priority 6: Develop skills for environmental sustainability
- Priority 7: Support National Strategies and Plans through skills development

From the above recommendations, priority should also be placed in assisting the MMS to address skills development needs that emerged as a result of COVID - 19.



Mr Bethuel Nemagovhani

Chief Executive Officer: Acting Date

RESEARCH METHODOLOGY

I. Introduction

SETAs are expected to facilitate the delivery of sector-specific skills interventions that assist to achieve the outcomes of the National Skills Development Plan (NSDP). It is therefore, a core mandate for the SETAs to develop an annual Sector Skills Plan (SSP) to inform adequate skills planning. In light of this, the MQA aims to support this objective by providing empirical insights through the SSP on the mining and minerals sector's (MMS) skills development priorities. The SSP outlines the MMS' scope of coverage, its key role-players, economic performance, employer profile and labour market profile, key skills issues, occupational shortages and skills gaps, existing and planned partnerships, the SETA's monitoring and evaluation and lastly, the strategic skills priority actions.

The purpose of this section is to provide details regarding the research process and methods that informed the development of this SSP. The research was guided by the 2020 DHET updated SSP framework and guidelines.

II. Research Process and Methods

A concurrent mixed methods research design, encompassing secondary and primary data were used to develop this SSP. Secondary research involved literature and document review. The data sources included information from the MQA such as the APR and SP, external reports from various institutions such as the DMRE, DHET, DBE, and Minerals Council South Africa (MCSA), e-publications, newspaper articles and press releases. On the other hand, primary research consisted of studies that the MQA has conducted. One of these studies is the SSP in which data is collected and analysed from April of every year.

Literature and document review, alongside the analysis of the WSP-ATR data and key informant interviews were used to finalise the SSP. The WSP-ATR data used was weighted to make it more representative of the MMS. In addition, a total of 20 key informant interviews were conducted. These provided insights on the economic performance and future outlook of the sector as well as the change drivers. Key informants also played a critical role in providing input and validation of the hard-to-fill vacancies, skills gaps and priority skills actions.

Whilst compiling the SSP, the research was not insusceptible to research limitations. The MQA appointed a new service provider to provide a WSP-ATR system which opened on the 9th May 2020 contrary to previous year's achievements were the WSP-ATR submissions opened in January. This provided employers with less than a month to complete their submissions. Due to the COVID - 19 breakout and national lockdown; the DHET extended the WSP-ATR submission period to 31 July 2020, this meant that final WSP-ATR data became available in August as to earlier. The MQA received 737 WSP-ATRs during the 2020 submission period. Data received in this cycle of submission could not be used for this year's SSP update due various concerns that comprised data credibility, such as incomplete data received from the new service provider. It is on these basis that the MQA has opted to use the 2019 WSP-ATRs submission for analysis as this will provide a complete picture of labour force, skills priority and pivotal skills list for the sector.

Report writing entailed the incorporation of evidence supported by the analysis of literature and documents reviewed, quantitative and qualitative data from studies that were previously conducted by the MQA. The report is presented by different chapters as guided by SSP framework and covers all the 9 subsectors of the MMS. The MQA's Board sub-committee (Skills Planning and Research Committee) which comprises representatives from Employers, Labour and the State were involved in the entire research process and provided input, guidance and oversight throughout the SSP development.

All primary research projects, including the SSP that informed some of the findings of the SSP are discussed in Table 1 below

Table 1: Primary research conducted by the MQA

Project name	Purpose & Objectives	Research Design	Sample Size	Data sources
Sector Skills Plan 2020-2025	The main purpose of the SSP is to determine sectoral skills development priorities of the MMS, with the objective to: • Determine funding priorities via the levy grant system; • Support regional and employer plans; • Inform allocation of resources to develop qualifications and learning programmes;	Mixed methods in the form of: Literature and document review	n/a	• DMRE employer statistics, public labour report, report on fatalities and injuries, GCC report, HEMIS & Occupations in high Demand, DBE's (EMIS), MCSA facts & figures, StatsSA QLF & QMR. • Other sources from the internet, relevant books, e-publications & press releases.
		Quantitative (WSP/ATR data)	498 551 (N)[1]	

[1] Population size as per 2019/20 WSP-ATR data

Project name	Purpose & Objectives	Research Design	Sample Size	Data sources
	• Establish occupation-specific skills priorities for the sector; • Inform education and training institutions of demand needs in the labour market; • Enable individuals to make informed career choices; • Monitor skills development provision in the sector.	Qualitative (key informant interviews)	9 MMS subsectors, 11 National government and state owned enterprises that are Key Role Players within the MMS	• Empirical research using the MQA's Levy payer database.
2019 Workplace Skills Plan (WSP) – Annual Training Report (ATR) Analysis	• The objective of this project was to develop a profile of the MMS in terms of the geographic location, size, and composition of organisations that submitted WSP/ATRs to the MQA for the 2019/20 financial year. • The report profiled the MMS' workforce, hard-to-fill vacancies as well as the training priorities identified in the WSP/ATR submissions in 2019/20.	Quantitative	453311 (N)	WSP/ATR data
Employment and training trends analysis report covering the period 2010-2019	• The study aimed to update the 10 year WSP-ATR trends analysis. • This is done to provide an updated analysis of trends in the MMS in terms of the sector's composition, geographic location and size of companies. • This also encompasses the trends of training interventions planned and achieved for WSPs/ATRs submitted in the financial years 2010 - 2019.	Quantitative	453311 (N)	WSP/ATR data

Project name	Purpose & Objectives	Research Design	Sample Size	Data sources
Women in Mining: Understanding factors that influence access and mobility in and within occupational structures in the MMS	• The study intended to provide the MQA with a better understanding of factors inhibiting the movement of women into the top echelons of authority within the MMS.	Mixed methods in the form of: Literature Review	n/a	Relevant internet, books, e-publications, journal articles, newspaper articles, press releases and conference proceedings
		Quantitative (Surveys)	312	Empirical research using the MQA's Levy payer database & snowballing from the MQA's tripartite representatives.
		Qualitative (in-depth interviews)	29	
Understanding the occupational health and safety matters in the MMS	• The study aimed at investigating health and safety matters in the MMS and methods of attaining a "Zero Harm" goal.	Mixed methods in the form of: Literature Review	n/a	Local and international peer-reviewed articles, policy documents, annual reports and various other relevant documents were reviewed.
		Qualitative (in-depth interviews and focus group discussions)	Two focus groups, 34 participants from 20 companies across eight sectors (excluding SITM)	Empirical research using the MQA's Levy payer database & snowballing from the MQA's tripartite representatives.

The usage of both quantitative and qualitative research in the above mentioned studies enabled the researchers to acquire extensive and an in-depth understanding of the MMS, while offsetting the weaknesses inherent of using each approach exclusively. Through the triangulation of data, findings are intended to ensure that conclusions meet the methodological and procedural requirements of reliability and thus, ensuring that the same conclusions can be made by using the same methods (validity).

Chapter 1 : Sector Profile

1.1. Introduction

This chapter provides an overview of the MMS in South Africa. It details the MMS' scope of coverage, its key role-players, economic performance, employer profile and labour market profile. These factors depict the dynamism and emerging trends of the sector and contributes to the understanding of the MMS' economic and employment contribution in the country and globally. Ultimately, these elements provide guidance for skills development.

1.2. Scope of Coverage

The MMS is categorised into the following 9 subsectors which will be analysed throughout the SSP and a breakdown of their relevant Standard Industrial Classification (SIC) codes are indicated in the table below:

Table 1-1: Scope of coverage

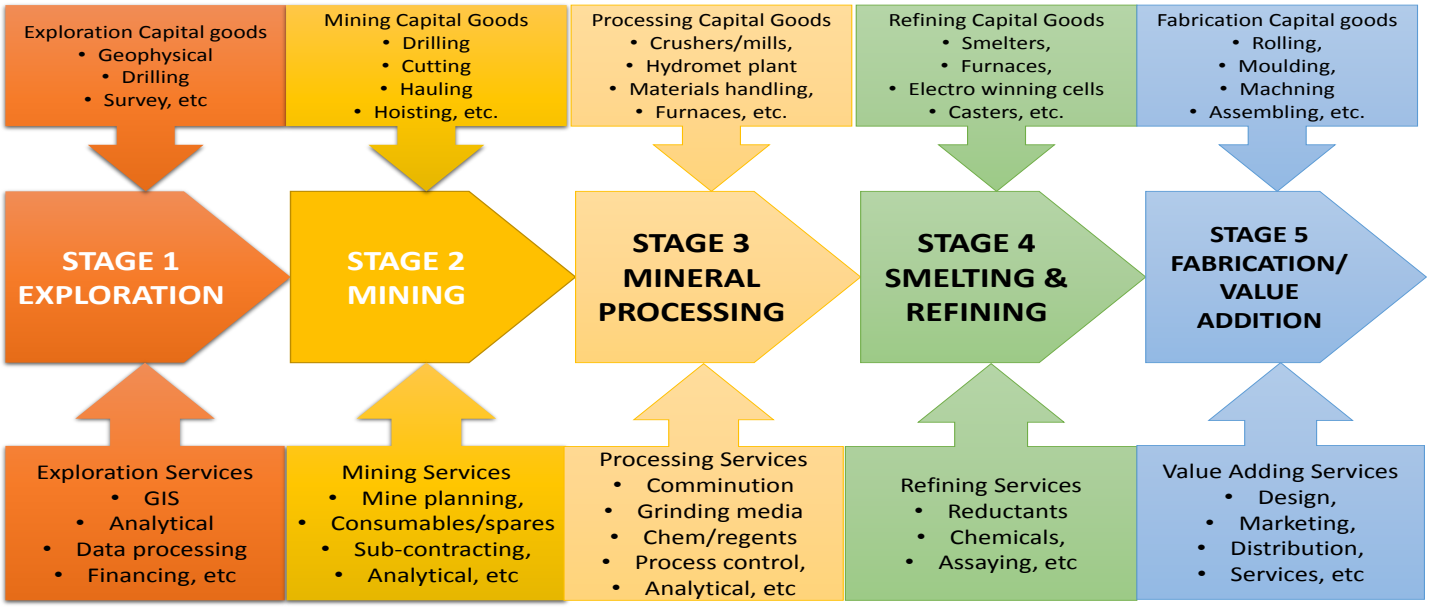
Subsector	SIC Codes
Coal Mining	21000, 22100
Gold Mining	23000, 23001, 23002, 23003
Platinum Group Metals (PGM)	24240
Diamond Mining	25200, 25201, 25202
Other Mining*	24000, 24100, 24200, 24210, 24220, 24230, 24290, 25000, 25102, 25103, 25300, 25310, 25311, 25319, 25320, 25390, 25391, 25392, 25399
Cement, Lime, Aggregates and Sand (CLAS)	34240, 25100, 25110, 25101, 25120, 25190
Services Incidental to Mining	92004, 87000, 29000, 85291
Diamond Processing	39212, 39219
Jewellery Manufacturing	39210, 39211, 37601

* Other Mining includes the mining of iron ore, chrome, manganese, copper, phosphates and salt.

Included in the scope of coverage is the value chain of the MMS as depicted in figure 1-1 below. A value chain is a set of activities that companies operating in a specific industry perform in order to deliver a valuable product or service for the market. The value chain in presented from the exploration of primary activities to the minerals value addition as well as the support activities in each stage of the value chain.

The majority of the companies in Stage 2 are involved in primary production, while Stages 3-5 depict secondary production, with increasing degrees of processing, beneficiation and value addition. This implies that there are green skills that can be prioritised across the values within all stages of the life cycle of mining in all subsectors within the MMS (MQA, 2018). The MQA prioritises green skills within the sector through its skills development funding mechanisms.

Figure 1-1: MMS Value Chain



Source: MQA, 2016

1.3. Key Role Players

The National Skills Development Plan 2030 encourages partnerships and collaboration across the skills development system to facilitate linkages and efforts to sufficiently address skills issues in the sector. While there are many role players within the MMS, the list provided is not exhaustive, but identifies a broader portrayal of the nature and type of role players that impact skills development in the sector. Since the outbreak of COVID - 19, there are several changes which are likely to affect the sector and its role players in the year 2020 and beyond. It should be noted that each key role player's contribution depends on their specific role context or mandate to influence the achievement of the NSDP outcomes and the broader national socio-economic imperatives.

This section provides the roles of each MMS' key role player, their functions in relation to the MMS, relevant NSDP outcomes and possible changes likely to be brought by the COVID - 19 pandemic.

1.3.1 National Government Departments

Table 1-2 below illustrates the government departments that are interlinked with the MMS and play a crucial role towards achieving skills development and national outcomes as well as possible changes likely to be brought by the COVID - 19 pandemic.

Table 1-2: National government departments key role players

Department	Role	Function in relation to the MMS and skills development	Relevant NSDP Outcome/s	Possible changes likely to be brought by the COVID - 19 pandemic
Department of Mineral Resources and Energy (DMRE)	• To implement legislation (MPDRA) by developing policies and strategies that drive transformation by redressing historical, socio-economic inequalities within the MMS.	• To drive strategies such as the 2018 Mining Charter which highlights factors that promote transformation. The Charter is a key driver to skills development and stipulates that mining right holders must invest a minimum of 5% leviable amount on essential skills development activities including the support for SA based academic institutions and research initiatives.	• Improve skills levels in the South African workforce, focussing on skills matters in relation to targets set by the Mining Charter.	• There will be a need to review policies (labour law policies) and adjust employment conditions or provisions (BCEA, LRA, SDA) in line with the new developments brought about by the pandemic. For example, working from home or the notion of "virtual office workers" is no longer a pipe dream but a reality that needs to be integrated into the laws, policies and the transformation discourse. • The DMRE will be required to prioritise the health and safety of employees, suppliers,

				contractors and other relevant personnel.
Department of Higher Education and Training (DHET)	• Implement legislation by developing and implementing policies and strategies to transform post school education by achieving the outcomes outlined in the NSDP.	• Conduct research and implement relevant initiatives to address skills priorities within the MMS. • Provides support to the MQA to fulfil its skills development mandate through research capacity building, development of SSP framework, (as well as CIP, OFO codes) and also the provision of relevant information for skills planning (SETMIS, HEMIS, integration of sectoral and national data). • Develops and implements appropriate legislation and policies for a sustained quality and accessible post-school education and training system.	• Improves the skills levels of the South African workforce by identifying occupations in high demand. • Increase production of occupations in high demand by developing appropriate curriculum or learning interventions. • Support the growth of the public college institutional systems by providing more funding to scale up provision of TVET and CET programmes. • Link education and the workplace.	• DHET will be implementing a risk adjusted strategy for the entire PSET sector based on the national COVID - 19 protocols, and will direct and manage the way institutions carry out their academic mandates at all times within this strategic and policy framework.

1.3.2 State Owned Enterprises

The table below specifies state-owned entities, their role as well function (advocacy, promotion and other industry development initiatives) appropriate for addressing skills development within the MMS envisaged in the NSDP as well as the possible changes likely to be brought by the COVID - 19 pandemic.

Table 1-3: State owned enterprise key role players

State-Owned Enterprises	Role	Function in relation to MMS and Skills Development	Relevant NSDP outcome/s	Possible changes likely to be brought by the COVID - 19 pandemic
Mine Health and Safety Council (MHSC)	• Promotes the transformation of occupational health and safety in the MMS in efforts to attain zero harm of mine workers and mine communities.	• Promotes the culture of health and safety in the workplace through awareness, research and training interventions (occupational health and safety programmes) to reduce injuries, occupational diseases and fatalities.	• Improves the levels of skills with regard to health and safety training • Supporting skills development programmes aimed at occupational, health and safety in the MMS.	• MMS being a sector that relies on people working in teams to foster mining of commodities, this requires people to work in close proximity to each other. There will be a need to review legislation that governs the occupational health and safety requirements within the sector and adjust employment conditions in line with the new developments brought about by the pandemic. • A need to increase occupational health and safety training interventions with a focus on COVID - 19 may be required.

Council for Geoscience (CGS)	• Governs the onshore and offshore geology of South Africa.	• Undertakes research to guide methods of developing modern technology to facilitate minerals and energy development- especially those regarding complicated mineralisation, groundwater controls and natural hazards. • Through its mine project, identify and promote the development of skills related remediation or rehabilitation.	• Identify and increase the production of skills in high demand through the support growth of the public college institutional types as a key provider required for socio-economic development and also recommend learning programmes falling within its scope of work.	• Research focused on developing methods to facilitate minerals and energy developments within the sector with the aim to minimise the spread of COVID - 19.
Council for Scientific and Industrial Research (CSIR)	• Fosters global and national partnerships in narrow reef, hard rock mining equipment systems through R&D and the development of competitive local manufacturing capabilities.	• Improves the technological base of the mining sector by achieving health and safety as well productivity outcomes through integrating the critical component of skills development required for mining-related technologies and the application of the 4IR. • Advocates for local purchasing of mining equipment to create more employment.	• Increase the level of skills in the South African workforce. • Identify and increase production of occupations in high demand. • Skills development support for entrepreneurship and cooperative development. • Support career development initiatives.	• Foster research partnerships that aid solutions on working within the sector amidst the COVID - 19 pandemic.
Mining Qualifications Authority (MQA)	• Support sector skills transformation through various interventions.	• Assist in the transformation of the MMS through skills development.	• Facilitate access to industrial exposure through workplace experience programmes. • Provide funding through bursaries, learnerships, internships to increase the level of skills in the South African workforce	• The 4 month skills levy holiday (this is discussed in detail in Chapter 2) for all MMS companies will significantly reduce the MQA levy income to the tune of about R400 Million. The MQA will have to review and scale down its

			• Conduct research to identify occupation that are on high demand	annual funding on skills development initiatives within the MMS. Prioritisation of skills initiatives will have to be done fastidiously. • Targets for certain interventions may require amendments. • WSP-ATR submissions will decline due to the inability to hold meetings. The process of the WSP-ATR submission requires companies to engage with their labour representatives/Unions with the aim of agreeing and signing-off the WSP-ATR. This is not possible during the lockdown period as most mines are unable to hold virtual meetings with labour representatives due to lack of technological tools. • There will be a need to conduct research on the impact that COVID - 19 has had in the sector and its impact on skills development.

1.3.3 Industry Key Role Players

Table 1.4 below shows the role, functions and outcomes that industry key role players can achieve in addressing skills development within the MMS as well as possible changes likely to be brought by the COVID - 19 pandemic.

Industry Stakeholder	Role	Specific Function in relation to Skills Development	Relevant NSDP Outcome/s	Possible changes likely to be brought by the COVID - 19 pandemic
Minerals Council South Africa (MCSA)	• Promotes interests of organisations in the MMS by forming partnerships with key stakeholders and advising them on legislative, policy and operative environment conducive for investment, growth and sustainability.	• The Minerals Council specialises in soliciting and consolidating stakeholder views, and lobbying, advocating and influencing these views to realize a skills development solution that is in the interests of all stakeholders. • Promote skills development initiatives in mining organisations and conduct research regarding skills development within the MMS. • Plays an active role in engaging and lobbying for skills development in various structures such as the MQA, Quality Council for Trades & Occupations (QCTO), Human Resource Development Council (HRDC), National Skills Authority (NSA), Umalusi and SAQA.	• Increase level of skills in the workforce by engaging in training interventions to enhance the skills profile of the labour force. • Identify and increase occupations in high demand through the offering of certificate programmes focussing in mine surveying, mine sampling, strata control, rock mechanics etc. • Link education and the workplace by engaging with the sector in order to facilitate the establishment of workplace experience opportunities.	• The MCSA will play a critical role in the maintenance and updating of COVID - 19 information portal. The industry's approach to reporting on incidents of COVID - 19 is aligned to the requirements of the DoH in the first instance, while keeping the DMRE, MHSC and organised labour informed at all times. • The Council developed an intensifying implementation plan since the early period of the virus. The plan entails the following: ✓ Employee education and health promotion; ✓ Health worker readiness; ✓ Ensuring access to consumables (masks, sanitizers, testing kits) and hardware (such as temperature monitors); ✓ Proactive influenza vaccination, which the industry undertakes and promotes every year; ✓ Understanding the potential impact on employees who may be immuno-compromised; ✓ Case definition and management of suspected cases or contacts of cases; ✓ Isolation of employees should the need arise;

				✓ Travel advice; ✓ Reporting and communication in the industry in the event of a case. • The Council has also played an advocacy role by recommending several measures to support the mining industry during this period, including improved licencing requirements for exploration; access to environmental trust funds; redirecting Social and Labour Plan (SLP) funds to help communities; several proposals to Treasury on possible tax relief; and a moratorium on contributions to skills development levies, amongst others.
Organised Labour	• Advances the rights of employees in the labour market and in society as a whole.	• Promotes the interests of workers including making inputs into WSP/ATRs.	• Increase the level of skills development in the South African workforce by advocating for skills development offerings and submission of WSP/ATRs.	• Bearing in mind the potential of restructuring, retrenchments and layoffs, organised labour will engage employees on possible innovative strategies of mitigating the effects of this pandemic on labour to stem the tide of retrenchment. • Organised labour will have to earnestly engage in advocacy and lobby efforts to ensure the integration of: ✓ Hygiene matters into the OHS education, training and awareness interventions. ✓ Skills development as mandatory issue for worker training and development.

Table 1-4: Industry key role players

1.4. Economic Performance

This section provides an overview of the economic performance and contribution of the MMS to the country as a whole.

1.4.1 Overview of the MMS

South Africa ranks among the top ten countries with respect to production of manganese ore, chrome, ferrochrome, iron ore, gold, platinum, piped medical gases, coal, nickel (DMRE, 2018). The country accounts 94% of known global reserves of the platinum group metals (PGMs), 73.7% of chrome, 29% of manganese, 18.4% of vanadium and 10.5% of gold reserves (DMRE, 2019).

The South African MMS remains one of the largest net exporters of minerals and metals (R348.2 billion or a third of export earnings in 2019) and is a significant contributor to the economy with a GDP contribution of 8.1%, with fixed direct investment of R94.7 billion in 2019 (Minerals Council, 2020, MQA, 2019). Although the sector has had positive contributions to the South African economy and population, the MMS has not been immune to challenges. Local cost pressures, labour actions, and continuing downswing in commodity prices have also resulted in shrinking margins and impairment provisions (DMRE, 2019).

1.4.2 Overview of the MMS subsectors

1.4.2.1 PGM Mining

PGM includes; platinum, palladium, rhodium, ruthenium, iridium and osmium mining commodities. South Africa's reserves constitute 87% of the global reserve base and the country contributes around 58.7% to global production. According to the MCSA (2020), palladium prices rose above that of platinum in 2019 and traded on average, US$679/oz higher than platinum. However, this dropped during the lockdown by more than 40% (Steyn, 2020). Rhodium prices increased 76.1% in US$, while the rand price increased 91.9%. During 2019, platinum prices continued to be suppressed, decreasing 1.8% in US$ terms, however, the weaker rand assisted in lifting the realised rand price for South African producers. There are estimations that production in the sector contracted by 2.9% (ibid).

The PGM subsector's constraints also includes unreliable power supply, alongside steep and unpredictable increase in electricity prices, steep increases in input costs from labour and disruption to operations as a result of community protests (MCSA, 2020). The potential solutions to alleviate these challenges according the Mineral Council include promoting investment demands for platinum, increasing investment in stimulating global demand for platinum jewellery, the adoption and accelerated implementation of the platinum-based hydrogen economy as well as improving vehicle emission standards in Brazil, Russia, India, China and South Africa (BRICS) economies (ibid).

1.4.2.2 Gold Mining

Globally, gold remains one of the most sought-after metals used for jewellery and many industrial applications. However, from 2008 and 2018, the industry has been experiencing a decline in terms of production, sales and employment. In 2019, gold production was impacted by a five-month strike at one of the major gold producers over wage increases. In addition, carbon tax was introduced in June 2019. This will greatly impact the gold subsector with estimates that in 2020, the subsector will pay R15 million (directly and indirectly) as part of its carbon tax obligation. This is likely to increase to R1.6 billion with indirect impacts costing for over R1.5 billion in 2030 (MCSA, 2020).

The gold subsector is also affected by illegal mining, crime, theft of precious metals and security at the mines – seven tonnes of gold is lost annually as a result, rapidly increasing input costs, which in turn threaten the sustainability of the subsector, electricity, steel and wage costs have also risen much faster than producer inflation, alongside ongoing legislative and tax cost increases (e.g. municipalities taking over water and electricity supply at a much greater cost to the industry), community protests as well as inter-union rivalry, lack of union recognition of the dire economic and financial position of some mines/shafts) (MCSA, 2020). Other challenges include limited investments due to challenging policy, regulatory, operating environment and a constrained pipeline because of minimal exploration (MCSA, 2018). Limited investments is also attributed to the gradual rate of implementing innovation and technology recorded between 1992 and 2016.

