



MINING QUALIFICATIONS AUTHORITY

REVISED 2025-2030

SECTOR SKILLS PLAN

FOR THE MINING AND MINERALS SECTOR

Submitted By:
Mining Qualifications Authority (MQA)

FINAL :31 JANUARY 2025

FOREWORD

The South African mining and minerals sector (MMS) remains a cornerstone of our economy. Yet, in a rapidly evolving global landscape, ensuring a skilled and competent workforce is more critical than ever. Building on the strong foundation laid in the previous Sector Skills Plan (SSP), the Mining Qualifications Authority (MQA) is proud to present this roadmap for the future – the 2025-2030 SSP.

In line with the NDP, 2024 -2029 Medium-Term Development Plan (MTDP) and the NSDP, this SSP goes beyond simply identifying skills gaps. It acknowledges the transformative power of automation, digitalisation, and other emerging technologies, ensuring our workforce possesses the necessary skills to thrive in a technology-driven future. This is in accordance with Strategic Priority 1 (Inclusive growth & job creation) and Strategic Priority 2 (Reduce poverty and tackle the high cost of living) of the MTDP. Furthermore, in line with these priorities, the SSP embraces the imperative for a just transition to a low-carbon and climate-resilient economy, outlining strategies to equip the workforce with the skills needed for sustainable mining practices. The evolving geopolitical landscape, with its growing demand for critical minerals, is also considered. The SSP anticipates these shifts, ensuring our workforce is prepared to capitalise on new markets while maintaining global competitiveness.

The development of this SSP reflects extensive collaboration with key role players. This includes government departments, state-owned entities, research institutions, professional bodies, and others who play a crucial role in the sector's success. Through these role players, the MQA remains dedicated to achieving several key goals.

Firstly, we remain steadfast in our commitment to a "zero harm" sector. This SSP outlines initiatives to foster a culture of safety and equip workers with the necessary skills to minimise risks and ensure a healthy and productive workforce. Secondly, the MQA is committed to building a diverse and inclusive mining sector. This SSP focuses on expanding access to skills development opportunities, particularly for historically disadvantaged groups. Finally, the SSP recognises the need for a skilled workforce that can drive innovation and optimise mining operations. It proposes strategies to bridge the gap between theoretical knowledge and practical application, fostering a culture of continuous improvement.

More than just a blueprint, this SSP serves as a roadmap for the future of skills development in the South African mining and minerals sector. By implementing the strategies outlined within, we can ensure a future where a skilled and empowered workforce propels the MMS towards a sustainable and prosperous future. Together, we can build a mining industry that is not only economically strong but also environmentally responsible and socially just.

ACRONYMS

Acronym	Description	Acronym	Description
AET	Adult Education and Training	AMMSA	Association of Mine Managers of South Africa
AMSA	Artisanal Small-Scale Mining	AgriSETA	Agriculture Sector Education Training Authority
APP	Annual Performance Plan	APR	Annual Performance Report
ARPL	Artisan Recognition of Prior Learning	ATI	Artisan Training Institute
ATR	Annual Training Report	CAGR	Compound Annual Growth Rate
CET	Community Education and Training	CETA	Construction Education and Training Authority
CHIETA	Chemical Industries Education and Training Authority	CIP	Continuous Improvement Plan
CLAS	Cement, Lime, Aggregates and Sand	COVID-19	Corona Virus Disease 2019
CSIR	Council for Scientific and Industrial Research	DBE	Department of Basic Education
DEDT	Department of Economic Development and Trade	DHET	Department of Higher Education and Training
DMR	Department of Mineral Resources	DTI	Department of Trade and Industry
EAC	Education and Advisory Committee	EIA	Environmental Impact Assessment
EMIS	Education Management Information System	ERRP	Economic Reconstruction and Recovery Plan
ETDPSETA	Education, Training and Development Practices Sector Education and Training Authority	ESG	Environmental, Social, and Governance
FGDs	Focus Group Discussions	FLC	Foundation Learning Competence
GCC	Government Competence Certificate	GDP	Gross Domestic Product
GSC	Governance and Strategy Committee	HDSA	Historically Disadvantaged South African
HEMIS	Higher Education Management Information System	HET	Higher Education and Training
HRD	Human Resource Development	HTFV	Hard-to-fill Vacancies
ICT	Information and Communication Technology	IDC	Industrial Development Corporation
JET	Just Energy Transition	JETF	Just Energy Transition Framework
KPIs	Key Performance Indicators	M&E	Monitoring and Evaluation
MEMSA	Mining Equipment Manufacturers of South Africa	MerSETA	Manufacturing, Engineering and Related Services Sector Education and Training Authority
MHSA	Mine Health and Safety Act	MHSC	Mine Health and Safety Council
MMS	Mining and Minerals Sector	MoU	Memorandum of Understanding
MTDP	Draft 2024 -2029 Medium-Term Development Plan	n	Sample size
N	Population size	NDP	National Development Plan
NCV	National Certificate Vocational	NGO	Non-governmental Organisation
NEET	Not in Employment, Education or Training	NQF	National Qualifications Framework
NLRD	National Learners' Record Database	NYDA	National Youth Development Agency
NSF	National Skills Fund	OHS	Occupational Health and Safety