Potential solutions include among others, unlocking potential through R&D, the introduction of modern techniques (technological applications in rock drilling), introducing specialised police mining units and recruiting suitable expertise to tackle crime, stabilising the unsustainable rise in administered prices which represent 50% of intermediary costs for mines and are completely out of mining companies' control and stabilising Eskom (MCA, 2018, 2020).

1.4.2.3 Coal Mining

Coal is the largest contributor of mining sales and is an important primary source of energy (electricity and energy fuels) that remains a driving force of the economy in South Africa. The South African coal mining industry is ranked 6th in the world in terms of production and 6th in terms of reserves, contributing 3.5% to global output (Minerals Council South Africa, n.d.). Coal reserves and coal mining activities are predominant in Mpumalanga. Its subsectoral constraints include environmental licensing, prospecting rights, mining rights, rail tonnage constraints (Overvaal tunnel on Coal Link line), the exploitation of the Waterberg reserves (requiring large investments) and similarly as other subsectors, community unrests and challenges within local government structures (MCSA, 2020).

In March 2020, when the government introduced the national lockdown, specific coal operations responsible for supplying the state power utility Eskom, were the only companies permitted to operate.

Coal has an export potential of 110 million tons versus the current 75mt which could employ 11 600 people and increase investment by more than 10% from gross fixed capital; formation of R18 billion (in 2017) to an estimated R20 billion per annum (MCSA, 2018, 2020).

1.4.2.4 Diamond Mining

In 2015, South Africa was ranked 7th in the world for diamond production. These deposits are concentrated in Northern Cape, Free State and Limpopo provinces. Industry specific challenges included the gazetted 2018 Mining Charter which now also applies to the diamond subsector (certain stipulated threshold may negatively affect the industry), rising illegal mining activities, safety, environmental and social concerns. This may place further pressure on a subsector that has been in declining for the past decade.

Potential solutions include, but are not limited to a clear regulatory framework in which illegal miners are formalised into artisanal miners (MCSA, 2018, 2020). In addition, diamond mining companies, the DMRE and South African Police Service need to work together to facilitate the prosecution of those involved in illegal mining.

1.4.2.5 Diamond processing and jewellery manufacturing

The South African diamond processing subsector consists of 221 licenced diamond manufacturers. The Master Diamond Cutters' Association has 80 registered members employing 95% of the employees in this subsector. South Africa's State Diamond Trader was launched in February 2008 and is mandated to purchase 10% of South Africa's rough diamond production to sell to local beneficiates. Companies in the jewellery manufacturing subsector beneficiate mining outputs such as gold, platinum, silver and diamonds to manufacture jewellery for both domestic and export markets. The majority of companies in this subsector are small and located in Gauteng, Western Cape and KwaZulu-Natal.

1.4.2.6 Cement, lime, aggregates and sand (CLAS)

The CLAS subsector is dominated by small and medium-sized companies. The majority of small-scale mining (90%) also fall into this group of industrial commodities. Large firms in this subsector include cement manufacturers, phosphates, vermiculate and dimension stone producers.

Aggregate and sands recorded the highest total sales in 2019, amounting R6.9 billion. This is despite a 1.8% decrease in physical production due to an ailing domestic construction sector where most of these materials are used. The depressed construction sector also affected limestone production as it decreased by 1.1%. Limestone is predominately used in cement production, a key ingredient for the construction sector (MCSA, 2020).

1.4.2.7 Other mining

The Other mining subsector includes producers of uranium, phosphates, copper, chrome, iron ore, manganese and salt. South Africa's copper deposits lie mainly in Limpopo. South African iron ore is ranked 13th in the world for reserves; 6th for production and 5th for exports. Manganese is ranked 1st in the world in terms of reserves, 2nd in production and 2nd for exports. Iron ore and manganese deposits are concentrated in Northern Cape.

There was a 22% increase in physical copper in 2019. With increased concerns over global emissions and emphasis on decarbonising the energy sector, copper demand is expected to remain strong as the metal produced from it is a key ingredient in electricity generation, transmission and distribution, and has a high intensity use in green energy projects (MCSA, 2020).

The majority of iron ore is used to manufacture steel that is used in the construction, engineering, automotive and machinery industries. Towards the end of 2019, South African iron ore prices moderated to close the year off at $91.5/tonne and nominal sales increased to 39,4% as a result of higher prices (MCSA, 2020). Although it is a limited resource, South African iron ore is of a higher grade, commanding world prices in the upper tier (ibid).

1.4.2.8 Services incidental to mining

The Services Incidental to Mining category consists of companies providing services incidental and closely related to the MMS. These includes research and development in the mining and mineral extraction, training, catering, payroll services, manufacturing, distribution, hiring and maintenance of machinery and equipment, consulting services, shaft sinking, transportation and logistics. The contribution of this sector to the GDP is indirect since the mining sector depends on essential services.

1.4.3 Mineral Sales and Exports

As a leading producer and supplier of a range of minerals, the country is in a position to offer a highly competitive investment destination which ensures that it meets specific trade and investment requirements of prospective investors, business owners as well as the developmental needs of its populace (DMRE, 2016).

The trends for the demand of South African minerals is shown in Figure 1-2 below for the period 2007-2017. The figure shows an upward trend of both local and export of minerals. However, the proportion of local sales has been increasing slowly, hence the call for beneficiation of minerals rather than exporting them in their unprocessed state. Local sales increased by 14.4%, whilst export sales increased by 6.3% between 2016 and 2017. Total sales and exports increased from 2009 to 2011 after the global financial crisis and thereafter, they have been on a sluggish trend because of the global economic slow-down particularly from China which is the largest consumer of the majority of minerals that are exported. The year 2017 was the most challenging, linked to alleged policy uncertainty and weak economic growth. The economy went into technical recession during the first half of the year and later rebounded.

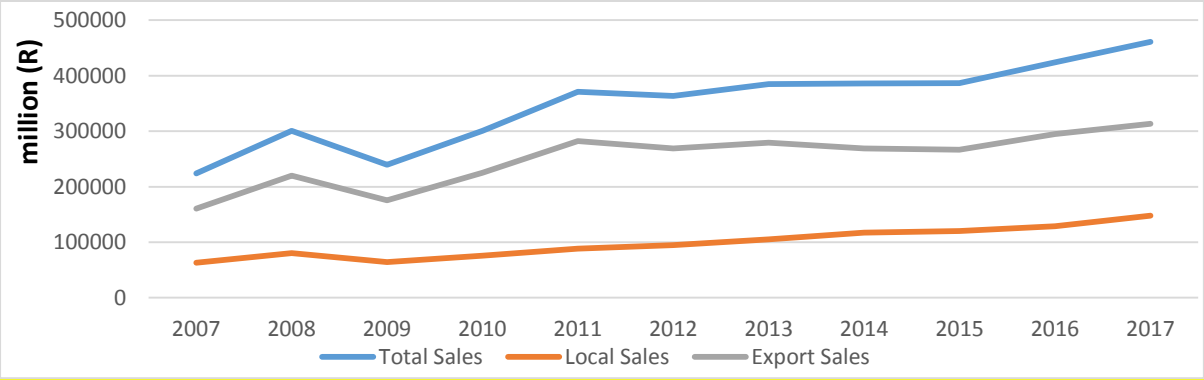


Figure 1-2: value of sales of minerals

Source: Quantec, 2018

According to Stat SA (2020); the COVID - 19 pandemic and lockdown regulations since 27 March 2020, have had an extensive impact on economic activities in mining. Mining production decreased by 47, 3% year-on-year in April 2020. The largest contributors were:

- PGMs (-62, 0% and contributing -14, 6 percentage points);
- Iron ore (-68, 7% and contributing -7, 5 percentage points);
- Gold (-59, 6% and contributing -6, 9 percentage points); and
- Manganese ore (-57, 6% and contributing -3, 8 percentage points).

1.4.4 MMS contribution to GDP

The figure below illustrates the MMS' contributions to the national GDP for the past 5 years (20015-2019). There was a decrease in the mining and quarrying GDP from 2016-2017. However, an exponential increase was observed in 2018 and further in 2019. The total direct contribution of mining to GDP accounted R360.9 billion (MCSA, 2020). The sector's GDP increased by 1, 8% in 2019 in comparison to the 2018 GDP which contributed 0, 1 of a percentage point to GDP growth. This can be attributed to the increased production of platinum group metals, iron ore and gold in the fourth quarter of 2019 (StatsSA, 2020).

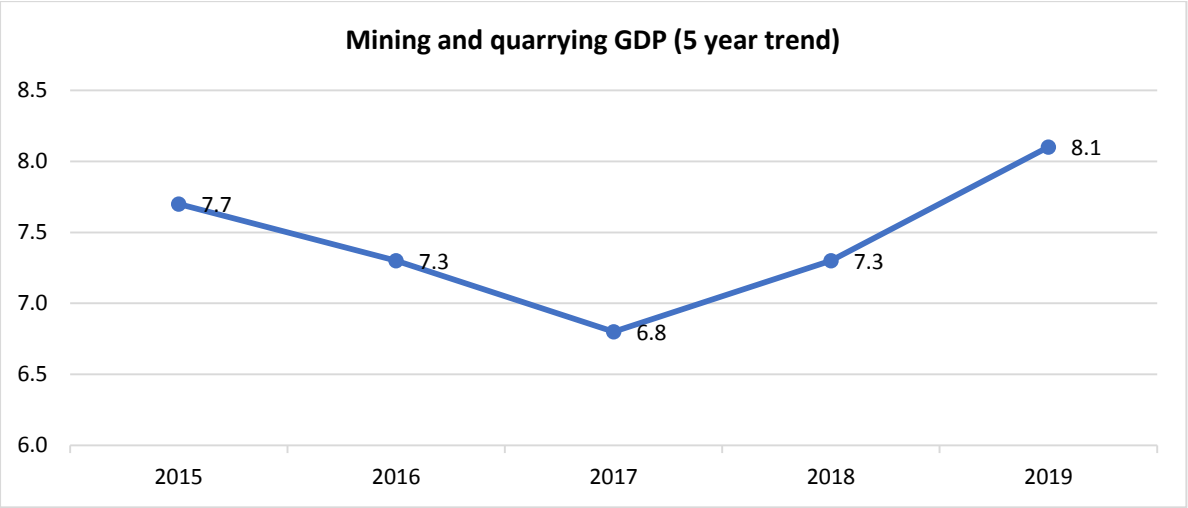


Figure 1-3: Mining and quarrying GDP (5 year trend)

Source: *Stats SA in Minerals Council South Africa 2018-2020, SARB, StatsSA & DMR, 2019*

1.5. MMS Future Outlook

To ensure the competitiveness of the MMS, the sector's future outlook is largely influenced by various factors discussed in figure 1-4 below. These factors each play a unique role in the sector's economic prospects, employment retention and will influence skills demand and supply.

MMS Future Outlook

2018 Mining Charter

A new Mining Chapter was published in September 2018

- The Charter of 2018 goes beyond setting quotas of the general inclusion of HDSAs, but includes quotas that incorporates their participation in top, senior, middle and junior management level.
- This includes the inclusion of disabled persons as well.
- Training in scarce and critical skills should prioritise HDSAs at a target of 60%.
- Companies are required to invest 5% of their total annual leviable amount on essential skills development.
- The finalisation of the 2018 Mining Charter and the withdrawal of MPRDA amendment Bill provided policy certainty and is likely to increase investment prospects. To attract investors, consistent policy certainty is key to enable economic growth in the sector

Global Demand for commodities

- As one the biggest traders with South Africa, the weakening of China's economy as a result of COVID - 19 has led to a decrease in the demand of minerals. The same applies to the USA and European countries which South Africa has good relations with.
- If these economic challenges persist, the MMS will suffer substantial losses financially and will have an impact employment as well as the communities they serve

Mandela Mining Precinct

- The Mandela Mining Precinct means the public–private partnership that stems out of the Mining Phakisa held in 2015 to facilitate and coordinate research activities pertaining to the South African Mining Extraction Research, Development & Innovation (SAMERDI) Strategy.
- The aim of the Mining Phakisa, held in October 2015, was to foster growth, transformation, investment and employment preservation and creation along the entire mining value chain.
- Innovations developed by the MMP are likely to result in job retention and growth in the sector up to the year 2046.
- The MQA has formed a partnership with the MMP to conduct research aimed at gauging technology and its implications on skills development in the MMS. This findings of the study will inform the medium to long term skills implications forecast linked to specific occupations that could be affected by the implementation of new technologies & the reskilling training drives for such occupations.

Mineral Beneficiation

- South Africa has the potential to raise the level of beneficiated mineral output, particularly in the production of finished goods.
- Mineral beneficiation is viewed as a major driver in advancing the empowerment of historically disadvantaged communities in South Africa.
- It presents opportunities for the development of new entrepreneurs in large and small mining industries and job creation.

The involvement of Labour representatives

- Trade unionism is one of the essential components of the current workplace dispensation. The MMS is highly unionised with a great number of employees represented or affiliated to a union.
- The inclusiveness of unions in decision making has a significant bearing on the productivity and sustainability of the MMS. With a move towards the fourth industrial revolution which may change the nature and type of skills required in the sector, labour representation is critical in gaining buy-in for re-skilling the workforce.

Figure 1-4: MMS future outlook

1.6. Employer Profile

The analysis of employers within the MMS is predominantly based on the DHET levy registration file. The data limitations in this regard pertained to certain employers not disclosing their location, size or number of employees. To best accommodate this, the MQA has captured these organisations as an unknown field.

1.6.1 Geographical location of employers in the MMS

The table below shows the geographic location of companies in the sector- indicating that Gauteng hosts the majority of mining companies (34, 1%). The Eastern Cape (1, 6%) and Free State (2%) on the other hand, contribute the least towards the provincial allocation of employers within the MMS. There is no relevant information on start-ups and closures to be published at this period.

Province	No. of Employers	% of Employers
Eastern Cape	37	1,6%
Free state	46	2,0%
Gauteng	796	34,1%
KwaZulu-Natal	74	3,2%
Limpopo	99	4,3%
Mpumalanga	227	9,7%
North West	217	9,3%
Northern Cape	134	5,7%
Western Cape	187	8,0%
Unknown	511	21,9%
Total	**2328**	**100,0%**

Table 1-5: Employers' geographical location

Source: DHET levy registration file (March 2020)

1.6.2 Subsector, Size and Number of companies represented in the MMS

The table below details the number of employers based on the subsector and company size category they fall within the MMS. The majority of employers are small (56, 2%), with medium and large employers sharing the balance equally (10, 7%). The largest number of employers can be found within the Other Mining subsector (35%), followed by Services Incidental to Mining (19, 5%), whilst the least number of employers fall within PGM Mining (1, 1%).

Subsector	Size of Employers				Total per subsector	
	Small	Medium	Large	Unknown	No. of Employers	% of Employers
CLAS	79	25	20	4	128	5,5%
Coal Mining	111	36	39	31	217	9,3%
Diamond Mining	19	8	14	2	43	1,8%
Diamond Processing	42	1	3	2	48	2,1%
Gold Mining	57	11	25	5	98	4,2%
Jewellery Manufacturing	145	6	-	6	157	6,7%
Other Mining	544	101	87	81	813	35%
PGM Mining	2	4	19	-	25	1,1%
Services Incidental to Mining	310	55	43	47	455	19,5%
Unknown	-	-	-	344	344	14,8%
Total	1309	247	250	522	2328	100,0%
Percentages (%)	56,2%	10,7%	10,7%	22,4%	100%	100%

Table 1-6: Subsector, Size and Number of companies represented in the MMS

Source: DHET levy registration file (March 2020)

1.7. Labour Market Profile

As mentioned in the research limitations section, the MQA appointed a new service provider to provide a WSP-ATR system which opened on the 9th May 2020 contrary to previous year's achievements. This provided employers with less than a month to complete their submission. Due to the COVID - 19 breakout and national lockdown; the DHET extended the WSP-ATR submission period to 31 July 2020. The MQA received 737 WSP-ATRs during the 2020 submission period. Data received in this cycle of submission could not be used for the SSP update due to various concerns that comprised data credibility. It is on these basis that the MQA has opted to not use the 2020 WSP-ATRs submission for analysis as this will provide an incorrect picture of labour force, skills priority and pivotal skills list for the sector. In addition, key informant interviews conducted did not have representation of all subsectors in the MMS. Therefore, findings might not include the views of subsectors that could not participate in the interviews. However, this limitation was accommodated by the usage of other data collection methods, i.e. quantitative data.

The labour market profile is obtained primarily from the MQA WSP and ATR dataset, the DHET levy registration file and DMRE's Public Labour data. Weighting of the data was applied to provide a close to a realistic outlook of the sector. The formula for weighting the data and other relevant formulae can be found in the Annexure to the SSP. For the previous financial year (as of 30 May 2019), 807 companies submitted WSP/ATRs.

Major Occupational Groups by Gender and Race

Occupational Categories	Gender		Race				
	Female	Male	African	Coloured	Indian	White	Total
Managers	2366	9586	4523	521	540	6368	11952
	20%	80%	38%	4%	5%	53%	2%
Professionals	8072	14927	13630	1130	651	7588	22999
	35%	65%	59%	5%	3%	33%	5%
Technicians and Associate Professionals	9318	46181	37911	2255	519	14815	55499
	17%	83%	68%	4%	1%	27%	11%
Clerical Support Workers	11586	10654	15393	1701	322	4823	22240
	52%	48%	69%	8%	1%	22%	4%
Service and Sales Workers	1937	4613	5603	225	31	691	6550
	30%	70%	86%	3%	0%	11%	1%
Skilled Agricultural and Related Trades Workers (Artisan category)	4388	40917	30356	2420	200	12329	45305
	10%	90%	67%	5%	0,4%	27%	9%
Plant and Machine Operators and Assemblers	17186	187354	196345	4816	161	3219	204540
	8%	92%	96%	2%	0,1%	2%	41%
Elementary Occupations	20512	96567	112698	2207	43	2130	117078
	18%	82%	96%	2%	0%	2%	23%
Learners	4969	7419	10957	778	72	582	12388
	40%	60%	88%	6%	1%	5%	2%
Total	80333	418218	427415	16052	2538	52546	498551
	16%	84%	86%	3%	1%	11%	100%

Table 1-7: Major occupational groups by gender and race

Source: Weighted MQA WSP and ATR (31 May 2019)

The table above shows that the race composition in the sector is dominated by Africans constituting 86% of the sector's employees followed by Whites (11%), Colored's (3%) and Indians (1%). This however is concerning as the dominant race group within the Managerial Occupations is Whites (53%) followed by African (38%), Indian (5%) and Colored (4%).

The MMS remains a male dominated sector employing 84% males throughout the major occupational categories, with the exception of Clerical Support Workers. The Occupational categories with the lowest representation of women are Trade workers (10%), Plant and Machine Operators and Assemblers (8%) and Elementary Occupations (18%).

1.7.1 Management levels by race 2019 - 2020

A more granular look within the different management levels depicted in the figure below reveals that Whites (63%) dominate the Top Management category followed by Africans (28%), Indians (5%) and lastly Coloureds (4%). In Senior Management, a similar trend of white dominance is noticed with the majority being Whites (60%), followed by African (30%), Indian

(6%) and Coloureds (4%). The Professionally qualified and experienced specialists and mid-management comprise mostly of African (56%) followed by White (37%), Colored (5%) and Indian (3%).

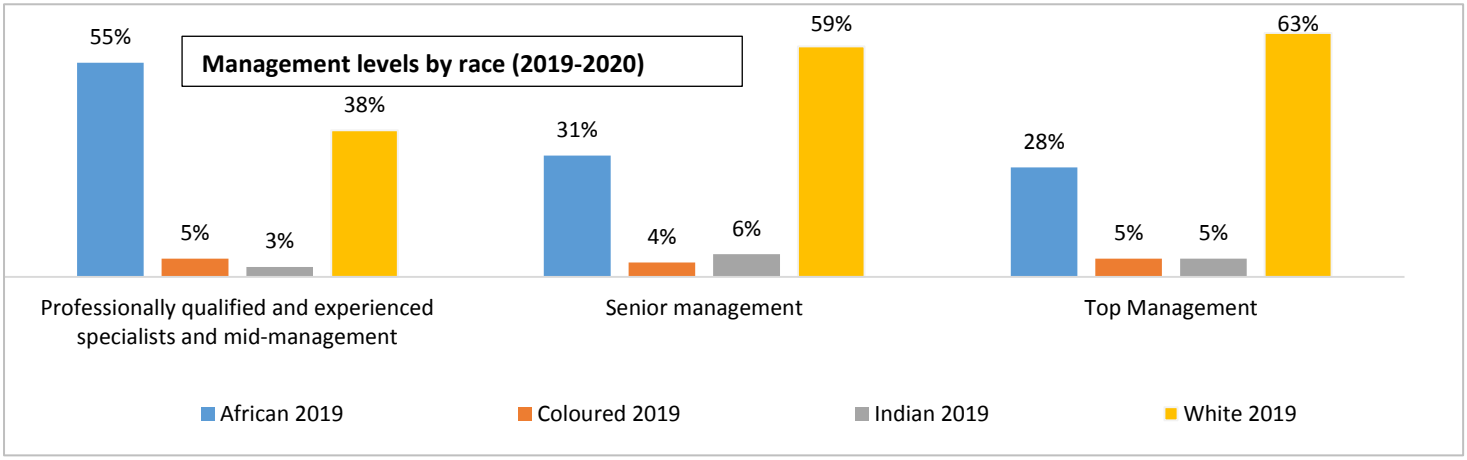


Figure 1-5: Management levels by race trend (2019-2020)

Source: MQA Weighted WSP and ATR (31 May 2019)

1.7.2 Management Levels by race and gender

Management Level	Gender	Race	No. of employees	% of employees
Top management	**Female**	African	108	44%
		Coloured	14	6%
		Indian	18	8%
		White	104	43%
	Male	African	238	24%
		Coloured	44	4%
		Indian	40	4%
		White	669	68%
Senior management	**Female**	African	361	8%
		Coloured	53	1%
		Indian	85	2%

		White	411	9%
	Male	African	1101	29%
		Coloured	122	3%
		Indian	190	5%
		White	2362	63%
Professionally qualified and experienced specialists and mid-management	**Female**	African	3986	57%
		Coloured	342	5%
		Indian	309	4%
		White	2353	34%
	Male	African	12121	54%
		Coloured	1034	5%
		Indian	463	2%
		White	8688	39%

Table 1-8: Management Levels by race and gender *Source: MQA Weighted WSP and ATR (31 May) 2019)*

The table above shows that at top management level, White and African females account for 43% and 44% respectively within the gender group, whereas Africans males account for 24%, whilst White males are at 68%. It is concerning to note that 19% of total employees in top management and senior management are females. Professionally qualified and experienced specialists and mid-management consists of only 24% females.

1.7.3 Highest Education Obtained

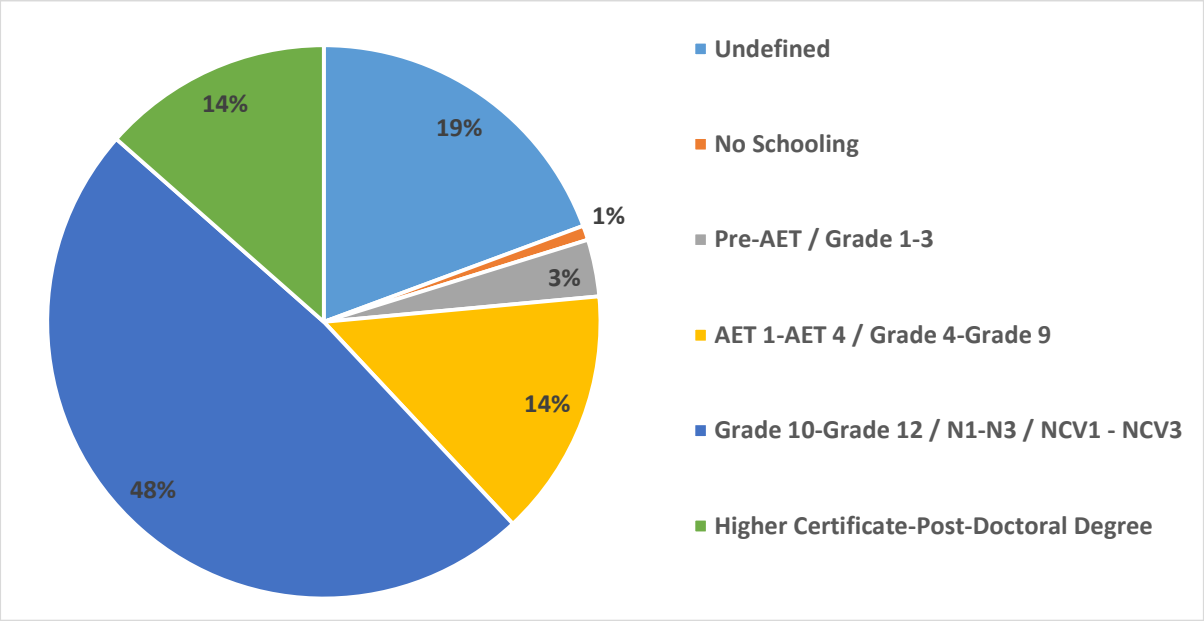


Figure 1-6: Highest education obtained *Source: MQA Weighted WSP and ATR (31 May 2019)*

Analysis of qualifications reveals that the highest proportion of employees (48%) in the sector have achieved between Grade 10 (including N1 and NCV1) and Grade 12 (including up to N3 and NCV3). This is followed by employees who have achieved between Grade 4 (including AET1) and Grade 9 (including up to AET 4) who constitute 14%. On the other hand, 14% of employees have between a Higher Certificate and Post-Doctoral degree. Approximately 1% of the sector's employees are reported to have no schooling. The "Undefined" category represents the employees whose education levels were not specified, equating to 19%.

1.7.4 The status and trends of employment in the MMS

The table below provides a 5-year trend analysis of employment in the MMS for the period 2015-2019. The column labelled "CAGR" represents the 'Compound Annual Growth Rate' over this period and makes adjustments for the spikes and drops in employment over the 5 year period, thereby depicting an annual average delineation of the rise or decline in employment figures.

Table 1-9: Provincial employment trends in the MMS (2015-2019)

Province	2015	2016	2017	2018	2019	CAGR
Eastern Cape	2 170	1 889	2 204	647	533	**-24,5%**
	0,4%	0,4%	0,4%	0,1%	0,1%	
Free State	40545	36378	39 665	15684	14823	**-18,2%**
	7,7%	7,0%	7,2%	3,2%	3,0%	
Gauteng	96802	84559	87 043	157275	154995	**9,9%**
	18,4%	16,3%	15,8%	31,9%	31,1%	
KwaZulu-Natal	11616	10669	12 120	7718	8792	**-5,4%**
	2,2%	2,1%	2,2%	1,6%	1,8%	
Limpopo	82373	86680	75 474	74790	77598	**-1,2%**
	15,7%	16,7%	13,7%	15,2%	15,6%	
Mpumalanga	90289	63219	70 516	78801	79353	**-2,5%**
	17,2%	12,2%	12,8%	16,0%	15,9%	
North West	165213	185352	225 320	132660	132801	**-4,3%**
	31,5%	35,6%	40,9%	26,9%	26,6%	
Northern Cape	31126	44329	33 605	20015	22128	**-6,6%**
	5,9%	8,5%	6,1%	4,1%	4,4%	
***Western Cape**	5114	6928	5 509	5882	7529	**8,0%**
	1,0%	1,3%	1,0%	1,2%	1,5%	
Totals	**525 248**	**520 003**	**550 905**	**493471**	**498551**	**-1,0%**

Source: MQA Weighted WSP and ATR (31 May 2019)

**Although percentage is high, one needs to take into account the actual numbers of employees i.e. the province represents 1, 5% of the sector.*

With regards to changes in the provincial distribution of employees, the Eastern Cape (-24,5%) followed by the Free State (-18,2%) have seen the largest decline in employees on a compounded average analysis over the 5 years, whilst Gauteng (9,9%) and the Western Cape (8%) have increased in employment over the same period.

Table 1-10: Sub sectoral employment trends in the MMS (2015-2019)

Subsector	2015	2016	2017	2018	2019	CAGR
CLAS	13449	13162	14424	15637	10746	**-4,4%**
	2,6%	2,5%	2,6%	3,2%	2,2%	
Coal mining	87389	56930	26610	86235	89775	**0,5%**
	16,6%	10,9%	4,8%	17,5%	18,0%	
Diamond mining	16286	8974	8743	16714	15888	**-0,5%**
	3,1%	1,7%	1,6%	3,4%	3,2%	
Diamond Processing	989	1849	1758	1790	1461	**8,1%**
	0,2%	0,4%	0,3%	0,4%	0,3%	
Gold mining	118235	91357	238245	98965	94152	**-4,5%**

Subsector	2015	2016	2017	2018	2019	CAGR
	22,5%	17,6%	43,2%	20,1%	18,9%	
Jewellery Manufacturing	1074	2802	1631	1902	1853	**11,5%**
	0,2%	0,5%	0,3%	0,4%	0,4%	
Other mining	107969	129829	153057	68580	83103	**-5,1%**
	20,6%	25,0%	27,8%	13,9%	16,7%	
PGM mining	144690	173529	87404	167794	166367	**2,8%**
	27,5%	33,4%	15,9%	34,0%	33,4%	
Services incidental to mining	35117	41509	19034	35854	35206	**0,1%**
	6,7%	8,0%	3,5%	7,3%	7,1%	
Totals	**525 248**	**520 003**	**550 905**	**493471**	**498551**	**-1,0%**

Source: MQA Weighted WSP and ATR (31 May 2019)

Other Mining (-5, 1%), Gold Mining (-4, 5%), CLAS (-4, 4%) and Diamond Mining (-0, 5%) have shown a decline in employment over the 5 year period. The subsectors showing the most improvement in employment is Jewellery Manufacturing (11, 5%) and Diamond Processing (8, 1%) over the 5 years.

Table 1-11: Gender distribution trends in the MMS (2015-2019)

Gender distribution	2015	2016	2017	2018	2019	CAGR
Male	454663	444553	474217	418449	418218	**-1,7%**
	86,6%	85,5%	86,1%	84,8%	83,9%	
Female	70585	75450	76688	75023	80333	**2,6%**
	13,4%	14,5%	13,9%	15,2%	16,1%	
Totals	**525 248**	**520 003**	**550 905**	**493471**	**498551**	**-1,0%**

Source: MQA Weighted WSP and ATR (31 May 2019)

The MMS remains a male dominated sector. However, the proportion of females have been increasing gradually from 2015 to 2019 with a compounded annual average over the 5 years at 2, 6%. Concerns are still raised on the appropriate growth rate in terms of the progress of female representation in the sector with the alignment of the transformational objectives of the Mining Charter.

Table 1-12: Racial distribution trends in the MMS (2015-2019)

Racial distribution	2015	2016	2017	2018	2019	CAGR
African	441699	435100	474189	424537	427415	**-0,7%**
	84,1%	83,7%	86,1%	86,0%	85,7%	
Coloured	15352	19582	17349	13070	16052	**0,9%**
	2,9%	3,8%	3,1%	2,6%	3,2%	
Indian	2832	3907	2701	2629	2538	**-2,2%**
	0,5%	0,8%	0,5%	0,5%	0,5%	
White	65365	61414	56666	53235	52546	**-4,3%**
	12,4%	11,8%	10,3%	10,8%	10,5%	
Totals	525 248	520 003	550 905	493471	**498551**	**-1,0%**

Source: MQA Weighted WSP and ATR (31 May 2019)

Equity composition of employees shows all race groups aside from coloureds have been diminishing on average over the 5 years. The greatest decline is depicted by Whites (-4, 3%) followed by Indians (-2, 2%) and Africans (-0, 9%).

Table 1-13: Employment by major occupational group trends in the MMS (2015-2019)

Major Occupational Groups	2015	2016	2017	2018	2019	CAGR
Managers	14165	13397	11871	13455	11952	**-3,3%**
	2,7%	2,6%	2,2%	2,7%	2,4%	
Professionals	26601	25591	22960	23387	22999	**-2,9%**
	5,1%	4,9%	4,2%	4,7%	4,6%	
Technicians & Associate Professionals	61145	57877	62986	53128	55499	**-1,9%**
	11,6%	11,1%	11,4%	10,8%	11,1%	
Clerical Support Workers	22315	21582	22435	21290	22240	**-0,1%**
	4,2%	4,2%	4,1%	4,3%	4,5%	
Service & Sales Workers	6419	6885	7100	6205	6550	**0,4%**
	1,2%	1,3%	1,3%	1,3%	1,3%	
Trades category	39678	39949	37320	40489	45305	**2,7%**
	7,6%	7,7%	6,8%	8,2%	9,1%	
Plant & Machine Operators & Assemblers	213412	216245	236402	206481	204540	**-0,8%**
	40,6%	41,6%	42,9%	41,8%	41,0%	
Elementary occupations	131172	127534	140632	118436	117078	**-2,2%**
	25,0%	24,5%	25,5%	24,0%	23,5%	
Learners	10341	10841	9122	10600	12388	**3,7%**
	2,0%	2,1%	1,7%	2,2%	2,5%	
Total	**525248**	**520003**	**550905**	**493471**	**498551**	**-1,0%**

Source: MQA Weighted WSP and ATR (31 May 2019)

A review of employment by occupational categories on a compounded average annual basis over 5 years shows that the MMS is bleeding Managers (-3, 3%), Professionals (-2, 9%), Elementary Occupations (-2, 2%), Technicians & Associate Professionals (-1, 9%), Plant& Machine Operators & Assemblers (-0, 8%) and Clerical Support Workers (-0, 1%) over the 5 year period

The MMS is however absorbing Learners (3, 7%), Trades (2, 7%) and Services and Sales Workers (0, 4%) over the 5 year period.

Table 1-14: Employment trends by disabled employees (2015-2019)

Disability distribution	2015	2016	2017	2018	2019	CAGR
Disabled Employees	3815	4864	4575	4639	3948	**0,7%**
	0,7%	0,9%	0,8%	0,9%	0,8%	

Source: MQA Weighted WSP and ATR (31 May 2019)

The disability figures in the sector remain a concern, there has been minimal change in percentages employed over the 5 year period however there has been a compounded average annual increase of 0,7% in disabled employees.

Table 1-15: Management by Equity trend (2015-2019)

Total employment in MMS	2015	2016	2017	2018	2019	CAGR
African	4315	4340	9018	5453	4523	**0,9%**
	30,5%	32,4%	36,0%	40,5%	37,8%	
Coloured	586	649	1311	518	521	**-2,3%**
	4,1%	4,8%	5,2%	3,9%	4,4%	
Indian	649	704	1071	550	540	**-3,6%**
	4,6%	5,3%	4,3%	4,1%	4,5%	
White	8614	7704	13656	6933	6368	**-5,9%**
	60,8%	57,5%	54,5%	51,5%	53,3%	
Total in management	**14164**	**13397**	**25057**	**13455**	**11952**	**-3,3%**

Source: MQA Weighted WSP and ATR (31 May 2019)

The equity profile of Managers depicts that Africans (0,9%) have been the only group to have increased on average over the 5 year period with the biggest decline coming from Whites (-5,9%) followed by Indians (-3,6%) and Coloured (-2,3%) over the same period.

1.8. Conclusions

This chapter revealed that South Africa remains a key role player in the global mining economy. The COVID - 19 pandemic has brought about several changes which have already started affecting the sector. As a result of this pandemic, the MMS' economic performance and growth are affected. The future economic outlook is bleak, with probabilities of increasing South Africa's triple challenges of inequality, poverty and unemployment. In addition, the employment rate has been affected over the years as it has been decreasing from a peak of 628 750 in 2012 to 498 551 in 2019.

The successful remediation of these COVID - 19 pandemic will depend on the effectiveness of global and national response to address challenges brought by the pandemic. This provides a window of opportunity to develop innovative strategies to address skills development within the MMS. Demographic disparities in gender and management by equity compositions signals the need for the MMS to continue addressing workforce imbalances. The sector should increase the intake and absorption of females in core mining occupations. The same applies for people living with disabilities. Individuals living with disabilities need to be provided with equal opportunities in employment within the MMS. Therefore, more efforts needs to be placed to increase the representation of individuals with disabilities. Moreover, it is imperative that transformational objective of the Mining Charter be aligned to relevant skills development programmes in the MMS with the aim of increasing participation of HDPs within management levels. The MQA through its skills development programmes may assist in addressing such challenges.

The next chapter aims at discussing the factors that drive change in the MMS and how they influence the skills demand and supply of skills, be it negatively of positively. Policy frameworks affecting skills demand and supply are also reviewed and deliberated.

Chapter 2 : Key Skills Issues

2.1 Introduction

This chapter discusses factors that drive change and impact on skills demand and supply within the MMS. Literature and document review alongside key informant interviews informed the findings of the chapter. The chapter identifies macro and micro, internal and external factors that continue to shape the skills development landscape of the MMS. This was done through the use of PESTEL analysis that assists in systematically identifying and evaluating political, economic, social, technological, legal and environmental factors that play a role in influencing the sector (Viljoen, 2018).

2.2 Change Drivers

Change drivers are factors that bring change in the industry. These changes compel the industry to modify their actions due to various factors that may affect them, be it positive or negative. In the MMS, numerous factors that impact skills development have political, economic, social, technological, environmental and legislative implications. In 2020 particularly, the COVID - 19 outbreak brought about unexpected socio-economic challenges, threatening global and national economic growth. Similarly to other sectors of the economy, the MMS has not been immune to the new socio-economic realities brought about by this pandemic. To reduce the spread and impact of this pandemic, a need emerged for both global and national responses to address the pandemic through national shutdowns, border entry restrictions, and social distancing. The pandemic has become an overarching key driver in the MMS with far reaching implications.

Understanding how these change drivers intersect with skills development is imperative to navigate through the concomitant challenges. Some of the change drivers are non-sectoral specific, meaning they are not directly related to the sector but exert change in the broader environment in which the sector operates. All change drivers discussed have direct implications for skills development in the MMS.

2.2.1 Political influences

2.2.1.1 Sectoral disruptions caused by the national lockdown

On the 27th March 2020, the South African government implemented a national lockdown which demanded the closure of businesses that were regarded as non-essential with the aim of curbing the spread of COVID - 19 (Stats SA, 2020). Mining operations were scaled down significantly, particularly deep level mining, which is labour intensive, except for collieries which are regarded as essential for the supply of coal to Eskom, though at reduced production levels. Productions that were scaled down included gold, chrome, manganese and surface material in the PGM subsector (Mining Review Africa, 2020). As a result, mines were compelled to undergo care and maintenance for the duration of the lockdown period to avoid the deterioration of operations (de Jager, 2020).

Having undergone lockdown levels 5 and 4, on 1 June 2020, the country moved to level 3 lockdown. Under the level 3 lockdown, mines could operate on full capacity, but expected to follow stringent health and safety measures to avoid the spread of the virus. However, though employees could return to work, the disruption of operations caused by the lockdown is

expected to severely impact the sector over and above the existing challenges that the sector was already facing prior to the pandemic. In this context, stakeholders believe that additional costs will be incurred as a result of restricted production initiated by the lockdown.

Furthermore, as a result of the national lock-down, Nated (mainly for artisan development), skills programmes, learnerships and short courses, learnerships and work placement programmes are likely to be affected. The majority of MMS-related skills are developed at this level of education, covering a variety of mining operations including blasting, excavations, metallurgy and engineering. Practical training at college workshops and on-the-job workplace experience will be affected as access to mining companies is restricted. Therefore, the assessment of learners will also be delayed, thus affecting completion rates. Ultimately, these implications affect Outcome 2 of the NSDP that articulates the need to link education and the workplace.

To address these challenges, key informants asserted the need for new forms of training to be established. They acknowledged that although not all training can be provided virtually, the MQA should start thinking of online training systems that can address some training offerings.

2.2.1.2 Skills Development Levies

In December 2012, the Minister repealed the 2005 Grant Regulations and promulgated 2012 Grant Regulations. Regulation 4(4) of the 2012 Grant Regulations reduced the mandatory grant that an employer could claim back from 50% to 20% of the total levies paid by the employer. The manner in which the 2012 Grant Regulations were promulgated, amongst others matters, led to litigation begun by BUSA, at the Labour Court. The Labour Court declared the Regulation to be invalid and consequently set aside, with suspension of the order until March 2016.

Prior to the order coming into effect, the regulation was re-promulgated in January 2016, to which BUSA launched renewed review proceedings in the Labour Court to set the re-promulgated regulation aside. The Labour Court dismissed the review application and BUSA decided to put through an appeal to the decision through the Labour Appeal Court (LAC). During October 2019, the LAC ruled that the decision to re-promulgate Regulation 4(4) was "irrational and lacking in any legal justification". The regulation, as re-promulgated in 2016, was consequently set aside.

Despite the said regulation being set aside, the LAC ruling is silent on both the percentage quantum that can be claimed back by employers and on the effective date of the order. The effect of the ruling is that the Minister, in consultation with employers and BUSA, would have to decide on the percentage for mandatory grants in consultation with the sector, and these accordingly published in the Government Gazette. To date, there has been no communication regarding the approved mandatory grant percentage that can be claimed back by employers. Pending the final agreement between the Minister and the employers (through BUSA) on the approved rate, there is uncertainty regarding the percentage of mandatory grants that can be paid by the SETA to the employer.

Furthermore, on 1 May 2020, the National Treasury introduced a four-month payment holiday for companies' skills development levy contributions (National Treasury, 2020). According to the draft Disaster Management Tax Relief Bill, employers defined in section 1 of the Skills Development Levies Act, 1999 (Act No 0 of 1999) are exempted from liability and payment in terms of section 3 of that Act, of the levy, as defined in section 1 of that Act. The relief will be effective until 31 August 2020 (ibid).

The impact of the tax relief will result in a negative financial impact on the SETA as there will be a decrease of funds available for skills development and training.

2.2.1.3 Industrial Relations

In 2019, labour cost increases exceeded inflation. Annual strike seasons are characterised by the increasing demands for salary increases and other operational related demands by unions and mineworkers. This is despite the challenging environment that mining companies face as a result of a myriad factors (low commodity demand, rising operational costs, unfavourable global economic outlook) in sustaining and growing the sector. For the year 2019, the impact of secondary strikes on the mining industry was estimated to cost the sector around R789 million in revenue per day (MCSA, 2019). Employees stood to lose R300 million in earnings per day, losses in terms of royalties would amount to around R8 million per day and losses in terms of taxes would amount to R14 million per day. In the gold subsector, revenue losses were estimated at around R201 million per day, whilst the platinum subsector is estimated at R555 million revenue losses per day. These loses are anticipated to not recover and will have a negative impact on the lives of employees, their families and communities at large (MCSA, 2019). Moreover, it is anticipated that these challenges will intensify going forward as COVID - 19 is likely to result in job losses.

2.2.2 Macro/Micro Economic factors

2.2.2.1 Global Influence and Market Performance

Local mining companies manage unique South African operational challenges while still operating in the context of global pressures (Guzek & van Antwerpen, 2015). As mentioned in chapter 1, mining companies are influenced by the global economy, with macro-economic growth and international markets strongly influencing both the demand and supply for resources as well as profitability (Lane et al., 2015). There is a strong correlation between the performance of commodity markets and mining stocks.

Mining stocks (including those of globally diversified mining role players continue to underperform since the outbreak of COVID - 19. For example, Chinese demand has had profound effects on South Africa's MMS. China is South Africa's largest trading export destination and over the years, it has developed specific interest in South Africa's chrome and platinum deposits (Reboredo, 2018, Maseko et al., 2020). However, platinum and palladium prices have dropped by more than 40% during the lockdown. The sector is compounded by flat global growth outlook for the country's main commodities, more specifically gold and PGMs. The weakening of China's economy has led to a decrease in demand of minerals. This has also affected share prices. According to Pwc (2020), the listed shares of some companies have already been affected by this. If China's economic challenges continues or deepens, the

MMS will suffer significant loss which will impact its employees as well as the communities they serve (Maseko et al., 2020).

2.2.2.2 Downgrade of South Africa's credit rating into junk

On the 27 March 2020, Moody's Investors Service placed the country's credit rating into junk status (Bloomberg, 2020). Moody's credit rating was the last of the major rating agencies to announce its downgrade after its peers Fitch and S&P (ibid). The downgrade of South Africa's credit rating is set to have a negative impact on the profitability of the MMS as the cost of borrowing is likely to increase. This will also affect investment prospects in every aspect of the economy including the MMS.

Upon the culmination of this pandemic, there will be a need for the country to adopt and implement wide-ranging measures to improve the country's competitiveness rankings, grow productivity generate higher levels of fixed investment (greater than 25% of GDP versus the current 19% of GDP), increase economic growth and start reducing unemployment and poverty (MCSA, 2020). According to the Minerals Council, comprehensive economic reforms in conjunction with the MMS can be a critical asset in stabilising and growing the economy provided that the relevant economic and regulatory circumstances prevail.

2.2.2.3 Increasing Energy tariffs and load shedding

The MMS continues to face an increased risk on the energy front as electricity has in recent years become a scarce commodity subject to supply interruptions and rising prices (SBPR, 2019). According to MCSA (2019), rising electricity prices affects consumers and will intensify further as NERSA ruled in 2019 that Eskom could recuperate R32.7billion of the MYPD3 (Multi-Year Price Determination) allowable costs sustained in the 2014 to 2017 financial years through the regulatory clearing account (RCA). In 2020, an additional RCA balance of R13 271m was ruled in Eskom's favour. This would mean that Eskom could raise electricity tariffs by at least 4.4% (excluding MYPD4) starting April 2018 to recuperate back the allowable revenue through the RCA. This, together with the additional tariff increase (15% applied for by Eskom within the awaited MYPD4) could see electricity prices rising much higher than inflation, and 10 percentage points higher than in recent years, over the next 2 years (MCSA, 2019).

The collapse of the commodity prices in the sector is attributed to the increase of electricity tariffs which commenced to upsurge in 2007. During this period tariffs also increased by 15% and the mining sector lost 53 500 jobs of which electricity tariff increases specifically accounted for 11 800, and a cumulative loss in fixed investment of R103.2 billion (MCSA, 2019). The sector has not recovered since 2007/2010 and a repeat of steep tariff increases over the last 10 years will exacerbate the situation, affecting the sustainability and growth of the sector.

Commodities that are projected to be vulnerable to the large adjustments in electricity tariffs include gold and platinum mining; ferrochrome and manganese smelting; basic chemicals; iron and steel and basic non-ferrous metals (IDC, 2019). The MYPD4 application would accelerate the demise of the gold industry (adding 41 027 job losses, on top of 57 482 currently under threat), and platinum group metals mining (adding 37 660 on top of the 90 000 already under threat). The total job loss impact from the MYPD4 when other commodities

are included could make this number as high as 150 000, that is; gold; 41 027 + PGM; 37 660 + other commodities; 71 313 = 150 000. In addition, the increase in electricity tariffs will affect local beneficiation, thus making it impossible to render local beneficiation of minerals as a feasible option.

Furthermore, with the MMS being one of the most energy-intensive sector, mining companies are negatively affected by load shedding. These power disruptions result in production losses which have an impact on the viability of mines. This then affects revenues, investment and will ultimately result in job losses as well. Unstable energy supply also poses a threat to the safety and security of employees, particularly when companies are uncertain about load shedding schedules and when these schedules are inaccurately implemented by Eskom.

To alleviate the above challenges, the sector requires a reliable supply of competitively priced and stable electricity. Key informants recommended that the relevant government leaders should permit regulatory processes that will enable the formation of self-generation facilities to supplement Eskom's constrained energy and not be heavily reliant on solitary supplier of energy. These challenges also compel mining companies to consider alternative green measures as a source of energy. However, that too will have an impact on the coal subsector in terms of production and employment. Moreover, there are indirect jobs created by the coal subsector through its multiplier effect on the economy, and these cohorts will also be affected.

2.2.2.4 Minerals beneficiation

In 2018, the mining sector exported 66% of its production to international buyers or commodity markets. These dollar earnings are equal to half of the country's foreign reserves (+/- $ 50 billion) (MCSA, 2018).

Opportunities exist for downstream processing and adding value locally to iron, carbon steel, stainless steel, aluminium, PGMs and gold. A wide range of materials is available for jewellery, other than gold, platinum and diamonds. There is also tiger's eye, and many other semiprecious stones (BrandSA, 2017). Key informants believe that the sector needs to develop local capacity by investing in interventions that will support and enable local beneficiation instead of exporting.

Through partnerships with entities such as the DTI, the country has the potential to develop unique capabilities and the necessary human resources with adequate skills and equipment to apply interventions beyond the mining sector. With that, it was expressed that there are opportunities for the mining sector to integrate with other sectors of the economy through mineral beneficiation. These opportunities could be embedded in the manufacturing sector (e.g. steel and iron ore, nickel, copper and zinc); energy sector (e.g. coal, uranium and gas); and agriculture sector (e.g. phosphates, potassium and sulphur). These in turn can be added jewellery for precious metals such as gold, diamonds and PGMs (Netshitenzhe, n: d).

It will also be prudent for the sector to form partnerships with SADC (Southern African Development Community) regions. Key informants expressed that the relationship between SADC regions and South African beneficiation can only be achieved through revising the country's trading policies. The trading policy was criticised for being rigid, sequestered and does not explore inter-regional benefits, which consequently, does not promote regional value chains. Purchasing from South African suppliers is believed to be significantly cheaper

than buying from global markets. It is therefore, recommended that the government should assist local companies by providing manufacturing subsidies just as it is done in EU countries where they subsidise their equipment manufacturers. Therefore, there is an opportunity for government to step up support to local businesses and help prevent the dominance from foreign suppliers. This will also result in increased employment opportunities and upskilling employees, not only for the benefit of the country, but the continent as well.