Acronym	Description	Acronym	Description
OFO	Organising Framework for Occupations	PIVOTAL	Professional, Vocational, Technical and Academic Learning
OQSF	Occupational Qualification Sub-Framework	PMF	Partnership Management Framework
PGMs	Platinum Group Metals	QCTO	Quality Council for Trades and Occupations
PYEI	Presidential Youth Employment Initiative	R&D	Research and Development
QLFS	Quality Labour Force Survey	RPL	Recognition of Prior Learning
RDI	Research, Development and Innovation	SAIMM	Southern African Institute of Mining and Metallurgy
SAF	Sustainable Aviation Fuels	SDA	Skills Development Act
SASME	South African Small and Medium Enterprises	SETMIS	Sector Education and Training Management Information System
SETA	Sector Education and Training Authority	SIC	Standard Industrial Classification
SHE&Q	Safety, Health, Environment and Quality	SMME	Small, Medium and Micro-sized Enterprises
SIHIP	Seta Integrated High Impact Programmes	SOPA	State of the Province Address
SONA	State of the Nation Address	SIP	Strategic Implementation Plan
SP	Strategic Plan	SSP	Sector Skills Plan
SSM	Small Scale Mining	STEM	Science, Technology, Engineering, Mathematics
Stats SA	Statistics South Africa	TVET	Technical and Vocational Education and Training
TETA	Transport Education and Training Authority	UNISA	University of South Africa
UIF	Unemployment Insurance Fund	WIL	Work Integrated Learning
VAT	Value-Added Tax		

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Executive Summary

The MQA, responsible for administering skills development in South Africa's mining and minerals sector (MMS), developed the 2025-2030 Sector Skills Plan (SSP) aligned with the national framework set by the Department of Higher Education & Training. This SSP acts as a roadmap, identifying the skills needed and outlining specific actions to build a highly skilled MMS workforce. It provides a comprehensive analysis of the sector's profile (key role players, employer profile and labour market analysis), change drivers, occupational shortages and skills gaps, SETA partnerships, and M&E. The plan culminates in proposing skills priority actions. These actions outline an approach to address skills demand in the MMS.

Navigating a Shifting Sector (Economic Performance):

The economic performance analysis revealed the fluctuating nature of the MMS, with commodity prices and production volumes impacting job security. A significant challenge is the large number of unemployed people, particularly those not currently in education, employment, or training (NEET). This untapped potential represents a missed opportunity for both the workforce and the sector itself, affecting the skills pipeline. While the MMS has created jobs (adding an estimated 7 650) and employs a substantial, retrenchments highlight the need for continuous skills development to ensure job security.

Employer and Employee Profile:

The SSP paints a detailed picture of the MMS workforce. Gauteng, houses many head offices, leading to a skewed geographical distribution of employers indicating that they are based in the province. Interestingly, the majority of registered mines (78.7%) are small companies, highlighting the need for skills development programs tailored to their specific needs.

PGM mining employs the majority of the MMS workforce (30.8%). The age distribution indicates that the workforce is maturing, with the largest age group being 36-44 years old (36.5%). This indicates a significant portion of the workforce approaching or in mid-career stages, with potential skill gaps emerging as they approach retirement. While women are increasingly represented (20.2%), achieving gender and racial diversity, as well as integrating people with disabilities, remains a challenge.