2.2.3 Social influences

2.2.3.1 Local Influence (Influences Related to National, Provincial and Local Economic Output)

South African mining companies are required to account for unique local issues which have profound operational implications. Over the past years, there has been an increase in community unrests within mining communities. These disruptions are a threat to production, profits and result in job losses. These disruptions are estimated to cost the sector about R20 million each time they occur. According to the stakeholders in the sector, mining companies time and again experience pressure from mining community members to recruit within communities which often do not possess adequate qualifications, skills and experience to fill in vacant positions in mines.

Community-based protests against mining companies are rooted in socio-economic issues such as job creation, and infrastructure development which are attributed to South Africa's triple challenges of inequality, poverty and unemployment. These translate into higher levels of discontent in mining communities and do not augur well with the mining operations. With the anticipated job losses emanating from the COVID - 19 pandemic, community unrests will be inexorable as the scourge of unemployment will increase. Job losses will not only affect employees and their families, but communities at large.

There are opportunities for mining companies to localise their value chains around specific mines, thus making broader socio-economic development integral to their operations. Key steps include elevating local suppliers to reduce exports by supporting minerals beneficiation and developing alternative industries such as agriculture to reduce communities' heavy reliance on mining for community development.

2.2.4 Changing technological landscape

2.2.4.1 Fourth Industrial revolution

The fourth industrial revolution is described as a world where individuals move between digital domains and offline reality with the use of connected technology to enable and manage their lives (Miller, 2015). It integrates cyber-physical systems and the "Internet of Things", big data and cloud computing, robotics, artificial intelligence-based systems and additive manufacturing (MCSA, 2019). This digital revolution does not only impact the mining sector, but its effects are evident across all sectors globally and nationally.

In the MMS, key informants reported that South Africa's mining industry are slower adopters of technology compared to other global countries such as Australia and Canada. South Africa lags behind in terms of the fourth industrial revolution as mines are said to be less digitised than those in many other regions as a higher proportion of its operations are underground, and thus, technology ramp-up will be more challenging to be undertaken.

Due to COVID - 19, most mining companies are now under pressure to accelerate the pace for integrating critical elements of the fourth industrial revolution into the workplace. According to the key informants, the need to keep up with new machinery and automated production systems and processes in the workplace is an imperative demand for the future of mining operations. This assertion in supported by the Deloitte 2018 Tracking the Trends Global Mining Study which assert that the mining industry's success will be determined by the border of analytics and artificial intelligence (AI) which will be used to leverage data generated to sharpen planning and decision-making across the mining value chain. This will also be accompanied by the digitalisation of mining supply chains and, driving sustainable shared social outcomes where mining organisations will become interdependent of other sectors and judged based on their relationships with their employees, investors, regulators as well as their impact on society at large.

Furthermore, the implementation of sophisticated technologies is transforming the sector's operations in terms of the type, level and mix of skills required, thus beginning to transform occupations such as rock drill operator, blaster, drill rig operator as well as most of the artisan trades. Upskilling and reskilling programmes are needed so that employees are trained in new mining processes that will extend the lifespans of mines and to also ensure the smooth transition to embracing the fourth industrial revolution (Moodley, 2019). As mining becomes more automated, physical strength and stamina will become less important than fine motor skills, dexterity and problem solving – all of which are more easily acquired by new entrants to the workforce will generate opportunities to attract more females and therefore, redress gender inequalities in the sector.

Key informants also emphasised the need to place focus on integrating technology in AET (adult education and training) programmes up to level 4. This could assist in improving literacy, technological and numeracy levels to enable employees to operate new machinery and coordinate new processes that emerge with the introduction of the fourth industrial revolution and currently, the impacts of COVI-19. At a supply level, the integration of technology can be incorporated in the curriculum of Higher Education and Training (HET) institutions as a delivery mechanism, as a complement to instruction, and as an instructional tool for training novice employees in the sector.

2.2.5 Environmental Concerns

2.2.5.1 Environmental Sustainability

The global emphasis on environmental impact as a result of mining activities is another key driver affecting the sector. The MQA's (2018) green skills study revealed that South Africa's air quality remains one of its most challenging environmental issues and is an issue that has been raised on several occasions with regards to the health and welfare of South Africa's population. Fugitive dust and spontaneous combustion emission from the mining sector are some of the most common sources of atmospheric emission that impact on air quality.

Support has been provided by the MMS' stakeholders for the sector to transition to a cleaner energy mix, i.e. transitioning to a growing role of non-fossil forms of power generation such

as wind and solar power where costs are not prohibitive as well as nuclear power (MCSA, 2020). In addition, the Minerals Council mentioned that some progress is already being made to generate cleaner coal power through the introduction of new power plants and the closure of older plants associated with historically emissions (ibid). Even so, it is believed that coal still remains a necessity in the country's future as the main source of power even with the expansion of renewables (ibid)). With this accounted for, the government is advised to fast-track legislation that make it possible for mining companies to generate their own power, including the over 600MW of solar power projects already in the pipeline that will contribute further to a reduction in the sector's combined carbon footprint (MCSA, 2020).

In addition, the availability and cost of water is quickly rising to the top of mining companies' agendas as one of the greatest constraints to supply. Many parts of the world and South Africa specifically, are facing a water crisis, not only because of the scarcity of water, but also the quality of the available water (Askham et al., 2017). The water shortage in South Africa has been aggravated by changing rainfall patterns due to climate change. Therefore, insufficient water could limit large-scale mine development and restrict other economic and livelihood activities as it makes the social and ecological reserve vulnerable to water demands from new developments, which may affect the country's resilience to climate change.

Unlike companies found in the secondary and tertiary sectors, mining companies are dependent on the location of their ore and thus, cannot change their operations' location to mitigate or adapt to environmental challenges. It is imperative for the sector to align their practices with goals closely linked to achieving the development path of the green economy. As mining activities and environment change, the need for green skills in the MMS is also expected to be affected. All the mining subsectors are likely to experience an increased demand for green skills. This is also part of the critical investor requirements and fulfilment of legislative requirements regarding sustainable development. To achieve this the MQA green skills study proposed the following recommendations:

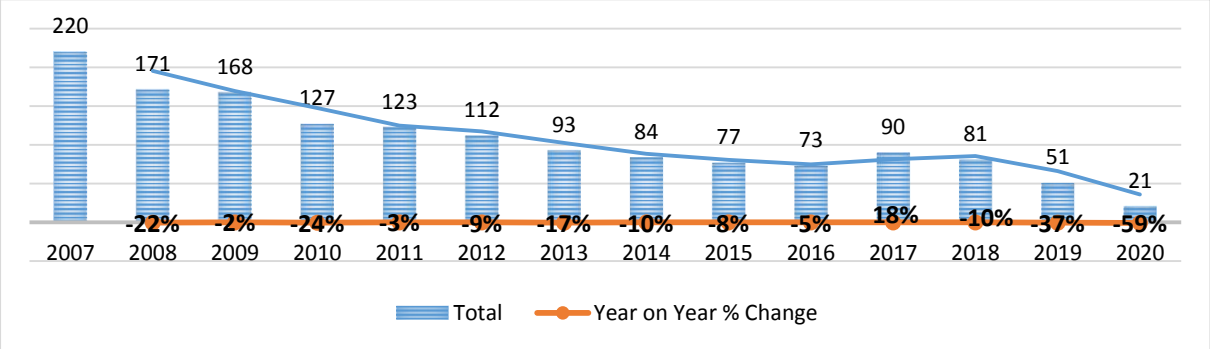
- Revision of the QCTO qualification framework to better align the needs of the MMS in relation to green skills.
- Bridge the gaps between the educational programmes and industry requirements by means of specialised courses (e.g. radioactivity).
- Broaden skills sets and develop sector-specific experience through internships and learnerships (specifically: Other mining, Gold mining, PGM mining).

2.2.5.2 Mine, Health and Safety

Mining operations come with inherent risks that can impact the health and safety of employees. Mining companies, the government and trade unions need to continue to place importance on employee safety since continued fatalities, injuries and occupational diseases jeopardise a mining companies' licence to operate. As illustrated in figure 2-1 below, there has been a significant decrease in the number of fatalities in the MMS between 2007 and 2016, though there was an exponential increase in 2017. That trend was reversed in 2018 and the figure for 2019 and 2020 continues to reduce. Even so, within the global "zero-harm" goal, one miner dead is one too many (MQA, 2020). The number of injuries were reported to

have accounted 2406 in 2019 compared to 2 447 in 2018, thus translating to a decrease of 2% (DMRE, 2020). The MQA's study on "Understanding the occupational health and safety matter in the South African MMS" revealed that there is a lack of alignment between the existing OHS programmes and the MHSA. Therefore, there is a need to revise existing OHS qualifications such as SAQA 74269 Occupational Health and Safety to better align with the requirements of the MHSA and the needs of the MMS in relation to green skills. The MQA was also advised to work with other SETAs to incorporate certain existing programmes into the MMS such as courses in communication of OHS issues, OHS leadership and OHS organisational culture required to deal with OHS organisational issues. These recommendations indicate the need to continue to examine the issues in OHS in the MMS in order to enable the sector to achieve its zero-harm aspiration.

Figure 2-1: Mining fatality trend (2007-2018)



Source: DMRE (2020) figures are as of 08 June 2020*

Furthermore, taking into account the huge amount of employees employed in the MMS, the sector is perceived to be susceptible to the spread of COVID - 19. The daily operations of underground mines for example involves a large number of employees descending into the depths of crowded cages. It is however, encouraging to note that as of 20 August 2020, 91.7% (11 576) out of 12 617 confirmed cases had recovered from COVID - 19 (MCSA, 2020). It should that necessary measures are being undertaken by the sector to elude the spread of the virus. Mines are taking initiatives in the form of the provision of equipment and consumables for testing facilities; provision and/or purchasing of personal protective equipment (PPE) and critical medical equipment for health and social development personnel in the field, and in hospitals and clinics; purchase of water tanks and supply of water to public facilities and communities; provision of food parcels to vulnerable families in host communities; contributions to the Solidarity Fund and other non-governmental organisations (NGOs); and increasing awareness through radio and print and social media (MCSA, 2020).

2.3 Policy frameworks affecting skills demand and supply

There are many policy and legislative instruments that are applicable to balancing the MMS against present and future trends to ensure its sustainability and growth. Sector skills planning in South Africa must consider a wide range of national policy imperatives that seek to support inclusive sector growth paths which advance economic growth, the social development and transformation agenda. The table below summarises the key national policies which guide the strategy and operations of the MQA and the MMS.

Policy/ Strategy	Policy input Relevant to the MMS (Policy Objective)	Implications for skills planning in the sector
The Mineral and Petroleum Resources Development Act (MPRDA)	• The MPRDA is aimed at creating conditions that are conducive for equitable access and sustainable exploitation of petroleum and mineral resources in the South Africa.	• Through its learnerships, bursaries, workplace exposure programmes and collaborations with TVETs and HETs, the MQA will be able to accelerate transformation to ensure the sustainable growth and development of the MMS to expand opportunities for HDIs.
Mining Charter, 2018	• The Mining Charter, 2018 aims to redress past inequalities by advocating opportunities of Historically Disadvantaged Persons to enter the MMS and to benefit from the exploitation of the nation's mineral resources. • Emphasis is placed on utilising and expanding the existing skill base to empower Historically Disadvantaged Persons**.** This also includes the promotion of Historically Disadvantaged Individuals (HDIs) and women into management positions. • Promotes the beneficiation of South Africa's mineral commodities • Calls for the development of entrepreneurial skills that improve people's livelihoods, and create mining led local and regional economic diversification. • Requires an investment of 5% of the leviable amount on amongst others essential skills development activities such as science, technology, engineering, mathematics skills, as well as artisans, internships, learnerships, apprentices, bursaries, literacy and numeracy skills for employees and non-employees (community members), graduate training programmes, research and development of solutions in exploration, mining, processing, technology efficiency (energy and water use in mining), beneficiation as well as environmental conservation and rehabilitation.	• Promotion of the transformation through the provision of learnerships, internships, bursaries related to the MMS and management development programmes continues to be a sectoral imperative. This also forms part of the Mining 2030 vision.
Mine Health and Safety Act (MHSA) No. 29 of 1996	• The MHSA aims to alter the culture and politics of health and safety in the mining sector through reducing accidents in mines that result in fatalities and injuries which are a contributor of individuals sustaining disabling injuries.	• The promotion of health, leading to a capable and healthy workforce who will be retained in the sector.

Policy/ Strategy	Policy input Relevant to the MMS (Policy Objective)	Implications for skills planning in the sector
Mineral Beneficiation Strategy	• The beneficiation strategy is aimed at developing mineral value chains and facilitating the expansion of mineral beneficiation initiatives in the country up to the last stages of the value chain. • The strategy is aligned to a national industrialisation programme which seeks to enhance the quantity and quality of exports, promote creation of decent employment and diversification of the economy, including promotion of the green economy.	• The MMS could form partnerships with other SETAs such as AgriSETA and MERSETA through programmes that support mineral beneficiation. In addition, greater collaboration with industry councils and jewellery manufacturers needs to be encouraged to promote the sustainability and growth of the sector. • The increasing need to implement innovative technology in the sector will have an impact on beneficiation as it will prompt the need to manufacture the demanded technology locally. This will then create employment opportunities for new entrants in the sector, community members and upskill existing employees. Qualifications will correspondingly be required to be carefully scoped against these new developments with a longer-term view of the type of the emerging workforce in mind. • Considering that contemporary and future beneficiation trends demonstrate a high dependence of employees with knowledge of science technology engineering & maths (STEM); supporting individuals with these expertise will become a critical component of sustainable industrial development.
New Growth Path (NGP)	• The NGP is the government's vision to reduce the rate of unemployment through job creation. It has set a target of five million new jobs to be created by 2020. It calls for the need to improve skills in every job and targets 1, 2 million workers for certified on-the-job skills improvement programmes annually from 2013. • The MQA is required to facilitate and co-finance training for approximately 10% of the MMS workforce annually. • Focus is also placed in supporting beneficiation on the final manufacturing of consumer and capital goods, which can create large-scale employment. • The growth path also requires a radical review of the training system to address shortfalls in artisanal and technical skills.	• The NGP in conjunction with the beneficiation strategy are expected to help grow the diamond manufacturing industry. Thus creating employment opportunities. • This will also lead to the development of new entrepreneurs with the relevant skills to enable South Africa to become a jewellery hub. • In striving to achieve the mandate of the NGP, the MQA has funded learnerships and bursaries to learners studying towards mining related qualifications. Workplace exposure support has also been provided to learners and lecturers.
Industrial Policy Action (IPAP) 2018/19	• IPAP plans to address the key challenges of economic and industrial growth and race based poverty, inequality and unemployment.	• Similarly as the Mineral Beneficiation Strategy, IPAPS's plans to promote the investment of mineral beneficiation could be achieved through developing economic linkages between the primary agriculture, mining and manufacturing sectors to secure much greater downstream beneficiation and maximise upstream linkages. Such linkages may

Policy/ Strategy	Policy input Relevant to the MMS (Policy Objective)	Implications for skills planning in the sector
	• It aims at promoting investment by the private sector in new industrial capabilities. In mining, mineral beneficiation has been identified in IPAP as a key instrument for the industrialisation agenda.	well result in multi-sectoral skills transfer and will address high rates of unemployment in the country. • The MQA could partner with the DTI to make its contribution in this area by organising trade fairs. This can be facilitated through providing small companies with access to new markets, giving them exposure to international design skills or accessing new designs over and above their existing design and trading skills. The acquired skills will ultimately be brought back to South Africa and transferred to emerging small companies.
The National Development Plan (NDP)	• The National Development Plan aims to eliminate poverty and reduce inequality by 2030. • It aims to improve education, training and innovation, provide learning opportunities through Community Education and Training Centres and support the development of specialised programmes in universities focusing on training college lecturers and provide funding for universities to conduct research on the vocational education sector.	• Currently the MQA funds learnerships, workplace experience programmes, internships and bursaries aimed at developing a pool of HET graduates to pursue careers in the MMS. This includes universities, university of technologies, CETs and TVETs. • Considering the implementation of innovative technology in the sector, R &D support should be given to HET to adjust their curriculum to be in line with these new developments. • Considering the decline of some subsectors in the MMS, there is a need to develop linkages with other sectors other than mining to accelerate employment creation and accommodate those that lose their jobs due to retrenchments.
National Skills Development Plan (NSDP)	• The NSDP was derived from the NDP and seeks to ensure that South Africa has adequate, appropriate and high quality skills that contribute towards economic growth, employment creation and social development. • The priorities that stand out in the NSPD for the MMS are as follows: ○ Identify and increase production of occupations in high demand ○ Linking education and workplace ○ Improving the levels of skills in South African workforce ○ Improving the quality of education, skills development and innovation ○ Increase access to occupationally directed programmes. ○ Support the growth of the public college system ○ Skills development for entrepreneurship ○ Support worker initiated training ○ Support career development service	• To address the key objectives of the NSDP, the MQA should continue establishing credible skills planning measures through research and identify skills that are needed in the sector and from that develop interventions to address challenges in their supply. • There will be a need for the MQA to continue supporting: ○ Workplace experience programmes ○ Funding that support occupations in demand ○ Partnering with TVET and CET colleges ○ Small scale mining programme ○ Career guidance events ○ Management development programmes for the sector's employees

Policy/ Strategy	Policy input Relevant to the MMS (Policy Objective)	Implications for skills planning in the sector
HRD Strategy for South Africa	The HRD Strategy for South Africa specifies that SETAs are mandated to: • Put in place a skills system that is effective in fostering partnerships that will address priority skills needs in the economy • Expand in the provision of workplace training in priority skills needs, i.e. number of apprenticeship, learnership & internship opportunities.	• There is a need to collaborate with the sector's key role players to address sector skills priorities • Support should continue to be provided to career awareness programmes, workplace exposure, learnerships, internships and artisan training for mining related occupations.

Table 2-1: Policy frameworks affecting skills demand and supply

In addition to the above mentioned policies and strategies is the National Youth Policy (NYP) 2015-2020 which states that the mining industry needs to work towards enabling more equity participation of black people, support youth-owned businesses through procurement and enterprise development, explore beneficiation as a tool for creating future industrialists, and use the employment equity legislative requirements to develop and mentor youth to strategic positions within mining companies. The White Paper sets out strategies to improve the capacity of the post-school education and training system to meet South Africa's needs. The skills implications of these policies is the need for the MQA to improve the capacity of post-school education through the provision of on-going support for bursaries, learnerships, internships, lecturers' workplace exposure and leaners' workplace experience programmes. Moreover, the National Environmental Management Act 107 of 1998 (NEMA) defines the national approach to environmental management and is aimed at promoting sustainable development of renewable and non-renewable resources. Given the existing environmental challenges facing the sector, there will be a need for the sector to align their practices with goals closely linked to achieving the development path of the green economy.

To support the development and advancement of the MMS's workforce, it is will be crucial for the MQA to continue to support National Strategies and Plans through skills development. Through its offerings such as learnerships, internships, bursaries, skills programmes, workplace exposure programmes and collaborations with TVETs and HETs, the MQA is able to accelerate transformation to ensure the sustainable growth and development of the MMS to expand opportunities for HDIs and improve occupational health and safety.

2.4 Conclusions

The chapter discussed the key skills issues that drive change and impact on skills demand and supply within the MMS. Findings revealed that the COVID - 19 outbreak has brought about unpredicted challenges in the MMS added to the existing challenges that the sector was already experiencing prior to the pandemic. Sectoral disruptions caused by the national lockdown, the Skills Development Levy holiday, industrial relations in the form of strikes were identified as drivers emanating from political influences in the sector. In addition, mining companies are influenced by global developments as they influence the demand and supply for resources and profitability. In conjunction with global influences, mining companies play a critical role in the communities they serve. Whilst serving their communities, there are times where mining companies experience pressure from community members often resulting in community unrests. With the anticipated job losses emanating from the COVID - 19 pandemic, community unrests will be inevitable as the scourge of unemployment will increase. Furthermore, technological transformations remain at the forefront of the sector's ability to become as safe, healthy, efficient and sustainable as possible, especially currently given the plague of the COVID - 19 pandemic. The MMS presents a unique opportunity for a new industrialisation drive and advancement in the economy as a whole. This applies across the value chain: from mining equipment and services, to extraction, infrastructure development, beneficiation, skills development as well as research and development. Along with this, there are opportunities for more profound empowerment of the previously disadvantaged including unskilled and semi-skilled employees, females, communities and entrepreneurs. This however, can only be achieved if the sector fully embraces technology and address energy and water crisis that are affecting mining operations.

The MMS is currently facing a new reality amidst the COVID - 19 pandemic and it is anticipated to have long-term ramifications for the sector. Uncertainty about the length and depth of the crisis are stimulating risks and volatility of financial markets, accompanied by job losses, a decrease in investments as well as production and sales. With the developments brought on by the change drivers in the MMS, it will be prudent for the sector to consider measures that will address the challenges affecting the sector for the benefit of employers, its employees and community at large. It will be imperative for the sector to understand the different sets of skill-sets that will be in demand in years to come provides a good starting point for planning. This is also accompanied with the need to consider interdisciplinary training that will allow employees to develop skills and knowledge in a range of subjects even outside mining in case of job losses.

Having explored the key skills issues in terms of the sector's change drivers as well as the policy frameworks affecting skills demand and supply, the next chapter aims at examining the occupational shortages and skills gaps in the MMS.

Chapter 3 : Occupational Shortages and Skills Gaps

3.1 Introduction

This chapter focuses primarily on understanding the occupational shortages and skills gaps, the extent and nature of skills supply, as well as the sectoral priority occupations and interventions (PIVOTAL). Taking into account the data limitation of the low WSP-ATR submission caused by COVID - 19, the 2019 data is utilised is certain segments of this chapter. Where possible the MQA has included narratives on the findings relating to the 2020 in depth interviews which forms part of the DHET requirements.

3.2 Sectoral Occupational Demand

3.2.1 Hard-to-fill Vacancies

Hard-to-fill vacancies (HTV) are strong indicators to measure occupational shortages and refers to occupations that an employer was unable to fill within 12 months or took longer than 12 months for the employer to find a suitably qualified and experienced candidates (DHET, 2019). The identified occupational demands and skills gaps were informed by the hard-to-fill vacancy and skills gap section of the submitted WSP and ATRs during the 2019 submission period. Employers are required to indicate reasons for the hard-to-fill vacancies for each occupation identified on the list.

The analysis of the hard-to-fill vacancies entailed a frequency run of the top 10 most identified occupations by companies through the WSP-ATR submissions. This was then cross- tabulated by provinces and subsectors to identify the number of occurrences per occupations within 2 variables (province and subsector). Thereafter, the sum of province and subsector was calculated to develop the top 10 pivotal occupations for the MMS. The top ten hard-to-fill vacancies order are presented by OFO code.

Table 3-1: Hard-to-fill vacancies

HTFV	OFO Code	Vacancies	Reasons for Hard-to-fill
Mine Manager	2019-132201	8	Lack of relevant qualifications/Lack of relevant experience
Production Manager	2019-132201	7	Lack of relevant experience/Equity considerations/Lack of relevant qualifications
Engineering Manager	2019-132104	10	Lack of relevant experience/Equity considerations
Mechanical Engineer (Mines)	2019-214401	9	Equity considerations/Lack of relevant qualifications/Lack of relevant experience
Mining Engineer	2019-214601	7	Lack of relevant experience/Lack of relevant qualifications
Occupational Hygienist	2019-226302	7	Lack of relevant qualifications/Absolute lack of skilled people/Lack of relevant experience
Mine Overseer (Production)	2019-312101	7	Lack of relevant experience/Lack of relevant qualifications
Diesel Mechanic	2019-653306	11	Lack of relevant qualifications/Lack of relevant experience
Fitter and Turner	2019-652302	7	Lack of relevant experience/Equity considerations
Auto Electrician	2019-671208	7	Lack of relevant experience/Lack of relevant qualifications

Source: MQA WSP/ATR (31 May 2019)

The 2020 analysis of the expert interviews conducted across the subsectors using the DHET interview guide revealed the following HTFV and their respective reasons:

Hard-to-fill	Reason/s for Challenge
Mining Production Supervisor	• Very low number of skilled professionals in these occupations • very low interest in these occupation • inability from Africans to occupy such qualifications • Relevant experience for longer periods
Mining Operations Manager	• Lack of skills, Experience • Low GCC pass rate, thus supply does not meet the demand
Safety, Health, Environment and Quality (SHE&Q) Practitioner	• Lack of career awareness • Scope is too broad for one practitioner
Mining Engineer	• Lack of relevant qualifications • Low GCC pass rate, thus supply does not meet the demand
Engineering Supervisor	• High salary expectations
Diesel Mechanic	• Lack of experience • Lack of technology as part of their training
Engineering Manager	• High salary expectations
Millwright and Rigger	• Lack of competitive structure to attract potential employees • Unsuitable job location
Mine Surveyor	• Few institutions offer this qualification (only UJ and UNISA are offering it) • Low pass rate. Those that enrol take time complete qualification. As a result, very few pool • Low GCC pass rate, thus supply does not meet the demand
Rock engineer	• Few institutions offer this qualification (only UNISA is offering it) • Low pass rate. Those that enrol take time complete qualification. As a result, very few pool Low GCC pass rate, thus supply does not meet the demand
Auto- electrician	• The majority of people have a basic electrician qualification, with few specialising in auto-electrician

Source: MQA in depth Interviews (July 2020)

The above table will be cross checked against the 2020 WSP data once made available however what is worth noting is that the 2020 expert interviews revealed no major differences from the 2019 HTFV list.

3.2.2 Skills Gaps

Skills gaps refers to skills deficiencies in employees or the lack of specific competencies by employees to undertake job tasks successfully required by industry standards. Skills gaps may arise due to the lack of training, new job tasks, technological changes, or new production processes. According to the DHET, the term "top up skills" also refers to skills gaps. Skills gaps usually requires short training interventions (DHET, 2019).

Table 3-2: Skills gaps by major occupational level

Major Occupation Group	Occupation name	OFO Code	Most common skills gaps
Technicians and Associate Professionals	Shift Supervisor (Mining)	2019-312101	Leadership, Supervisor, Planning and organising
	Engineering Foreman	2019-312101	Leadership, Supervisor, Communication - written
	Shift Foreman / Boss (Mining)	2019-312101	System Skills, Planning and organising, Leadership
	Mining Operations Supervisor	2019-312101	Leadership, Supervisor, Mine production process
	Production / Operations Supervisor (Manufacturing)	2019-312201	Technical - job-specific, Supervisor
	Production Plant Supervisor	2019-312201	Supervisor, Planning and organising, Problem-solving
	Engineering Supervisor	2019-312103	Technical - job-specific, Supervisor, Problem-solving
Trades Workers (Artisan category)	Diesel Mechanic	2019-653306	Technical - job-specific
Plant and Machine Operators and Assemblers	Drill Rig Operator	2019-711301	Technical - job-specific, Occupational health & safety skills, Mine production process
Elementary Occupations	Mining Support Worker	2019-831101	Occupational health & safety skills, Active Learning, Active Listening

Source: MQA WSP and ATR (31 May, 2019)

AS shown in table 3-2, Diesel Mechanic features on both the hard-to-fill vacancies and the top-up skills. The top up skills needed the most across all occupations above are the following:

- Leadership - The process of influencing others to understand and agree what needs to be done, how to do it as well as the process of facilitating individual and collective efforts to accomplish shared objectives.
- Technical (job-specific) - Applying principles, techniques, procedures, and equipment specific to the job.

- Supervisor - Monitors and regulates processes and employees in their performance of assigned or delegated tasks.

This section was crossed checked against the analysis of the 2019 expert interviews conducted across the subsectors using the DHET interview guide. Findings revealed that the most common skills gaps related to 'Technical top-up skills' which falls into the category listed above as Technical (job-specific), i.e. applying principles, techniques, procedures, and equipment specific to the job.

The findings from the 2020 expert interviews conducted across the subsectors using the DHET interview guide revealed the following:

Occupational level	List the 3 most common skills gaps in your organisation at these broad occupational levels
Senior (managers and professionals)	• Leadership skills • Project Management • People management skills • Technical skills
Mid-Level (technicians, associates, artisans, clerical)	• Supervisory/Management skills • Disciplinary/ ER skills • Project Management
Lower-Level (plant operators and elementary)	• Basic Supervisory skills • Technical skills

The main concern over senior management occupational level is due to historical nature of the sector where few historically disadvantaged persons were not accorded the same opportunities, and thus the majority of managers are white males. For mid-level managers, technical experience is a major challenge as companies tend to fast-track promotions for the sake of complying with BBBE requirements.

It is important to note that this will be further crosschecked and updated against the WSP 2020 data when it is made available and conclusions will be drawn thereafter.

3.3 Extent and Nature of Supply

The future growth prospects of a sector is dependent on the availability of appropriate and affordable skills, therefore an analysis of the supply-side is necessary. Data received from the MQA, DMRE, DHET and Minerals Council South Africa on education and training was analysed. It is important to note that the MQA supply side data may change post Audit. Findings from the key informant and expert interviews as well as desk research were included in this section.

3.3.1 Current state of education and training provision

Skills development has a huge dependence on basic education as a foundation phase to enable individuals to move into further areas of education and training. Similarly to other economic sectors; skills required for the MMS are produced at basic education level, TVET colleges, through private Training Providers, Universities of Technology, Universities as well as workplaces.

3.3.1.1 Overview of Basic Education

The skills available to the MMS consist of people that are currently employed, as well as those that are unemployed, but available for work. Chapter one's labour market profile showed that the biggest proportion of workers (48%) have achieved the equivalent of Grades 10 - 12 as their highest level of education. In 2019, South Africa achieved an 81.3% matric pass rate (DBE, 2020). From this pool of matriculants, 54.6% compared to 58% in 2018 passed mathematics (ibid). More learners choose mathematics literacy over pure mathematics (DBE, 2019). For learners who aspire to study towards STEM professions that require a strong knowledge of mathematics, this becomes problematic as opportunities are limited in this area with mathematical literacy. In the MMS specifically, many occupations require a foundation of good quality maths and science subjects and to some extent geography.

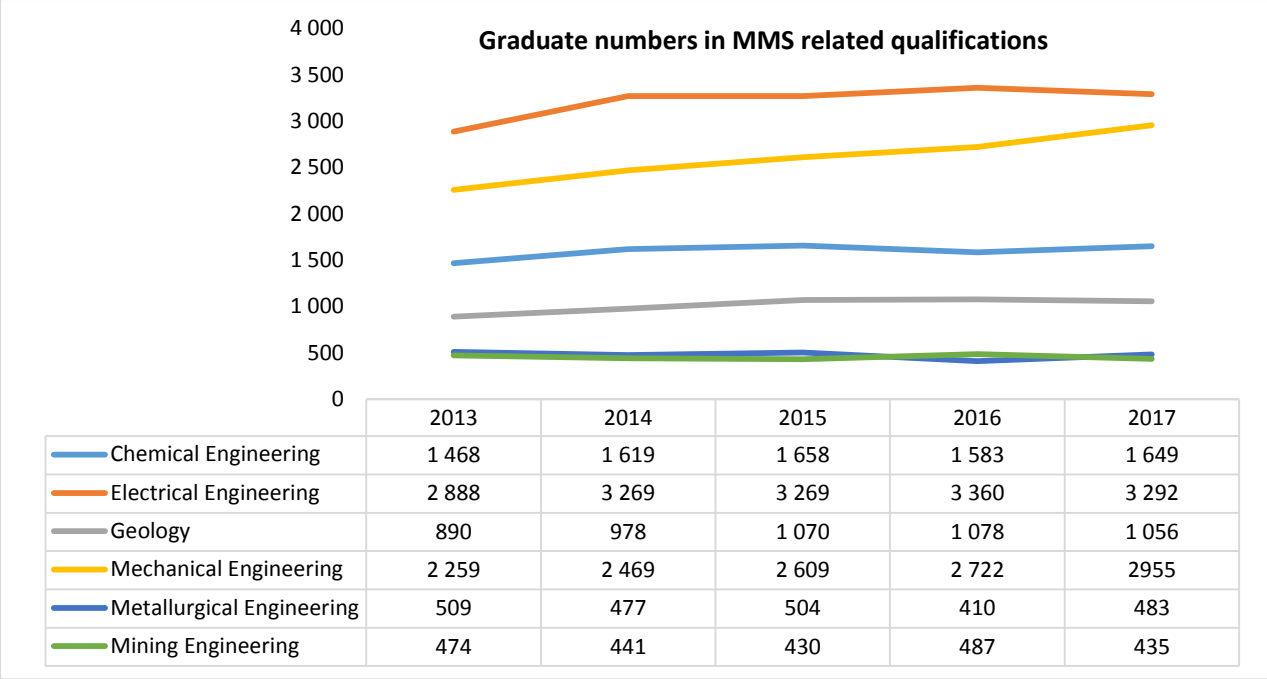
Another challenge is that school integration has been a persistent challenge for many rural provinces and a fair portion of the Department of Basic Education's budget is channelled to rural school integrated (DBE, 2019). The NDP calls for 450 000 Grade 12 learners to achieve university entrance passes with Maths and Physical Science by 2030. Although the national Grade 12 pass rate has improved somewhat in recent years, questions remain about the quality of the Grade 12 certificate, considering that learners need to score only 30% to pass some subjects. According to academics, there is a need to focus on interventions that will promote the core business of teaching and learning itself – a curriculum that will be flexible to accommodate diversity teaching that actively engages learners and assessments that do not only test but promotes learning (UCT, n:d). On the other hand, the MQA should continue to provide support to programmes aimed at improving this challenge.

3.3.1.2 Higher Education and Training

Where possible, Statistics on Post- School Education and Training in South Africa 2018, published by the DHET is utilised. Higher education and training or tertiary education, includes education for certificates, diplomas as well as undergraduate and postgraduate degrees. In recent years, more school-leavers have been obtaining marks that enable them to enrol for studies at university level – however, owing to the poor maths and science pass marks in the country, the uptake for the sector itself remains relatively low.

At tertiary level, some of the fields of study relevant to the sector are mining engineering, mine surveying, metallurgy, chemical engineering, geology, electrical engineering, mechanical engineering, as well as jewellery design and manufacturing. Mining engineering is offered at the University of the Witwatersrand, the University of Pretoria, the University of Johannesburg, and University of South Africa (UNISA), while Mine Surveying is only offered at the University of Johannesburg and UNISA. Jewellery design and manufacturing is offered at Stellenbosch University and at four other Universities of Technology. The other fields of study are each offered at a number of institutions. Figures 3-1 and 3-2 demonstrate a 5 year trend of the number of graduates enrolled and completed core mining related qualifications.

Figure 3-1: Graduates that completed a MMS related qualification

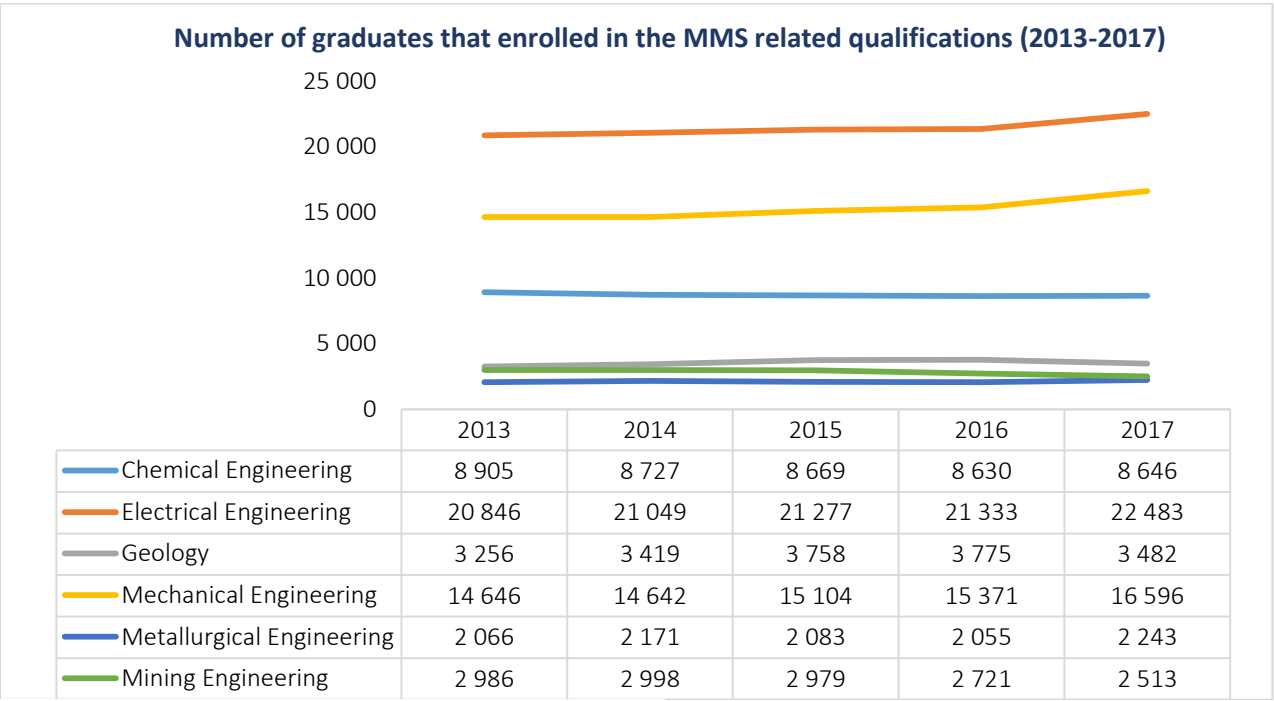


	2013	2014	2015	2016	2017
Chemical Engineering	1 468	1 619	1 658	1 583	1 649
Electrical Engineering	2 888	3 269	3 269	3 360	3 292
Geology	890	978	1 070	1 078	1 056
Mechanical Engineering	2 259	2 469	2 609	2 722	2955
Metallurgical Engineering	509	477	504	410	483
Mining Engineering	474	441	430	487	435

Source: DHET, HEMIS Data (2019).

Electrical engineering (3292 in 2017) continues to have the highest output, followed by mechanical engineering (2955 in 2017) and chemical engineering (1649 in 2017). Mining engineering graduates decreased from 487 in 2016 to 435 in 2017, this discipline has been cited as a hard to fill vacancy.

Figure 3-2: Graduates that enrolled in a MMS related qualification



	2013	2014	2015	2016	2017
Chemical Engineering	8 905	8 727	8 669	8 630	8 646
Electrical Engineering	20 846	21 049	21 277	21 333	22 483
Geology	3 256	3 419	3 758	3 775	3 482
Mechanical Engineering	14 646	14 642	15 104	15 371	16 596
Metallurgical Engineering	2 066	2 171	2 083	2 055	2 243
Mining Engineering	2 986	2 998	2 979	2 721	2 513

Source: DHET, HEMIS Data (2019).

The figure above demonstrates a 5 year trend of the number of graduates who enrolled into a qualification related to the MMS. The pipeline for supply of MMS related qualifications have shown an across the board increase in enrolments since 2016 aside from mining engineering and mechanical engineering which poses a concern for the sector.

3.3.1.3 Bursaries funded by employers to employees

Table 3-3: Employee bursaries funded by employer

Bursary Type	No of bursaries	% contribution
Other (non-mining related)	1310	93,3%
Mining Engineering	32	2,3%
Analytical Chemistry	16	1,1%
Electrical Engineering (Heavy Current Only)	10	0,7%
Chemical Engineering (Mineral Processing)	9	0,6%
Metallurgy	7	0,5%
Environmental Health and Management	6	0,4%
Electro Mechanical Engineering	4	0,3%
Geology	4	0,3%
Extraction Metallurgy	2	0,1%
Mine Survey	2	0,1%
Industrial Engineering	1	0,1%
Jewellery Design	1	0,1%
Total	**1404**	**100%**

Source: MQA WSP/ATR 31 May 2019.

The top three bursaries provided by the employers to their employees within the MMS, aside from "other", are mining engineering (2, 3%), analytical chemistry (1, 1%) and electrical Engineering - Heavy Current Only (0, 7%).

Table 3-4: Community bursaries funded by employers

Bursary Type	No of bursaries	% contribution
Other	245	58,3%
Mining Engineering	33	7,9%
Electrical Engineering (Heavy Current Only)	32	7,6%
Geology	22	5,2%
Chemical Engineering (Mineral Processing)	18	4,3%
Electro Mechanical Engineering	17	4,0%
Environmental Health and Management	12	2,9%
Metallurgy	10	2,4%
Mine Survey	9	2,1%
Extraction Metallurgy	5	1,2%
Analytical Chemistry	4	1,0%
Industrial Engineering	4	1,0%

Bursary Type	No of bursaries	% contribution
Mechanical Engineering	3	0,7%
Community Study Assistance	1	0,2%
Electrical Engineering	1	0,2%
Metallurgical Engineering (Extractive Only)	1	0,2%
Partial BCom Commercial Law	1	0,2%
Physical and Mineral Science	1	0,2%
Scholarship	1	0,2%
Total	**420**	**100%**

Source: MQA WSP and ATR 31 May 2019.

The top three bursaries funded by employers in the MMS to individuals who are not their employees, aside from "other", are mining engineering (7,9%), electrical Engineering - heavy current Only (7,6%) and geology (5,2%).

3.3.2 MQA's interventions to address Skills Supply in the MMS

3.3.2.1 MQA's interventions to address challenges at basic education level

The MQA, alongside the MMS have been developing skills interventions over the past years to meet the skills needs of the sector at various levels of education.

Employees whose highest level of education are between Grades 4 and 9 constitute 14% of the sector. This range includes AET levels 1–4. As discussed in Chapter two, given the influence of technology in the sector, there is a need for reskilling some of the current and future employees in areas such as machine operations and maintenance. Thus, it will be important for the MMS to prioritise funding for AET training, including level 4, also taking into account that numeracy and literacy skills that were identified by stakeholders as skills that need to be topped up for elementary workers. The objective of AET is to support employers to participate in AET training to progressively increase levels of literacy in the MMS. By so doing, this will help develop adequate literacy and numeracy levels for the sector's emerging skills requirements. In 2019/20 a total of 1241 employees received one or more AET training.

3.3.2.2 Career Guidance

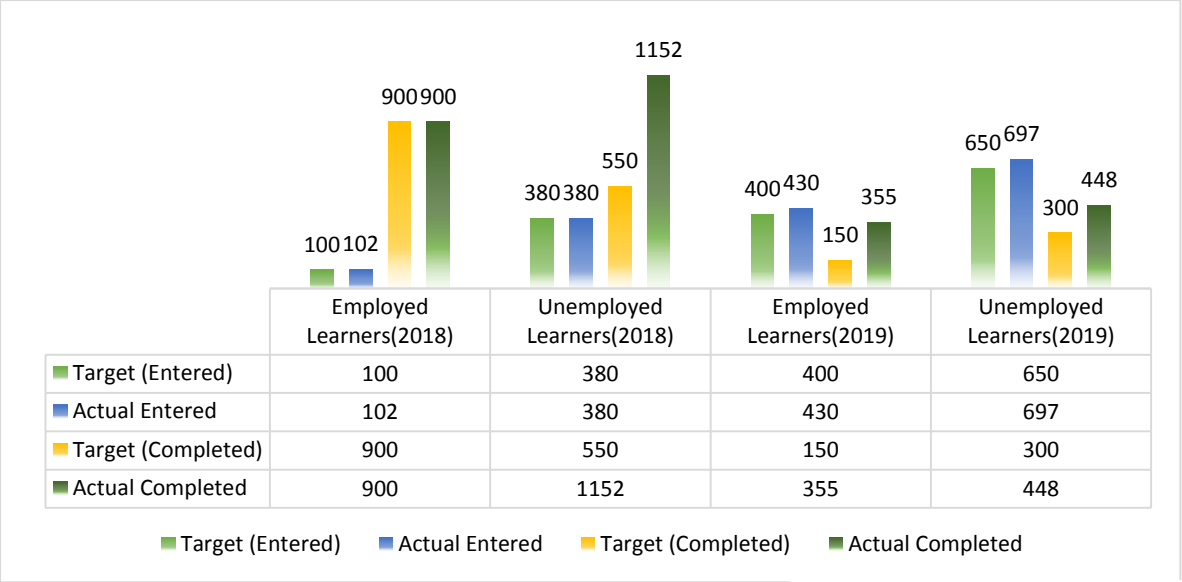
Career guidance is a process of self-discovery that helps learners identify what they are good at, understand how their skills, talents, and interests translate into work and find the education and training they need to work in the existing job market. In 2018, the MQA increased its commitment to undertake 83 career awareness events thus exceeding its target of 70 by 13. In 2019 the target for these events was set at 80 and the MQA exceeded this target by 11 with a total of 91 career awareness events. This is in line with the NSDP's requirement to support career development services in the sector. The aim of the career awareness events are to promote occupations in the sector and rectifying misperceptions about the MMS not being an attractive industry to work in through the dissemination of comprehensive information related to careers and pathways that attract quality candidates for mining careers. In light of the current acute shortages in the sector, focus should also be placed on the retention and further development of learners' talent in the industry upon entering the market. TVET college sector

TVET colleges form a critical component of the current training capacity of skills for the sector. Their programmes include NCV, Nated (mainly for artisan development), skills programmes, learnerships and short courses. The majority of MMS-related skills are developed at this level of education, covering a variety of mining operations including blasting, excavations, metallurgy and engineering. Practical training at college workshops and on-the-job workplace experience are an important component of this level.

There are still concerns by stakeholders that many students are not adequately work-ready upon graduating, particularly artisans. This is derived from the notion that many college workshops are not equipped with modern equipment to adequately provide practical training required for the completion of qualifications. While employers in the sector appreciate the need to carry a measure of responsibility for training graduates to develop industry-specific skills, there is a need for curricula to be revised and updated with the latest technologies currently being used in the sector.

Below is a summary of the MQA's skills development interventions at the TVET college sector level to assist the industry to meet its skills requirements.

3.3.2.3 Employed and unemployed learnerships (Non-apprenticeship)



	Employed Learners(2018)	Unemployed Learners(2018)	Employed Learners(2019)	Unemployed Learners(2019)
Target (Entered)	100	380	400	650
Actual Entered	102	380	430	697
Target (Completed)	900	550	150	300
Actual Completed	900	1152	355	448

Figure 3-3: Employed and unemployed learnerships (Non-apprenticeship)

Source: MQA APR (July, 2020)

The above figure illustrates the number of employed and unemployed learners that entered and completed a learnership in 2018 and 2019. The HRD Strategy for South Africa, NGP and NSD emphasise the provision of workplace training in priority skills needs that could be in the form of learnerships. The MQA had a target of 100 learnership entries for employed learners and 380 for unemployed learners in 2018 and this was increased to 400 and 650 respectively. With regard to the completions of learnerships the MQA had a target of 900 for employed learners and 550 for unemployed learners in 2018 with these targets being reduced in 2019 to 150 and 300 respectively. It is worth noting that the MQA has consistently achieved the targets for both the 2018 and 2019 reporting years. The purpose of these learnerships is to enrol learners into core learnerships for the MMS. For those that are employed, these learnerships play an important role in advancing employees' careers, leading to qualifications recognised by the SETA and DoL.

In assessing the top 3 programmes completed, it is worth noting that employed learners are mostly involved in core mining programmes and unemployed learners are mostly involved in the Jewellery manufacturing and Health and Safety as per the table below.

3.3.2.4 Top 3 Programmes completed by unemployed and employed learners by order

Employed Learners	Unemployed Learners
1. National Certificate Mining Operations for Underground Hard Rock	1. National Certificate in Jewellery Manufacturing
2. National Certificate Minerals Processing	2. National Certificate Occupational Health, Safety & Environment
3. National Certificate Rock Breaking Underground Hard Rock	3. National Certificate Rock Breaking Underground Hard Rock

Table 3-5: Top 3 programmes completed by unemployed and employed learners

Source: MQA APR (June, 2020)

3.3.2.5 MQA learnerships (apprenticeship)

The lack of skilled artisans is argued to be one of the major obstruction to employment creation and economic growth in South Africa. The MQA Artisan (apprenticeship) Development Projects' targets are set by the Department of Higher Education and Training and support the HRD Strategy for South Africa, the IPAP2, NGP, the NSDP and Chapter 9 of the NDP to produce artisanal and technical skills annually. In light of this requisite, figure 3-4 illustrates that in 2018 the MQA set a target to enter 275 learners into an artisan programme in which it was exceeded at 320 and 2019 the MQA set a target to enter 800 learners and exceeded this by 111. The top 3 fields in 2019 that learners entered were electrician (240), followed by fitter (189) and diesel mechanic (106). In addition, the target for completions in 2018 was 1300, this was achieved at 1306 and the target for completions in 2019 was 750 of which 950 were achieved. Similarly as the programmes entered, the top programmes completed in 2019 were electrician (258), fitter (187) and diesel mechanic (167).