Key Drivers of Change:

The MMS is undergoing significant transformations. Technological advancements such as automation and data analytics necessitate a workforce equipped to operate and maintain these new technologies. The growing importance of Artisanal and Small-Scale Mining (ASM) and mineral beneficiation requires targeted skills development programs for specific subsectors.

The energy landscape is another key driver of change. The limited and unreliable energy supply, coupled with the increasing demand for renewable energy sources, presents both challenges and opportunities. Expertise in renewable energy technologies for mine operations and maintenance of renewable energy infrastructure will be crucial. Additionally, attracting young people back to rural mining communities through skills development programmes and entrepreneurship initiatives can address the issue of youth migration and the high number of unemployed youth (NEETs).

Identifying Skills Shortages and Gaps:

The SSP analyses hard-to-fill vacancies, highlighting roles such as Mine Manager, Mechanical Engineer, and Mining Engineer – consistently reported as hard-to-fill over the past five years. Lack of relevant experience, poor remuneration, and inadequate qualifications contribute to these vacancies. The rise of automation necessitates expertise in electromechanical engineering and data analysis. This is reflected in the bursary support provided by employers. The environmental focus within the sector calls for skills in environmental compliance and

sustainability.

Building Partnerships for Success:

The MQA prioritises collaboration to address skills needs. Strategic partnerships exist with government departments, state-owned entities, educational institutions, research entities, and industry associations. Collaborations with universities, TVET colleges, and CETs ensure a strong foundation in core technical skills. Partnerships with research institutions can lead to the development of programmes addressing emerging skills necessary for the sector's growth and sustenance.

In addition to existing partnerships, the MQA seeks to expand collaborations with institutions such as the Council for Geoscience and the IDC to unlock expertise in geospatial intelligence and business development support for small-scale mining. International partnerships can also further enrich the skills development strategy by introducing best practices and new skill areas relevant to the future of the sector.

Monitoring and Evaluation: Measuring Impact:

The SETA's sector skills planning reflections revealed a significant increase in learner participation in MQA programmes since 2018/19, demonstrating a rising demand for skills within the MMS. Programmes such as Learnerships, Workplace Experience, and Mine Community Training have shown consistent growth.

The MQA utilises a multi-pronged approach for monitoring and evaluation (M&E) which includes on-site visits, desktop verification, tracer studies, and annual reports. Opportunities for improvement in M&E include standardising data collection methods and expanding the use of tracer studies. This will allow for better trend analysis, long-term impact assessment, and data-driven decision making for future skills development strategies.

Skills Priority Actions

Building on the findings presented in this Sector Skills Plan, the subsequent skill areas will be prioritised for the current planning cycle (2025-2030):

- ✓ Priority Action 1: Constant engagement with the MMS for collaboration in various programmes to bridge the gap between workplace and training institutions for a fit for purpose skills development system.
- ✓ Priority Action 2: Strengthen existing partnerships for effective skills development and develop plans to support the implementation of SIHIPs.
- ✓ Priority Action 3: Heighten efforts to facilitate growth and support of ASM through skills development.
- ✓ Priority Action 4: Continue to support interventions to improve mine health and safety through skills development and increasing the number of safety officers in the MMS.
- ✓ Priority Action 5: Align skills development with evolving technologies in the MMS
- ✓ Priority Action 6: Implement skills development support for the ex-mine workers and the NEET population.
- ✓ Recommendation 7: Assess the effectiveness, efficiency and efficacy of all of the MQA's interventions.
- ✓ Priority Action 8: Develop a Research Recommendations Implementation Framework to maximize the impact of research on sector planning.

Overall, this Sector Skills Plan provides a comprehensive analysis of the MMS landscape. By understanding the challenges and opportunities, skills gaps, and the changing needs of the sector, the MQA can develop targeted interventions and partnerships to ensure a skilled