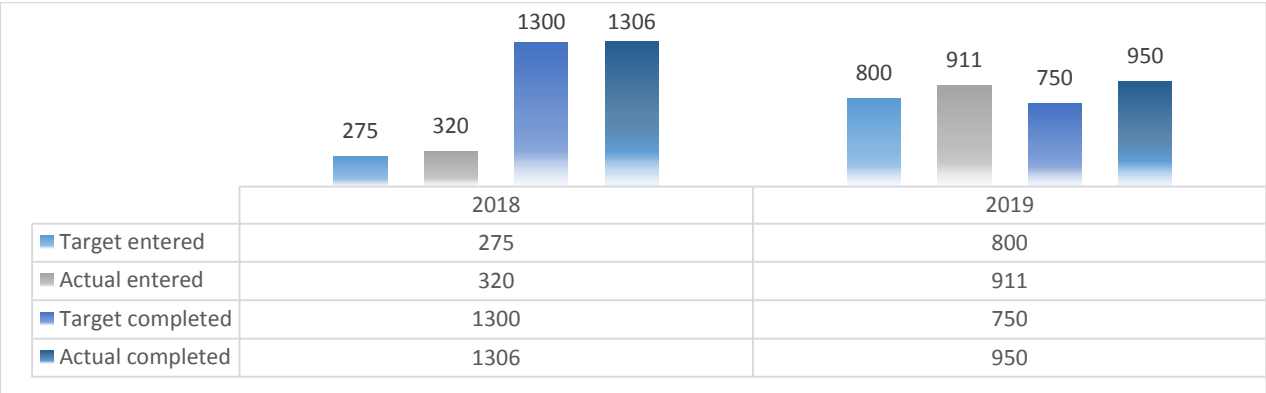


Figure 3-4: Apprenticeship entered and completed

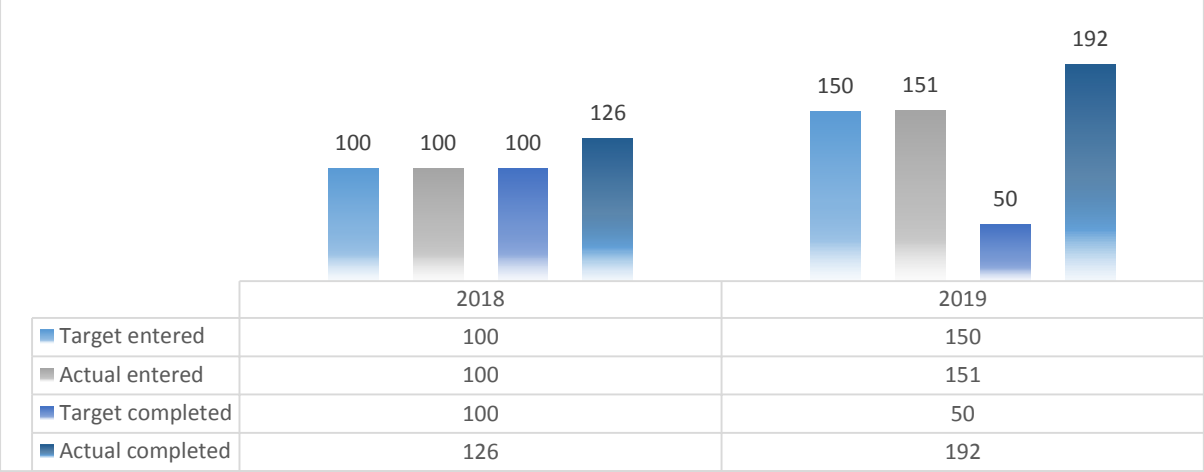
Source: MQA APR (July, 2020)

Competition with other sectors for artisans as well as an uncertainty of job attainment in the MMS after completion still denotes that not all artisans developed within the MMS will be absorbed.

Moreover, as reported in Chapter 2, technology continues to play a role in shaping the skills sets in the sector. With this accounted for, stakeholders in the MMS still maintain that there is a shortage of artisans with specialised knowledge and experience in updated and new technology. Therefore, learnerships need to incorporate changes in technology within occupations and include work experience at suppliers of new technology to the mines as much as possible.

3.3.2.6 Practical training and workplace exposure

Outcome 2 of the NSDP articulates the need to link education and the workplace. SETAs can facilitate and broker the linkages between the labour market, employers and sectors with the education and training institutional supply such as Universities, Universities of Technology, TVET and CET colleges (NSDP, 2019).

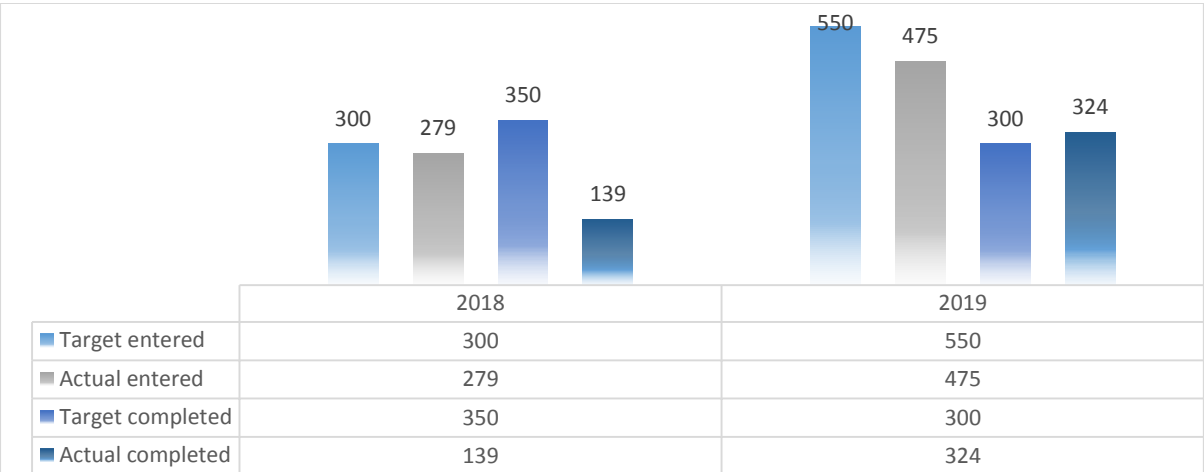


	2018	2019
Target entered	100	150
Actual entered	100	151
Target completed	100	50
Actual completed	126	192

Figure 3-5: TVET NCV graduates entered and completed

Source: MQA APR (June, 2019)

As seen in figure 3-5 above, in 2019/20 a target was set to place 150 TVET NCV graduates to enter a work placement programme with host employers. This target was met at 151 entered TVET NCV graduates. The completion target for the work placement programme at TVET colleges was also achieved at 192 from a target of 50.



	2018	2019
Target entered	300	550
Actual entered	279	475
Target completed	350	300
Actual completed	139	324

Figure 3-6: Workplace exposure undergraduates entered and completed

Source: MQA APR (July, 2019)

On the other hand, work exposure is also provided to university undergraduate students, from figure 3-6 above it is noted that in 2019 their entry targets (550) was underachieved by 75 at 475. The completion target of 300 was achieved at 324. The non-achievement in the number of undergraduates entering a workplace experience programme could be attributed

to challenges experienced in securing sufficient and available workplaces to host new learners.

Moreover, the MQA and universities have identified the need to form a strategic collaboration to achieve employment equity and transformation within universities' mining engineering and mine survey departments. The collaboration seeks to achieve sustainable, high quality mining education in support of the transformation agenda of the government and the MMS through creating a pool of skills and promote interest in academia among HDSAs. It also aims to empower universities to transform and to be representative in its lecturer staff complement. In 2019/20, the target to place 30 lecturers in the programme was almost met at 27. This target was not met due to the lockdown as universities were unable to conclude contracting for the lecturers whom all fall under the same NQF band level 6-10.

3.3.2.7 MQA interventions at HET level

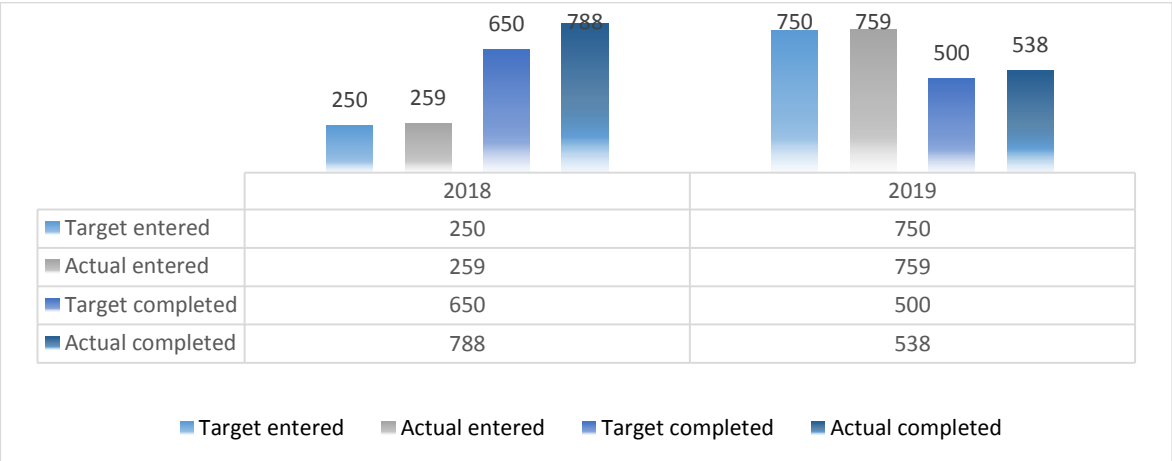
The MQA bursary scheme contributes to the skills transformation agenda and was established to provide financial assistance to students from previously disadvantaged backgrounds and to increase the number of students pursuing careers in the MMS. To date the bursary scheme continues to assist students by offering them the opportunity to study mining related careers at HET institutions. The bursary support programme also forms part of the MQA learner support strategy, which is in line with the Mining Charter, 2018 and the objectives of the NSDP.

In previous years, bursaries were mainly targeted at unemployed students. However, due to the demand by the sector to promote transformation and the need to support employees with competencies that endorse upward career progression, in 2018 the MQA started providing bursaries aimed at employees. The bursaries are awarded to individuals who are currently employed in mining companies and studying or intending on studying towards a mining related qualification, be it a Certificate/Diploma/Degree/Postgraduate.

3.3.2.8 Bursaries awarded to employees

A target of 50 employee bursaries was set in 2019, this target was achieved at 52. Compared to 2018 where the same target of 50 was underachieved at 32. Given that this is a relatively new function, it seems to be gaining traction well.

3.3.2.9 Unemployed bursaries entered and completed



	2018	2019
Target entered	250	750
Actual entered	259	759
Target completed	650	500
Actual completed	788	538

Figure 3-5: Unemployed bursaries entered and completed *Source: MQA APR (July, 2020)*

The 2019 target set for unemployed bursaries entered of 750 was met with at 759, this was largely due to the inability to conclude contracting with learners as a result of the 2019 national COVID - 19 lockdown. With regards to the unemployed bursaries completed in 2019 it is encouraging to note that the target of 500 was met with a surplus of 38.

3.3.2.10 Other MQA interventions

In addition to its support towards work-based skills development programmes, the MQA also provides access to economic opportunities to mine communities and labour sending areas. Supporting mining communities enables mining companies to fulfil their transformational mandate through skills development and places them in enhanced positions to manage any skills gap issues that lead to unemployment in those communities.

The sections below provide the targets and achievements of the MQA's support to youth development and small-scale mining in mine communities.

3.3.2.10.1 Youth Development and Mine Community Programme

The development programme aims at providing training to unemployed youth living in mine communities and labour sending areas with the aim of furnishing them with alternative skills which could enhance entrepreneurial skills post mining activities. A total 692, out of a target of 1800 youth in mining communities and labour sending areas entered the youth development programme in 2019/20, whilst 27 out of a target of 800 youth completed the programme in the same financial year. The reasons for the targets not being met was the training proposals did not meet funding criteria and proposals received did not meet the requirements to deliver on the Youth Development projects were approved in prior year.

Furthermore, the mine community development programme is similar to the youth development programme, with the difference being that it provides training to a broader population, i.e. women, retrenched individuals and people living with a disability from mining communities and labour sending areas. The programmes provides support on portable skills and mining related programmes to retrenchees and unemployed individuals to enable employability and sustainability of the livelihoods of beneficiaries. The MQA set a target of 1050 training programmes for entered and 900 for completed mine community beneficiaries. Both targets for entered and completed beneficiaries were exceeded, with the latter achieving 969 and former 1441.

3.3.2.10.2 Support for small-scale mining skills

As seen in Chapter 1, small mines are well represented in the MMS. However, although represented, small-scale mining companies experience challenges with sustainability attributed to the capital intensive nature of the industry as well as broader market dynamics. Therefore, it is imperative to support these companies to develop a path that will empower them to perform efficiently. In its efforts to mitigate some of these challenges, the MQA has a programme aimed at training communities in small-scale mining. In the year 2019/20, a target of 150 was met at a total of 150 beneficiaries participating in the small-scale mining programme as opposed to 60 in the 2018/2019 year. The support of small-scale mining skills is in line with outcome 6 of the NSDP which aims to increase skills development support for entrepreneurial activities and the establishment of new enterprises and cooperatives.

3.3.2.10.3 MQA-accredited Training Providers

A of 259 from a target of 230 training providers were accredited by the MQA in the financial year 2019/20 exceeding the previous financial year's target of 200 and 229 achieved accredited provided. This ensures that there is a pool of accredited training providers to offer MMS related qualifications. It also confirms the level of proficiency and quality of training undertaken for current and future employers.

3.3.3 Other supply-side considerations in the MMS

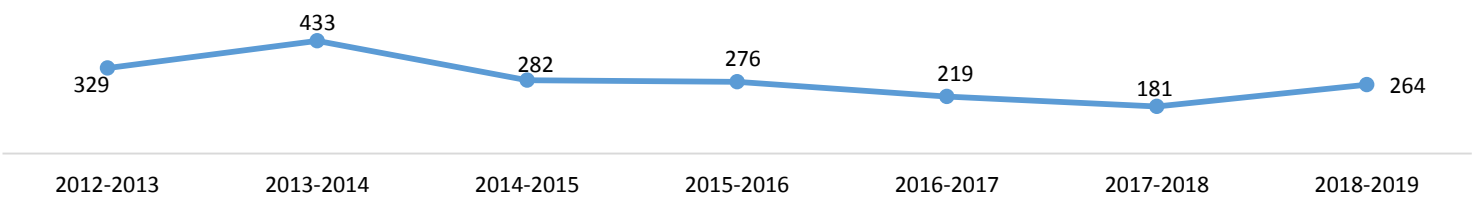
The following two sections provide details on other supply offerings which do not fall into any of the afore-mentioned education echelons, namely Government Certificates of Competency, Minerals Council South Africa certificates and management skills.

3.3.3.1 Government Certificates of Competency

Certain core occupations within the MMS, such as Mine Engineer and Mine Manager can only operate upon attainment of a Government Certificate of Competency (GCC) by the DMR, which confirms that the employee has the necessary skill-set required to perform the job. There are stringent qualification criteria, which include years of experience and passing of examinations to qualify for a GCC. The table below shows the number of certificates which the DMR has issued in the past seven years. There was an increase in the number of GCCs issued for all certificates between financial years 2017/18 and 2018/19, except Mine Surveyor. Although there was an increase in certificates issued for Mine Engineer and Mine Manager, their low numbers remain a worrying factor as they are identified as a hard-to-fill occupation. In addition, although not major, there were slight improvements of females that attained GCC certificates in 2018-2019 compared to 2017-2018. This could indicate that some progress is being made to ensure transformation in the sector, although further improvements still need to be made.

Table 3-6: 2018 DMRE GCC issued certificates

Year	Mine Engineer (Elec & Mech)			Mine Manager (Coal & Metal)			Mine Overseer (Coal & Metal)			Mine Surveyor			Winding Engine Driver		
	Total	M	F	Total	M	F	Total	M	F	Total	M	F	Total	M	F
2012-2013	72	71	1	62	49	13	165	157	8	12	12	0	18	14	4
2013-2014	115	100	15	73	57	16	177	168	9	10	10	0	58	34	24
2014-2015	121	102	19	15	12	3	103	93	10	10	8	2	33	15	18
2015-2016	98	80	18	29	22	7	105	99	6	9	8	1	35	19	16
2016-2017	70	57	13	29	24	5	77	67	10	15	9	6	28	12	16
2017-2018	47	39	8	27	22	5	76	65	11	11	9	2	20	11	9
2018-2019	68	56	12	49	36	13	104	83	21	7	4	3	36	21	15
Total	591	505	86	284	222	62	807	732	75	74	60	14	228	126	102
%	100%	85,4%	17,0%	100%	78,2%	27,9%	100%	90,7%	9,3%	100%	81,1%	18,9%	100%	55,3%	44,7%



Source: DMRE, 2019

The MQA needs to work in collaboration with the DMR to implement supportive measures that will improve the pass rates of GCC candidates.

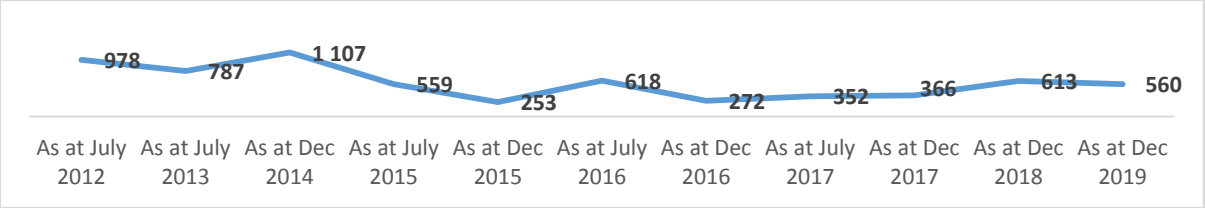
3.3.3.2 Minerals Council South Africa certificates

The table below demonstrates the number of certificates in MMS-related qualifications which the Minerals Council South Africa has issued since 2012. The Minerals Council South Africa Certificates of Competency (CoCs) were introduced to standardise stand-alone in-house qualifications for persons working in the South African MMS. When looking over the last 5 years from 2016 to date, the numbers have been increasing on average for most certificates, with the exception of Certificate in Elementary Mine Surveying, Certificate in Strata Control and Certificate in Mine Survey Draughting. The decline in issuing of certain certificates is likely to be attributed to declining employment figures for the industry and the fact that some of these service functions are being outsourced.

Table 3-7: Minerals Council South Africa certificates issued in 2019

Certificate	As at July 2012	As at July 2013	As at Dec 2014	As at July 2015	As at Dec 2015	As at July 2016	As at Dec 2016	As at July 2017	As at Dec 2017	As at Dec 2018	As at Dec 2019
Certificate in Advanced Mine Surveying	70	58	91	57	6	54	19	19	17	39	21
Certificate in Advanced Mine Valuation	102	66	75	38	16	38	10	29	8	16	15
Certificate in Advanced Rock Engineering	11	3	4	4	3	5	1	3	0	8	3
Certificate in Basic Mine Sampling	141	63	164	80	43	73	26	50	28	59	75
Certificate in Basic Mine Surveying	130	142	156	77	66	120	14	42	19	98	78
Certificate in Elementary Mine Sampling	90	73	64	52	35	31	26	24	92	11	36
Certificate in Elementary Mine Surveying	130	88	141	95	25	46	46	24	9	68	43
Certificate in Mine Environmental Control	19	8	29	8	4	15	6	10	9	21	81
Certificate in Radiation Protection Monitoring Screening	125	109	181	61	41	108	37	63	32	95	58

Certificate	As at July 2012	As at July 2013	As at Dec 2014	As at July 2015	As at Dec 2015	As at July 2016	As at Dec 2016	As at July 2017	As at Dec 2017	As at Dec 2018	As at Dec 2019
Certificate in Rock Mechanics	27	25	25	16	2	12	14	11	6	31	14
Certificate in Strata Control	79	64	96	61	10	50	49	29	67	32	42
Intermediate Certificate in Mine Environmental Control	32	48	51	59	1	51	13	40	72	122	88
Certificate in Mine Survey Draughting	22	40	30	12	1	15	11	8	7	13	6
TOTAL	**978**	**787**	**1 107**	**559**	**253**	**618**	**272**	**352**	**366**	**613**	**560**



Source: MCSA, 2019

3.3.3.3 Management skills

Technical individuals, often engineers, are promoted to managerial positions as there is a need for managers of mines to have a strong technical understanding of the operations they are managing. The sector lacks employees with a combination of senior technical knowledge and strong management skills which can negatively affect productivity and internal relations. Stakeholders believe that the best place to develop these skills is at the workplace, which takes at least eight years. Numerous stakeholders suggested that opportunities need to be created at early career stages, for example managing small tasks as well as attending management development courses.

The MQA has a management development programme in place which aims to address this challenge. The target of 80 HDSA employees who entered this programme was not achieved in 2018 with 76 HDSA MMS employees completing a management development program. This was due to an insufficient pipeline of learners from previous years completing training in that year. In 2019 the target for employees who entered this programme was set at 100 and this was achieved at 120. A total of 9 HDSA MMS employees completed a management development program in 2019 against an ambitious target of 160. The major reason for this is due to the insufficient pipeline of learners to complete the Management Development Programme in this financial year.

3.4 Sectoral Priority Occupations and Interventions (PIVOTAL)

The research study was designed to be as interactive as possible in the facilitation of the entire research process. Therefore, a consultative participatory approach with the MQA management and sub-Board Committee was used to inform and finalise the most appropriate methodology to develop the MQA Pivotal list. Once all parties were in agreement with the methodology, the PIVOTAL list was sent to the Board where endorsement was made in favour of it.

Through the consultation process, the MQA's OFO Code PIVOTAL Skills List in Table 3-8 was determined by considering the hard-to-fill vacancies reported in the WSP/ATRs. The analysis included a frequency run of the top 10 most identified occupations by companies through the WSP/ATR submissions. This was then cross- tabulated by provinces and subsectors to identify the frequency of mentions per occupation within 2 variables (province and subsector). Thereafter, the sum of province and subsector were calculated to develop the top 10 PIVOTAL occupations for the MMS.

It is important to note that since the PIVOTAL list is OFO code-based, it is not possible to reflect other critical priorities within the occupation due to the limitations with the reporting framework. For example, AET, MDP, as well as skills related to mineral beneficiation and sustainability are blanket priorities in the sector and required to be developed within many occupations and at different NQF levels. Therefore, highlighting some of these occupations in the PIVOTAL list would be excluding many others which are also applicable. Considering this, and that PIVOTAL skills are required to address skills gaps, the research team chose to focus its PIVOTAL list on occupations which were identified as hard-to-fill vacancies only.

The interventions listed in the PIVOTAL list were informed by understanding the unique reasons for the challenges faced by employers where each of the occupations are concerned. The PIVOTAL list is ranked in order of OFO code according to advice by key stakeholders in the sector, including representatives of the industry, labour and government.

Table 3-8: MQAs' OFO Code Based Pivotal List (2020-21)

Occupation name	OFO Code	No. of hard-to-fill vacancies
Mine Manager	2019-132201	8
Production Manager	2019-132201	7
Engineering Manager	2019-132104	10
Mechanical Engineer (Mines)	2019-214401	9
Mining Engineer	2019-214601	7
Occupational Hygienist	2019-226302	7
Mine Overseer (Production)	2019-312101	7
Diesel Mechanic	2019-653306	11
Fitter and Turner	2019-652302	7
Auto Electrician	2019-671208	7

Source: WSP/ATR (31 May 2019)

3.5 Conclusions

The analysis of the MQA's WSP/ATR submissions and discussions with stakeholders indicated that the hard-to-fill occupations are as follows:

Mine Manager, Production Manager, Engineering Manager, Mechanical engineer (Mines), Mining Engineer, Occupational Hygienist, Mine Overseer (Production), Diesel Mechanic, Fitter and Turner, and Auto Electrician. The reasons accounting for these vacancies ranged from individual, organisational and supply side levels. At individual level, reasons include lack of relevant qualifications and a lack of relevant experience, whilst organisational reasons were attributed to equity considerations. Efforts to address the challenge should not be isolated but well-coordinated and integrated to develop a holistic approach that involves a wide range of social partners.

The main supply-side concerns were found to be as follows:

- Basic education: low mathematic enrolment and pass rate; and lack of early access to career awareness.
- TVET college sector: lack of adequate practical training and workplace experience at colleges and low throughput rates.
- HET sector: sector still lagging behind in attracting females to critical mining qualifications.
- Other (not specific to a level of education): lack of specialised knowledge and experience in updated and new technology; lack of work experience; lack of management for core MMS-related occupations.

Chapter 4 : SETA Partnerships

4.1 Introduction

The NSDP (2018) underscores the role of the MQA as the SETA to act as an intermediary to bridge the gap between the world of work and education by facilitating and brokering linkages between the labour market, employers and sectors with institutional supply of relevant skills sets. Such could be realised through placements and through inter-SETA partnerships, between SETAs and employers and between SETA and education and training providers. The DHET (2019) defines partnerships as "a collaborative agreement between two or more parties intended to achieve specified outcomes directed towards addressing mutually inclusive skills priorities or objectives within a specified time frame." Partnerships are formed at many levels, including macro (policy), meso (sectoral) and micro (organisational) levels. They may be vertical, between TVET colleges and national institutions, or horizontal between TVET colleges or local organisations. They can take the form of representation of stakeholders on TVET national bodies or national councils with the aim of providing advice and being consulted on policy, planning and performance evaluation, curriculum development, and total quality management. At micro level, partnerships can be between individual entities and local governments, community organisations as well as spectrum of training providers (Mitchell, 1998).

The purpose of this chapter is to evaluate the effectiveness of existing SETA partnerships in the sector with particular reference to value-adding partnerships, challenges for creating and maintaining partnerships and proposing measures for deepening those partnerships. The chapter examines the MQA's existing partnerships, focusing on the nature, objectives, and value that each partnership adds to the MQA's ability to fulfill its mandate. The chapter will also look at the successes and failures of each partnership and factors that contribute thereof, the gaps that each partnership is intended to address, as well as what should be done to strengthen the partnerships that are not working well.

4.2 Assessing the effectiveness of existing SETA Partnerships

4.2.1 Existing partnership with TVET and CET Colleges

The NDP makes reference to building a strong relationship between the college sector and industry to ensure speedy absorption of graduates into jobs. The New Growth Path highlights the role that TVET colleges play in equipping the youth with middle level skills, while the Green Paper for PSET (2012) supports TVET college partnerships while simultaneously acknowledging that such partnerships may at times have areas of improvement. The White Paper on PSET (2012) also recognises the importance of partnerships between educational institutions and employers. The Human Resource Development Strategy of South (HRD-SA) also emphasises the vitality of industry-institutional partnerships. Strategic goal 2.3., directs that each TVET institution "*has at least one functional and sustainable industry-institution partnership aimed at enhancing the link between formal learning and world of work and providing opportunities for placements"* (HRD-SA, 2012:34).

According to the National Skills Development Plan (NSDP) 2030, Government Gazette No.42290, 7 March 2019, SETAs have a crucial role to play in facilitating workplace learning partnerships between employers and sectors within the education and training institutional supply. In its mission to create a linkage between education and the workplace, the MQA entered into a number of partnership agreements with TVET and CET colleges.

4.2.1.1 The rationale and purpose of partnership - College institutional capacity building interventions

Continuous concerns have been raised about the capacity of the vocational education system in equipping people with knowledge and/or competences required for particular occupations or more broadly in the labour market. This is with regard to, corporate governance practices to ensure ethical leadership, accountability, transparency and sustainability as document analysis of information from colleges reveals that their majority do not see corporate governance practices as major part of their activities (Moloi & Adelowotan, 2019), leadership and management skills to implement strategies to inspire and enable innovation to address the hard to fill occupations, the persistent misalignment between the supply and demand (education and the world of work) demonstrated by a wide range of issues such as mismatch between the curriculum and industry skills requirements, the disjuncture between theory and practice due to lecturer's limited teaching, technical skills and industry experience lack of work readiness on the part of college cohorts (SASSETA, 2019). To address these systemic challenges, in 2019-20, the MQA concluded Memorandum of Agreements (MoAs) renewable on annual basis with a number of TVET colleges with objectives directed towards providing support for the creation of necessary conditions for improvement of teaching and learning. To this effect, the MQA started entering into partnerships with TVET and CET colleges in 2019. Hitherto contract agreements were signed between the MQA and the colleges. To this end, the MQA has existing partnership agreements with 26 TVET and 7 CET colleges across all the nine provinces, thus maintaining national footprint to ensure impact across the country. This partnership is in line with the DHET's mandate to build the capacity of colleges. The nature of this partnership is structured in a way that allows the parties involved to sign a 1 year contract.

All the partnership agreements share the same objective, which is to strengthen institutional capacity with an objective to improve pedagogical outcomes and ultimately produce people with the much required industry aligned, specific and fit to purpose competencies. Areas of capacity building include equipping college employees or council members with necessary knowledge, skills and values of the principles of corporate governance, management and accreditation as well as training lecturers in facilitation, assessment and moderation competencies. This is aimed at improving the institutional performance with regard to management, governance and teaching systems to create conditions optimal for improved classroom practice in areas such as learning design, teaching, learner support, learner achievement and certification. This partnership adds value by closing some of the systemic deficiencies experienced within the colleges in domains such as issues of governance, management, and accreditation strategically important for programme rollout (teaching and learning).

4.2.1.2 CET and TVET Capacity Building and Accreditation

The MQA has existing partnership agreements with 26 TVET and 7 CET colleges across all the nine provinces of South Africa. This partnership is in line with the DHET's mandate to build the capacity of colleges. The nature of this partnership is structured in a way that allows the parties involved to sign a 1 year contract, while training is usually conducted over a period of 6 months or more.

All the partnership agreements share the same objective, which is to provide training interventions to CET and TVET employees or council members on corporate management and governance as well as assessor and moderator training. This is aimed at improving the TVET college management and governance systems as well as the quality of teaching and learning.

This partnership adds value by closing some of the gaps experienced within the TVET and CET colleges, such as issues pertaining to governance, management and accreditation.

Below is a list of the names of TVET and CET colleges that the MQA currently has a partnership with for capacity building accreditation:

Colleges		
Province	**Name of CET**	**Name of TVET**
Gauteng	Gauteng CET College	Ekurhuleni East TVET College
Eastern Cape	Eastern Cape CET College	Buffalo TVET College
		King Sabbath Dalindyebo TVET College
North West	North West CET College	Vuselela TVET College
		Orbit TVET College
Western Cape	Western Cape CET College	West Coast TVET College
		College of Cape Town
		False Bay TVET College
Free State	Free State CET College	Maluti TVET College
		Gold fields TVET College
		Motheo TVET College
		Flavius Mareka TVET College
Kwazulu-Natal	Kwazulu-Natal CET College	Majuba College
		Coastal KZN TVET College
		Umfolozi TVET College
		Elangeni TVET College
Limpopo	Limpopo CET College	Vhembe TVET College
		Mopani South East TVET College
		Sekhukhune TVET College
		Capricorn TVET College
		Waterburg TVET College
		Letaba TVET College
Northern Cape	N/A	Northern Cape Urban TVET College
		Northern Cape Rural TVET College
Mpumalanga	N/A	Nkangala TVET College
		Gert Sibande TVET College

Table 4-1 - TVET & CET Capacity Building and Accreditation

4.2.1.3 Successes, Failures and Improvement Areas for partnership with TVET and CET colleges

Partnerships	
Indicators	**Institutional strengthening of systems**
Successes	• Training of council members to provide leadership with regard to governance with emphasis on adhering to the ethical standards and management to provide strategic leadership crucial for colleges to deliver on their business strategies • Training of management on accreditation to ensure appointment of suitable service providers to facilitate institutional accreditation (unit standards and credit bearing programme offerings) • Training of lecturers in assessment and moderation to improve teaching and learning outcomes – lecturers trained on how to facilitate, conduct outcome-based assessment and moderation, to train unemployed youth on both credit bearing or non-credit bearing unit standards aligned programmes
Shortcomings	• In 2017-18 a target of 30 lecturers was set, 64 lectures participated in this programme. However, the programme was not implemented in 2019-20 due to various challenges such as availability of lecturers (colleges struggled to release lecturers for workplace exposure due to a lack of financial resources for temporal replacements) and programme duration (3 months was deemed too short for industrial exposure). • The spreading of allocations across still remains a challenge as some do not apply. • The role played by the partnership offices within these institutions was not clearly outlined resulting in delays with project roll-out. • There was a lack of understanding regarding compliance requirements, thus resulting in delayed payments and affecting timeous delivery of training.
Improvement Areas	• Based on the lessons learned, the MQA intends to offset the previous challenges via the re-configuration of the workplace experience (industrial exposure) programme to allow lecturers adequate time to gain the necessary exposure and training and in collaboration with colleges craft an innovative strategy to address the substitution challenges. • Put up project management and monitoring systems to remove bottlenecks in all stages and eliminate delays in the implementation of the projects, to ensure deliverables, outputs and outcomes. • Ensure clarification of the reporting lines within the colleges as well as understanding of the procurement process of the MQA including how to successfully apply for the grants. • Improve project planning and align DG to TVET and CET calendar to improve participation of lectures in the programme. • COVID integration of the new normal, the dispensation of virtual office as well project management (MQA, 2020).

4.2.2 Partnership with private and public institutions regarding skills development research in the mining and minerals sector

In its strategic objective to partner with public and private institutions, the MQA has partnered with three institutions for the purpose of conducting research that will improve skills development planning and decision-making within the MMS.

4.2.2.1 Understanding the Impact of Changing Technology and its Skills Development Implications in the Mining Sector

The MQA concluded a partnership agreement through MoAs with the Council for Scientific and Industrial Research (CSIR) and Mintek. The partnership with the CSIR is in relation to the SATCAP programme driven by the Mandela Mining Precinct. These partnerships share the same objective, i.e., to conduct a research study to probe the integration of technology into the mining production processes and its effects on skills requirements in relation to the MMS' core occupations.

The parties involved will remain bound for a period of two years, however the aim is to complete this particular study by September 2020.

The value add would be gaining an insight on the skills necessary to address the demand brought upon by changing technology in the MMS. Sharing of research knowledge and skills between the CSIR and Mintek will assist the MQA in realising its mandate to building research capacity for skills planning and research internally, thereby improving skills development planning and decision-making through research.

At this point, it is difficult to make a judgement on the partnership's level of success as the research is still in progress.

4.2.2.2 Understanding health and safety matters to attain zero harm in the mining sector

The MQA concluded a MoA with the MHSC for the purpose of conducting a research study to investigate the occupational health and safety matters and its relations to skills requirements in the MMS. The objective of the study was to examine the nature and type of the health and safety interventions that are intended to achieve zero goal by first reducing harm occupationally related diseases, injuries and fatalities in the MMS.

This partnership agreement remain binding for a period of two years which is still in effect, however the study was completed at the end by March 2020. Similar to the partnership with the CSIR and Mintek, this partnership is also being rolled out for the first time. The collaborative efforts between the MQA and MHSC will seek to promote health and safety in mining through research informed education and training interventions. The report identified various organisational related OHS skills such as OHS policy analysis, incident investigation, OHS process evaluation and OHS leadership and management, human related OHS skills cover health analysis, people management and PPE training and OHS communication as factors requiring attention to achieve the mandate of zero harm in the MMS. There is also set of technical skills required for a wide range of employees across the occupational structure in pursuit of this mandate. These include skills in risk management, identification of potentially hazardous geological anomalies, heat analysis and monitoring, monitoring and testing noise hazard, analysis of seismicity, rock fall and fall of ground with possible relevant OHS technical programmes. The MQA OHS report (2020) also recommends alignment of OHS programme with the needs of the MMS work in collaboration with other SETAs to incorporate the existing programmes into the MMS, aligning them with SAQA as well as examine in house programmes of the companies in the MMS to develop best practice interventions (MQA, 2020).

Because competence or capacity to roll out programmes in these areas rests within various entities in the continuum of demand and supply, there is a strong partnership between

various stakeholders, employees, employer and training provider becomes a necessity to craft a well-integrated, coordinated and holistic approach.

4.2.2.2.1 Challenges experienced in securing research partnerships

Soliciting partnerships has been a challenge because interested partners expressed a reluctance to co-fund the MQA related research projects and their own research agenda many times differ with that of the MQA, at times. The risk in this is that the MQA spends a lot of time seeking research partners, which result in project delays.

4.2.2.2.2 What should be done to strengthen research partnerships?

In the light of the above challenges, the MQA re-configured the co-funding model and funded MQA research agenda fully from its budget, whilst exploring other avenues of co-funding as additional to the MQA's identified projects.

4.3 Planned Partnerships

4.3.1 Minerals beneficiation Partnerships

South Africa's Minerals Beneficiation Strategy is planning to transform the industry from being largely resource-based to knowledge-based. The IPAP places mineral beneficiation as one of its key priority areas and has identified several growth factors including mineral beneficiation and jewellery manufacturing as potential areas to create jobs. Opportunities exists for downstream processing and adding value locally to iron, carbon steel, stainless steel, aluminium, PGMs and gold. Through a partnership with entities such as the DTI and DSBD (Department of Small Business Development), the country has the potential to develop unique capabilities and the necessary human resources with adequate skills and equipment to apply interventions beyond the mining sector. The DTI for instance, could play the role of developing master plans that will incorporate mineral beneficiation innovations with not only the MMS, but other sectors. The MQA in collaboration with the steel sector could form a partnership through the DTI to probe factors influencing aspects of cross-sectoral networking, trading and skills-transfer for the development and promotion of locally beneficiated products. Taking into account the need to develop locally produced products, the MQA could also partner with DSBD to equip small and emerging businesses with the necessary resources and skills to be involved in the beneficiation of minerals. This is aligned to outcome six of the NSDP that aims to increase skills development for entrepreneurial activities and the establishment of new enterprises and cooperatives.

4.3.2 Green skills partnerships

South Africa has been experiencing a water and energy crisis and the MMS has been susceptible to this challenge which far-reaching implications due to stoppage in production with concomitant financial loss. To stem the water crisis, the MQA could partner with the Department of Environmental Affairs (DEA) to conceptualise a project that would aim at investigating measures on how mining companies can recycle and optimally re-utilise waste water to other economic and livelihood activities such as agriculture. In turn, community members can benefit from this as they could develop subsistence farms which could be used to fight against the poverty challenge experienced by the majority of communities in the country. In addition, a research partnership should be established with the National Research Foundation (NRF) to identify factors that could possibly lead to the development of cleaner mineral production processes and alternative means of energy to expand the national grid's capacity as well as cleaner coal consumption. This implies that the green skills identified across various stages of the mining life cycle and mineral value chain through research should

be given attention through development of programmes for up skilling, skills programmes, part and full qualifications.

4.3.3 *Partnerships between the MQA and Community Education Training Centres (CETs)*

The MQA attaches high premium to partnerships to achieve economies of scale in the MMS. Therefore, it has included in its research agenda topics that are of significance to its mandate to address skills challenges. For example, the research that focuses on the assessment of the partnership between the MQA and CETs seeks to unpack the nature (purpose, principles and goals) underpinning its partnerships particularly with the CETs in the context of the NSDP seeking to expand access to skills development. The main purpose is to explore the partnership's effectiveness by reviewing the strengths and weakness as well opportunities with the end of continual improvement of the partnership model.

4.3.4 *Partnerships to mitigate the effects of COVID 19*

The outbreak of the COVID 19 pandemic ushered a new era, a 'new normal', and a dispensation that requires partnerships to flatten the infection curve not only in the workplace but also within families, communities and in the society at large. The MMS is not immune from this given the statistical figures provided recently showing a surge in the infection rates. Thus, research partnerships that will explore the effects on COVID - 19 on skills development in the MMS become crucial to understand its impact on the sector. Forming partnerships with employers, NDH, DOLE, MHSC and Minerals Council will be imperative to equip the MMS' employees with the knowledge and means to protect themselves and their families from COVID - 19.

4.4 The MQA's model for a successful partnership

Recognising the criticality of collaboration, the MQA developed a model that spells out critical success factors for its partnership (depicted in figure 4.1. below) with other stakeholder to address skills challenges. This was informed by the successes, failures and lessons learnt from its existing partnerships. Embedded in this model is the impact of the COVID - 19 pandemic in the MMS and thus, should include integration and intensification of OHS (hygiene) programmes.

The model has four focus areas, in which efforts to reduce the spread of COVID - 19 should be the critical cross field outcome integrated in the anticipated outcomes i.e. training of lecturers in assessment and moderation in alignment with the MQA's mandate and strategic objectives for the purpose of providing support to colleges to improve their institutional performance and responding to their conceptualised mandate; course offering alignment that aims at ensuring that the curriculum is in sync with the labour market needs as well as national development priorities that impact and is aligned to the MMS; research and impact studies that aim to ensure that performance measurements of interventions provide empirical evidence to guide planning and skills priority alignment as well as workplace based learning (WBL) that seeks to develop an effective working model that addresses issues of access to work based experience to learners. With this accounted for, the propensity to achieve the identified roles and outcomes will thus, result in a mutual understanding and be beneficial to both the MQA and its partners; leading to a success. This model informs partnerships of the MQA with other stakeholders going forward and will be monitored to assess strengths and weakness and how best to improve it.

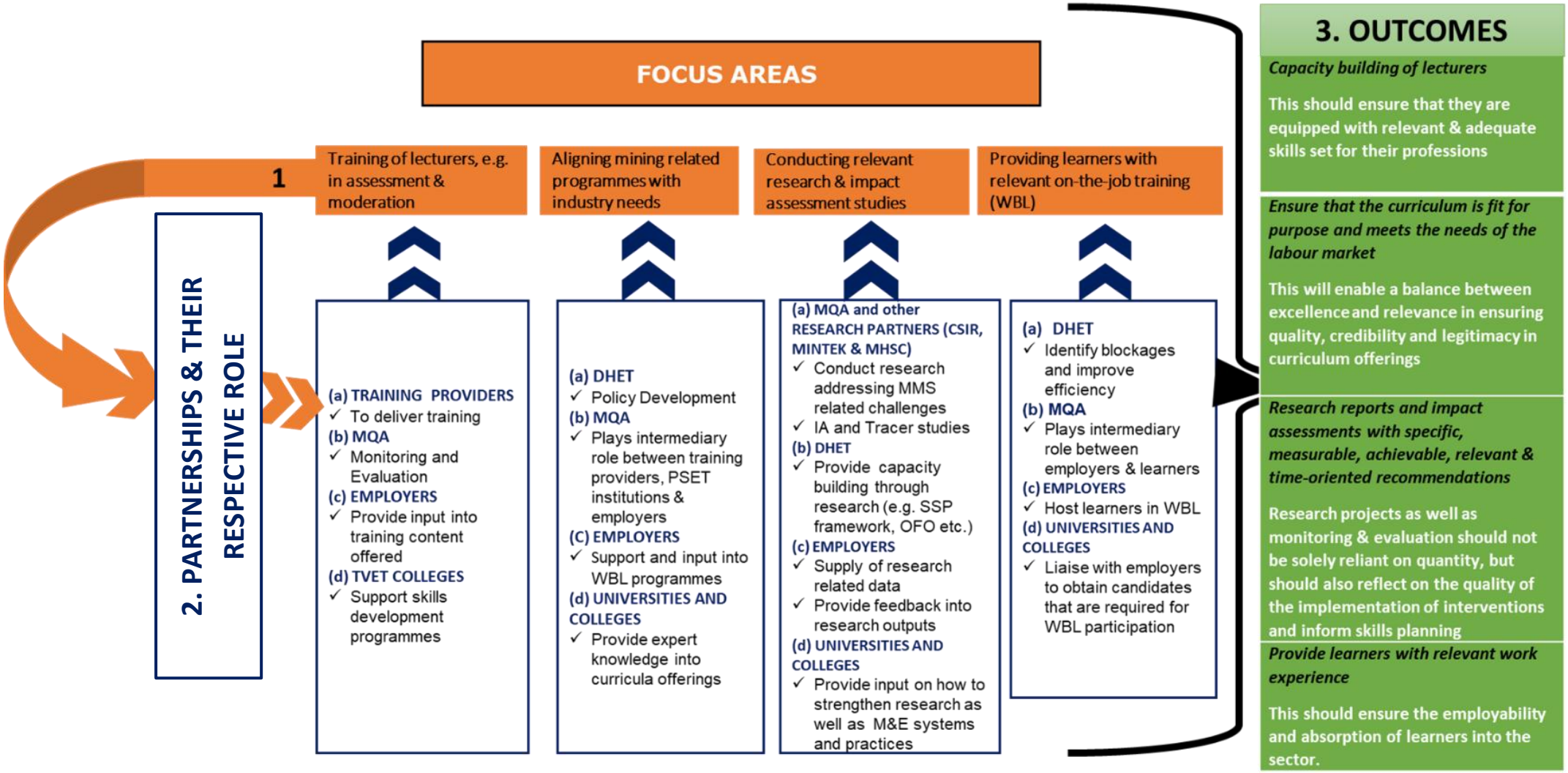


Figure 4-1: The MQA's model for a successful partnership

Source: MQA, 2018

4.5 Conclusions

The overriding focus tend to be the breadth or number of partnerships from a statistical perspective , quantitative targets are unit of measuring the MQA involvement with TVET colleges as DHET (in its SLA with SETAs) expect the MQA to have a certain number of partnerships in their performance targets and business plans.

There is a conceptual challenge that requires attention with regard to the definition of partnerships as the current one is loosely structured, observe and impact and value of partnerships on transformation with respect to skills development. Thus the current thinking appears to suggest a positive correlation between the number of partnerships and TVET college responsiveness (HRDC, 2014).

Although there is a limited data on college-industry linkages there is an indication of of the existence of pockets of excellence in these partnerships (Gewer, 2020), KZN National Tooling Initiative supported by DIT an excellent example of how TVET College can forge sustainable relationship (Rasool, 2013). An intervention to respond to a critical shortage of technically skilled people. Programmes focus on recapitalisation, skills development, competiveness and support structures (HRDC, 2014).

The general perception is that the NCV qualifications has disrupted efforts to forge relationships with industry. The continued reliance in NATED programmes and distrust for the NCV and the constriction of supply created through the first three years of NCV implementation has made the industry to turn to other resources including the update in Grade 12 school leavers. This means TVET colleges are encountering credibility crisis to the extent that employees are better equipped or trained in the workplace than in TVET Colleges. The legitimacy crisis suffered by NCV qualification system requires establishment of an effective partnership regime

Lack of specific models to adopt directly when establishing partnerships due to varying national, historical, political, ideological, and cultural and socio- economic contexts of TVET systems makes it impossible to find turnkey solutions as what work in one context may fail in another.

Chapter 5 : Monitoring and Evaluation

5.1 Introduction

The DHET (2019) updated SSP Framework directs the MQA to spell out its approach by developing M& E systems to track progress of short terms (APP) and long term (SP) strategic priorities, explain how M&E data support research and planning and mechanism for addressing such priorities.

Monitoring is conceived as an ongoing function that aims primarily to provide the management and stakeholders with early indication of progress or lack of thereof, in the achievement of desired results of interventions within an organisation (Hobson et al, 2014). This done by collecting and analysing data to measure performance of interventions towards achievement of outcomes. Evaluation on the other hand, is the periodic, retrospective assessment of projects/ programmes/interventions undertaken by either internal or external stakeholders to determine the outcomes of interventions (negative and positives) (Hobson et al, 2014). This might assist in clarifying the underlying factors affecting the success of programmes, highlighting unintended consequence, recommending future improvements and generating lesson learned.

This chapter is aimed at reflecting on the SETA's achievement of the strategic priorities the previously submitted SSP. As part of this reflective exercise and in order to be able to plan for the financial year ahead, it is important for the SETA to look into the extent to which the previous year's priorities were met, extrapolate key learning points, focus on the challenges and opportunities going forward. To contextualise the chapter, the main concepts, namely monitoring and evaluation are clearly defined and the importance of the M&E clarified. Also discussed are the critical success factors of effective M&E practice. The chapter also examines the MQA's monitoring and evaluation strategies with specific focus on its strategic skills priorities.

5.2 Sector Skills Planning Reflections

5.2.1 The MQA's Approach to Monitoring and Evaluation Informing Organisational Processes of Research & Planning

As a broad management strategy aimed at improving performance and demonstrable results the MQA views planning, monitoring and evaluation as interconnected, hence the emphasis is on development rather than organisational results. This is an ongoing process, of doing, learning and improving, results based management cyclical approach concerned with learning, which not only improves results from existing interventions, but also enhances capacity to make better decisions in future and improves formulation of future programmes, risk management, as there are risks inherent and residual in programmes as awareness equip those involved with tools to mitigate and pursue opportunities and accountability, effective measures for promoting a culture of results orientation and ensuring those involve are accountable for their actions. The objective of this is planning, M& E (Result based Management) is to support substantive accountability to stakeholders (government, employees and employers), prompt corrective action , informed decision making ensure, promote risk management, enhance organisational and individual learning (UNDP, 2009).

To attain this, the MQA has developed a Monitoring and Evaluation Framework used to ensure that continuous records of all the projects that are implemented are in line with its mandate. The purpose of the framework is among others, to develop and maintain

monitoring and evaluation systems to meet national standards and the MQA's requirements to ensure that value for money is derived from all interventions.

This framework is applicable to the strategic planning process and by extension to the implementation of the Strategic Plan (SP) and Annual Performance Plan (APP). During the planning process, the Strategic Planning Unit coordinates the formulation of the Strategic Plans and the Annual Performance Plans across all functions of the organisation. The planning process, references various internal and external sources which are used to influence and inform the decision making process before compiling the organisation's SP and APP.

In addition, as the practical approach to the M&E, the responsible Unit also provides ongoing project implementation and verification reports which are also referenced to in the planning process as well as during the implementation of current projects. The trends and intelligence derived from these reports inform better decision making at the planning stage and also inform project management processes during the selection, inception, allocation and implementation of projects.

Monitoring, in the context of the MQA is conceptualised as a process that involves real time collection, analysis and reporting of data on inputs, outputs, outcomes, impacts and external factors of programmes. These also include regular feedback on progress, implementation, results and indicators of problem(s) requiring immediate corrective action.

5.2.2 Tracer Studies

The M&E Unit conducts various tracer studies that influence the strategic planning process of the MQA and are used to inform decisions taken such as; interventions to be considered for setting APP targets, resources to be invested on the various interventions, advise on current and emerging risks associated with the various programmes, advising on which programmes have the most impact in the sector, lessons learnt during the implementation of current and past projects and subsequently provide recommendations on the most effective implementation methods and efficient use of existing resources.

For the first time in 2018, the MQA conducted tracer studies aimed at investigating and exploring the following:

- The level of the MQA's contribution in the advancement of skills development within the MMS;
- Trace the whereabouts of former beneficiaries to determine what has happened in their careers and their lives during and after completion of their respective programmes;
- Analysing the outcomes of the MQA funded programmes and the impact thereof.

These case studies provided information on the organisational return on investment and assists to reconfigure and improve on the proper funding model of programmes such as bursaries, internships, artisan and non-artisan programmes as well occupational directed programmes such as MDP.

In 2019, the MQA committed to undertake five tracer studies, with a focus on programmes identified in the table below.

Table 5-1: 2019 tracer studies

Programme	Completion status	Endorsement by board
Non –Artisan Disability	Completed	Not yet approved by MQA Board
HET Lecturer Support	Completed	Not yet approved by MQA Board
AET	Not yet completed	Still in progress.
Work Experience	Not yet complete	
Management Development Programme	Not yet completed	

The findings of the above mentioned tracer studies will be incorporated in the final SSP upon the completion of all studies and approval by the MQA board. The initial intention was to incorporate the findings of these tracer studies into the final SSP upon the completion of all studies, but apparently, they are still not completed. While conducting tracer studies is necessary, it is sufficient because it does not cover monitoring of all the strategic priorities, hence the need to monitor all.

5.2.3 Strategic Priorities in the previous SSP captured in the MQA's Strategic Plan and APP

The following reflects on the MQA's strategic priorities that were captured in its Annual Performance Report and Strategic Plan.

Skills development Priorities	2019-2020 Strategic Plan	Annual Performance Plan 2019-2020
1. Support transformation of the sector through skills development.	Objective 3: Promote work-based skills development to support transformation in the mining and minerals sector. AND Objective 4: Facilitate access to occupationally directed learning programmes for the unemployed. Objective 5: Support training initiative in Mine communities	Programme 3: Learning Programmes /Skills Development.
	Impact: • *Target exceeded for beneficiaries who completed a work-based programme (i.e. undergraduate workplace experience, learnerships- both artisan and non-artisan learnerships as well as internships in 2019/20, thus enabling access to occupationally directed economic opportunities.* • *Beneficiaries of work-based skills programmes are mostly unemployed youth in the mining communities and labour sending areas that complete training programme per annum.*	

Skills development Priorities	2019-2020 Strategic Plan	Annual Performance Plan 2019-2020
2. Continue to support interventions to improve mine health and safety through skills development.	Objective 3: Promote work-based skills development to support transformation in the mining and minerals sector. AND Objective 4: Facilitate access to occupationally directed learning programmes for the unemployed. Objective 5: Support Training initiatives in mine communities. Objective 6: Ensure the delivery of quality programmes in the Mining and Minerals Sector (MMS).	Programme 3: Learning Programmes /Skills Development AND Programme 4: Education and Training Quality Assurance.
	Impact: • *3498 out of a target of 3000 employees successfully completed the Occupational Health and Safety Representatives' skills programme as well as other Health and Safety Programmes such as learnerships and bursaries.* • *There was a decrease in the number of fatality rates in 2019 (51 compared to 81 in 2018).* • *A formal partnership was established between the MQA and MHSC aiming to investigate factors affecting health and safety in the workplace within the MMS. The completed research will contribute to efforts placed to obtain the zero harm goal in the MMS.*	
3. Monitor and respond to technological changes through skills development.	Objective 6: Ensure the delivery of quality programmes in the Mining and Minerals Sector (MMS). AND Objective 3: Promote work-based skills development to support transformation in the mining and minerals sector. AND Objective 4: Facilitate access to occupationally directed learning programmes for the unemployed.	Programme 4: Education and Training Quality Assurance. AND Programme 3: Learning Programmes /Skills Development
	Impact: • *A formal partnership was formed with the CSIR and Mintek to conduct a research study to probe the integration of technology into the mining production processes and its effects on skills requirements in relation to the MMS core occupations*. This collaboration will be proactive in revitalising curriculum and programmes to support the fourth Industrial revolution's needed skills as well as the inclusion of employees in equipment design as part of the SATCAP programme.	
4. Monitor support the skills required for minerals beneficiation.	Objective 2: Improve Skills development Planning and decision-making through Research. AND Objective 3: Promote work-based skills development to support transformation in the mining and minerals sector. AND Objective 4: Facilitate access to occupationally directed learning programmes for the unemployed.	Programme 2: Sector Skills Plan and Research AND Programme 3: Learning Programmes /Skills Development
	Impact: • *The top 2 learnerships supported by the MQA to unemployed individuals are in jewellery manufacturing and diamond processing-which are linked to minerals beneficiation.*	

Skills development Priorities	2019-2020 Strategic Plan	Annual Performance Plan 2019-2020
	• *The small-scale mining programme is another initiative that contributes to skills required for minerals beneficiation.*	
5. Focus on increasing support to address the hard-to-fill occupations in terms of skills development in the MMS.	Objective 3: Promote work-based skills development to support transformation in the mining and minerals sector. AND Objective 4: Facilitate access to occupationally directed learning programmes for the unemployed.	Programme 3: Learning Programmes /Skills Development.
	Impact: • *The MDP, bursaries, learnerships, artisan development programmes are all aimed at addressing hard-to-fill occupations in the sector.*	

Table 5-2: Strategic Priorities in the previous SSP captured in the MQA's Strategic Plan and APP

**The detailed targets and achievements of the skills programmes highlighted in the Strategic Plan and Annual Performance Plan are discussed in Chapter 3.*

All the above mentioned interventions are aimed at addressing the five national skills development priorities by

- continuing to support transformation through skills development
- improving mine health and safety
- monitoring and providing support to interventions responding to technological changes
- developing skills required for minerals beneficiation and
- focusing on increasing support to address the hard-to-fill vacancies in in the MMS.

Overall, the MQA makes the difference in terms of skills development within the MMS with its contribution to interventions such as bursaries, beneficiation skills, internships, learnerships, RPL, MDP, artisan programme, AET programmes which are mining related. More particularly, the AET programme seems to be making inroads into breaking the back of illiteracy within the sector as the majority of mining employees are at least in possession of a matric or its equivalent as a highest qualification. In terms of bursaries, most of them are allocated to beneficiaries studying towards the core mining related qualifications. Nevertheless, there is a need for annual monitoring of institutional performance, track these activities and determine the extent to which there are addressing or not addressing the short term and long term targets.

5.2.4 The MQA's Oversight Function

In addition to M&E, the MQA, inspect organisations to ascertain the extent to which they adhere to normative standards, good practices or any other MQA set criteria to make recommendations for improvement or corrective and this happen in cases where there is perceived non-compliance as compensating controls apply to organisations with a compliance record, the MQA also conducts audit to assess the adequacy of management controls for efficient use of resources , compliance with rules, regulations and established policies, the effectiveness of risk management and adequacy of organisational structures, systems and processes and review a wide range of its funded programmes that are aimed at addressing the skills outcomes of the NSDP such as bursary schemes, artisan and non-artisan programmes, learnerships and MDP. All these programmes are subjected to a rigorous

verification process on annual basis. For example, this is conducted utilising a risk based approach, desktop and physical verification, which amongst others take the issues raised in previous reports, the adequacy and effectiveness of existing compensating controls, and programme specific challenges into considerations. The purpose of conducting learner verifications against the annual target of 90% is to ascertain accuracy, existence, completeness and compliance with relevant legislations and MQA policies in respect of all the learners that are eligible for grants.

5.2.5 The MQA's Risk Management Strategy

Taking into account that crisis settings have ramifications on aspects of programming such planning, monitoring and evaluation, there is a need to strengthen institutional capacity for such contexts. To this effect, the MQA Board approved the Risk Management Policy and Strategy, as part of policy implementation and subsequently strategic and operational risk registers were compiled following the risk assessment workshops for the 2019/2020 financial year. Risk assessment exercises are conducted once a year and the registers are updated on a quarterly basis with the review of the residual risk as and when the implementation of the action plans necessitates such. Emerging risks are considered when registers are updated. For instance, the MQA register is to be updated this FY to reflect the current development with regard to the impact of COVID 19, in which organisational risks are ranked in terms of severity and then cascaded down to operations. This means specific risk mitigation plans has to be developed by respective units to identify and manage programme related risks that could inhibit realisation of much desired goals, results and targets.

5.2.6 Use of M&E to support research and planning

M&E data and information on progress towards results is gathered, reviewed and used at outcome, project/programme and sectoral levels for management action and decision-making within the MQA. Clarifying and analysing progress, issues, challenges and lessons is interconnected to precipitating actions and decisions including effective changes in plans and resources as required. This is used to revalidate if the programme results logic remain valid in the light of project experience and empirical evidence, discern issues that emerged from the project implementation, determine if the foreseen risks and assumptions have materialised and also if unforeseen challenges, opportunities and risks materialised and how best they are managed. M& E also assist to identify gar areas which could be part of the research agenda. These issues are factored in the Annual Performance reports to inform strategic planning going forward.

5.2.7 Plan of Action

The following programmes aimed at supporting transformation through skills development did not meet their targets.

Target not met	Reasons for not meeting target	Mechanism to ensure achievement of strategic priorities not achieved
Number of unemployed Youth in mining communities and labour sending areas that complete training programme per annum.	Insufficient pipeline for completions.	Allocations for youth development projects will be prioritised in order to build sufficient pipeline for completion.
Number of unemployed Youth in mining communities and labour sending areas that enter training programme per annum.	Proposals received did not meet the requirements to deliver on the Youth Development projects were approved in prior year.	Allocations for youth development projects will be prioritised in order to build sufficient pipeline for completion.

Number of undergraduates that enter a work place experience programme per annum	Unavailability of employers to submit documents for registration of learners towards the end of the financial year due to the national lockdown. Employers that allocated grants did not register learners as per their allocation. Support of only mining related disciplines.	Extension required to allow companies to submit learner contracts for registration.
Number of unemployed learners awarded a bursary per annum.	Unable to conclude contracting with learners due to the unavailability of learners because of the lockdown.	An extension to submit performance information is required. This will allow conclusion of contracting of new learners.
Number of HDSA MMS employees that complete a management development programme per annum	Insufficient pipeline of learners to complete the Management Development Programme in this financial year.	During the target setting, consider the number of learners in the pipeline.

Table 5-3: Strategic Objectives not achieved and mechanisms to ensure achievement in future

5.3 Conclusions

To ensure achievement of current strategic priorities, based the key findings it is recommended that:

The MQA should include the M&E Framework in its skills development value chain. This implies that all operations should treat M&E as intrinsic not extrinsic matter which is done once off. This would ensure that provision of assurance is formative (ongoing) and summative to gain insight into the efficiency, effectiveness and impact of every intervention by establishing that the intended outcomes of interventions supported by the MQA influence the landscape of skills development within the sector.

The MQA Risk Register which reflects the organisational risks should be cascaded down to operations to reflect the possible risks and mitigation plans for each intervention.

All targets reflected in the APP and SP should be annually monitored to keep track of changes, challenges and progress for remedial action if necessary.

Information yielded by M&E activities should continue to inform research and organisational planning going forward. There should be a streamlining exercise of the cyclical relationship between research, programmatic as well as monitoring and evaluation interventions. Information yielded by M&E activities should inform research and organisational planning going forward.

The MQA should reconsider and review the current annual performance and strategic plans as well as the annual budget to factor in issues arising from COVID - 19 and engage in a process of reprioritization.

There is insufficient pool of learners to recruit in the supply pipeline and the MQA should develop a comprehensive strategy on how to ensure sufficient base for recruiting across programmes.

Based on the lessons learned there should be a development of framework for critical success factors or best practice for M&E.

Chapter 6 : SETA Strategic Skills Priority Actions

6.1 Introduction

The purpose of this chapter is to consolidate and present key findings from the previous chapters to influence prioritisation and inform recommendations that are realistic consistent and achievable. From the key findings, the chapter identifies the key priority actions for the MMS going forward.

6.2 Key Skills Findings

Chapter 1 reflected on the MMS' scope of coverage, its key role-players, economic performance, employer profile and labour market profile. Findings revealed that the COVID - 19 pandemic has brought several changes which have affected the economic performance of the sector. Disruptions by COVID - 19 are likely to increase South Africa's triple challenges of inequality, poverty and unemployment as the current economic outlook is affected by a reduction of production and sales. In assessing the labour profile, African employees constitute a large proportion of the labour force, however, their representation at the different echelons of management (with exception of the senior management) is not equitable with their population in the sector. On the other hand, the gender distribution is skewed towards males, with women representing only 16 % of the MMS workforce. This is against the backdrop of the 2018 Mining Charter which sets equity targets of 60% of blacks in senior management positions, of which 25% should be female, middle management must have a minimum of 60% black employees of which 25% should be female and 70% blacks in junior management of which 30% must be female. The Charter also sets the target for the employment of people with disabilities at 1.5%. However, findings revealed that only 0.8% of disabled individuals are employed in the MMS. Monitoring and evaluation of the effectiveness, efficiency and efficacy of initiatives aimed at redressing past inequalities is critical to provide key learning points to inform strategies to add impetus into the transformation agenda.

Chapter 2 examined factors that drive change and impact on skills demand and supply within the sector. Political influences in terms of sectoral disruptions caused Covid 19 induced national lockdown and skills development levy holiday, industrial relations as well as regulatory effectiveness and consistency, Macro/Micro Economic factors as a result of global influences and market performance, the downgrade of South Africa's credit rating into junk, increasing energy tariffs and minerals beneficiation, Social influences involving local Influence (influences related to national, provincial and local economic output), Changing technological landscape influenced by the fourth industrial revolution and Environmental concerns encompassing environmental sustainability and mine, health and safety were identified as change drivers that influence the development of the MMS. Moreover, a wide range of national policy imperatives that seek to support inclusive sector growth paths which advance economic growth, the social development and transformation agenda were also discussed. These include the Mineral and Petroleum Resources Development Act, Mining Charter, 2018, Mine Health and Safety Act No. 29 of 1996, Mineral Beneficiation Strategy, New Growth Path, Industrial Policy Action 2018/19, the National Development Plan, NSDP, HRD Strategy for South Africa, the National Youth Policy 2015-2020 and the National Environmental Management Act 107 of 1998. All these change drivers as well as policy and legislative instruments influence change, interlock and reinforce

one another to shape the skills development landscape. Therefore, it is imperative to understand these factors and the opportunities that could be derived from them in order to influence skills supply and demand in the sector.

Chapter 3 highlighted that the top 10 hard-to-fill vacancies are Mine Manager, Production Manager, Engineering Manager, Mechanical engineer (Mines), Mining Engineer, Occupational Hygienist, Mine Overseer (Production), Diesel Mechanic, Fitter and Turner, and Auto Electrician. The reasons accounting for these vacancies ranged from individual, organisational and supply side levels. At individual level, reasons include lack of relevant qualifications, lack of relevant experience and Equity considerations. The top-up skills identified are related to leadership, technical (job-specific) and supervisory skills. The extent and nature of supply indicated that although there is an increase in the matric pass rate, the enrolment and pass rate of mathematics is low. This limits the pool of students who could be eligible to pursue MMS related qualifications as mathematics is a key requisite for such qualifications. At tertiary level, the number of mining engineering graduates have been decreasing. This is concerning as the discipline has been cited as a hard to fill vacancy. In addition to the basic and higher education, the MQA alongside MMS' companies have been developing skills interventions aimed at addressing the skills needs of the sector at various levels of education. These are in the form of career guidance, learnerships, internships and bursaries. The MQA also provides access to economic opportunities to mine communities and labour sending areas through its youth development and small-scale mining programmes. The DMRE and Minerals Council are additional entities that play an essential role in skills development in the MMS through the provision of their customised qualifications aimed at producing capable and competent employees with the necessary skill-set required to perform their jobs.

Chapter 4 focused on existing partnerships within the MQA. The chapter assessed the effectiveness of existing MQA's partnerships with particular reference to value-adding partnerships. It also outlined both success stories and lessons learnt for interventions that were implemented. TVET and CET were capacitated and assisted with getting their courses accredited. In addition, the MQA's partnerships also included research partnerships. The purpose is to establish partnerships that will develop knowledge and skills in a collaborative manner to achieve specified outcomes directed towards addressing mutually inclusive skills priorities in the MMS. The learning points should be extrapolated from these partnerships to inform an effective sector partnership model which will address focal areas, i.e. areas where challenges are, the partnership mix, and the goals of such partnerships.

Chapter 5 reflected on the SETA's achievement of the strategic priorities based on the previous financial year. The MQA has an existing M&E framework that is aimed at providing assurance for all projects implemented in line with its mandate and to determine the impact that training programmes have on the sector and its beneficiaries. The framework is also used to coordinate and formulate the SP and APP across all functions of the organisation. Since 2018, the MQA has been conducting tracer studies to determine the overall impact that these programmes have had on beneficiaries and the SETA's contribution to skills development in the MMS. The findings emanating from these studies will be incorporated in the final SSP once all studies have been completed and approved by the Board. The chapter also provided an

analysis concerning how the SETA has addressed previous financial year's strategic priorities. From that analysis, it emerged that the SETA's priorities are supporting skills development and transformation in the sector. Though the SETA achieved the majority of its priorities, it is acknowledged that concerted efforts need to be placed in addressing those that were not achieved.

The section below discusses key recommended priority actions in no particular order of importance.

6.3 Recommended Priority Actions

6.3.1 Recommended Priority 1: Facilitate transformation and SMME development of the sector through skills development

As indicated in chapter 2, the purpose of the NSDP to ensure that South Africa has adequate, appropriate and high quality skills that contribute towards economic growth, employment creation and social development through attainment of eight outcomes. The New Growth Path IPAP intends to create an inclusive economic growth and development path through creation of jobs in the mining sector. In this respect, among others, employment equity plays a critical role in South Africa's transformation agenda. In order to support these national priorities, and attain the outcome of improving the level of workforce as outlined by NSDP, the following should be implemented:

- *The MQA should continue to prioritise skills development of Historically-Disadvantaged South Africans (HDSAs). These include, and are not limited to undertaking skills development interventions to capacitate more females and disabled people in the sector.*
- *Address issues of inequities echelons of management in the MMS through supporting HDSAs to penetrate management roles. Therefore, there is a need to continue providing support to the Management Development Programme. Management programmes should also target engineering students to pre-empt their advancement to managerial positions at mining operations at later stages of their careers.*
- *Priority should continue to be given to linking education and the workplace by facilitating access to industrial experience and the placement of graduates into the workplace.*
- *Considering, that small organisation are largely likely to be hit the hardest by COVID - 19 pandemic, The MQA should strengthen its support of programmes such as the youth development programme and small-scale mining skills programme to enable small businesses to perform efficiently in sector. Priority should also be placed in small businesses that are engaged in beneficiation to promote local economic development.*
- *More tracer studies should also be conducted to determine the impact and effectiveness of MQA's programmes to enable the contribution of skills development in the sector.*

6.3.2 Recommended Priority 2: Continue to support interventions to improve Mine Health and Safety through skills development

The MHSA makes provision for the protection of the health and safety of all employees and persons in the mines through the promotion of training in mine health and safety. The COVID - 19 pandemic has heightened the need to prioritise occupational health and safety matters in the MMS. As a result, the MQA will continue to prioritise support for training in mine health

and safety as one of its legislative mandates to improve the health and safety standards of the sector by continuing to fund interventions aimed at increasing access to occupationally directed programmes and those that emerged from this pandemic.

6.3.3 Recommended Priority 3: Continue to monitor and provide support to interventions responding to technological changes through skills development

As mentioned earlier, companies will be shifting more aggressively towards automation in the face of this pandemic. Technological transformation remains at the forefront of the sector's ability to become as safe, healthy, efficient and sustainable as possible. Through research, occupations in high demand (including water and energy related ones) can be identified to inform planning to establish appropriate resource allocation, qualification development and skills development required to ensure that the goal of zero harm is achieved. This should also include changing approaches for education and training provision and therefore there is a need for a paradigm shift from traditional, contact based to online, virtual methods of delivery to accommodate the ne normal way of things.

6.3.4 Recommended Priority 4: Monitor and support interventions aimed at developing the skills required for minerals beneficiation

South Africa's Minerals Beneficiation Strategy is planning to transform the industry from being largely resource-based to knowledge-based. The IPAP places mineral beneficiation as one of its key priority areas and has identified several growth sectors including mineral beneficiation, jewellery manufacturing as critical areas to create jobs. This could also be attained through:

- *Identifying occupations in demand with respect to beneficiation,*
- *Continuing quality assuring training of those already in this sector*
- *Developing the skills and competencies of youth and potential entrepreneurs in the sector to grow SMMEs and create more jobs in the sector*
- *Form inter-SETA partnerships to integrate with other sectors of the economy through mineral beneficiation. These opportunities could be embedded in the manufacturing sector (e.g. steel and iron ore, nickel, copper and zinc); energy sector (e.g. coal, uranium and gas); and agriculture sector (e.g. phosphates, potassium and sulphur). These in turn can be added jewellery for precious metals such as gold, diamonds and PGMs.*

6.3.5 Recommended Priority 5: Focus on increasing support for core mining-related skills and hard-to-fill occupations in terms of skills development in the MMS

There is a need to support interventions aimed at addressing hard-to-fill occupations by identifying and increasing production of occupations in high demand through provision of support to interventions such artisan development, internship programmes, learnerships and bursaries. By so doing, this will fill skills gaps and eliminate issues of supply and demand mismatches. Support should also be provided to interventions supporting top-up skills such as leadership and supervisory and those related to job specific skills.

6.3.6 Recommended Priority 6: Develop Skills for environmental sustainability

The global emphasis on environmental impact as a result of mining activities is one of the key drivers affecting the sector. The MQA's (2018) green skills study revealed that South Africa's air quality remains one of its most challenging environmental issues and is an issue that has

been raised on several occasions with regards to the health and welfare of South Africa's population. Fugitive dust and spontaneous combustion emission from the mining sector are some of the most common sources of atmospheric emission that impact on air quality. In addition, the availability and cost water is quickly rising to the top of mining companies' agendas as one of the greatest constraints to supply.

It is imperative for the sector to align their practices with goals closely linked to achieving the development path of the green economy. To achieve this, the following can be done:

- *Revision of the QCTO qualification framework to better align the needs of the MMS in relation to green skills.*
- *Bridge the gaps between the educational programmes and industry requirements by means of specialised courses (e.g. radioactivity)*
- *Broaden skills sets and develop sector-specific experience through internships and learnerships (specifically: Other mining, Gold mining, PGM mining)*

6.3.7 Recommended Priority 7: Support National Strategies and Plans through skills development

The NDP, a national blue print to address the triple challenges of poverty, unemployment and inequality highlights the notion a capable state as well skills development as key drivers to attain developmental goals of the society. The MQA is expected to play a critical role of skills development in the MMS by addressing the outcomes outlined in the NSDP through programme interventions that address skills demand and supply issues in the workplace by forging relevant partnership, funding skills development by creating conditions optimal for innovation in era of 4IR and COVID - 19.

6.4 Conclusions

To attain the outcomes of the NSDP and broader socio-economic imperatives in the MMS, the following skills priority actions are recommended:

- Priority 1: Facilitate transformation and SMME development of the sector through skills development
- Priority 2: Continue to support interventions to improve mine health and safety through skills development
- Priority 3: Continue to monitor and provide support to interventions responding to technological changes through skills development
- Priority 4: Monitor and support interventions aimed at developing the skills required for minerals beneficiation
- Priority 5: Focus on increasing support to core mining skills and the hard-to-fill occupations in terms of skills development in the MMS
- Priority 6: Develop skills for environmental sustainability
- Priority 7: Support National Strategies and Plans through skills development

From the above recommendations, priority should also be placed in assisting the MMS to address to skills development needs that emerged as a result of COVID - 19.

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