Research Process and Methods

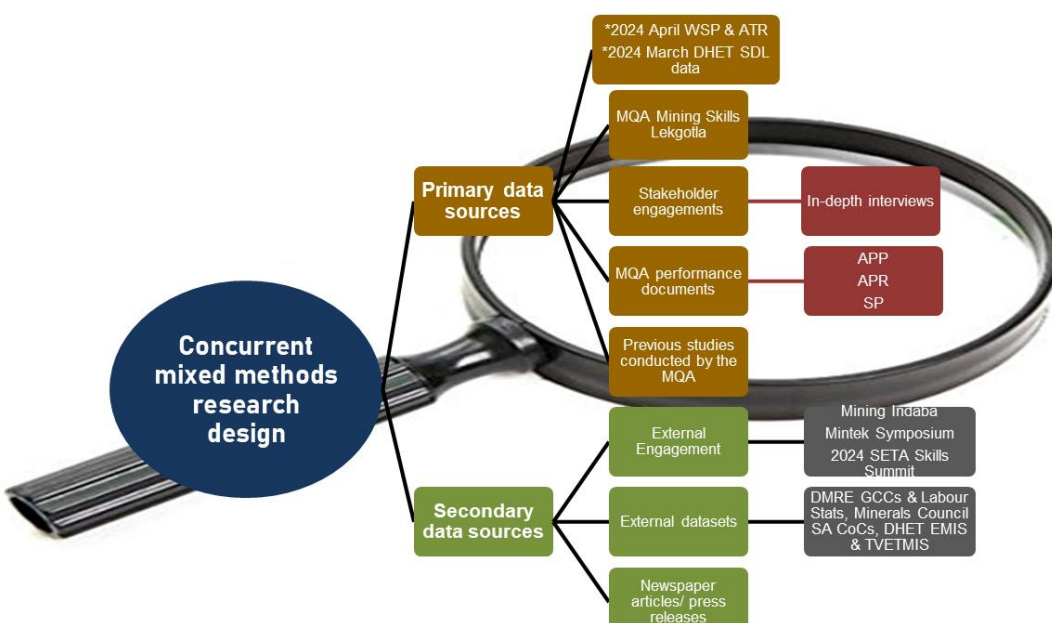
The Skill Education and Training Authorities (SETAs) play a pivotal role in ensuring a skilled workforce aligned with national priorities. They achieve this by facilitating the development and delivery of sector-specific skills interventions, directly contributing to the outcomes of the 2024 -2029 Medium-Term Development Plan, the goals of the National Skills Development Plan (NSDP) and ongoing sectoral transformations. Aligned with the five-year planning cycle, each SETA develops a Sector Skills Plan (SSP) to guide skills development within their sectors. This plan is subsequently reviewed and updated annually to ensure its ongoing effectiveness.

This report details the Mining Qualifications Authority's (MQA) 2025-2030 Sector Skills Plan (SSP) which serves as a roadmap for the next five years, outlining the skills development landscape specific to the MMS. While the Plan is forward-looking, it is essential to reflect upon the successes, challenges, and lessons learned during the 2020-2024 planning period to inform and refine future strategies. A reflection of the past five years will enable the identification and amplification of effective skills development initiatives, addressing areas where objectives were not fully met, and anticipating future needs by analysing shifts in workforce demands, technological advancements, and economic trends. This proactive and reflective approach will ensure that the 2025-2030 SSP is responsive to the immediate requirements of the sector while also anticipating the challenges and opportunities that lie ahead.

In light of the above, this SSP takes into account the MMS's scope of coverage, key role players, employer profile, and labour market composition. The SSP further identifies critical skills issues, occupational shortages, and existing skills gaps. Importantly, the Plan details existing and planned partnerships, the SETA's monitoring and evaluation function, and finally, presents the strategic skills priority actions to address the evolving skills development needs of the MMS.

This section delves into the research process and methodologies that informed the development of this specific SSP, adhering to the 2025-2030 DHET SSP framework.

Research Process and Method



The following figure provides a comprehensive overview of the research journey undertaken to develop this SSP.



Figure i: SSP Research Process and Methods

The figure above illustrates the research process and methods employed to develop this SSP. The approach utilised a concurrent mixed methods design, strategically leveraging existing knowledge (secondary data) alongside the collection of primary data. Secondary data sources provided a strong foundation for the research. Datasets from institutions such as the Department of Mineral Resources (DMR), Department of Higher Education and Training (DHET), Minerals Council South Africa, along with e-publications, relevant newspaper articles, and press releases, were used to respond to various chapters of the report.

Primary data collection further enriched the research by incorporating findings from Workplace Skills Plans/Annual Training Reports (WSP-ATR), DHET's Skills Development Levy (SDL) Report, the MQA's Annual Performance Reports (APR), Strategic Planning reports, and valuable insights gleaned from past studies conducted by the MQA.

To gain a comprehensive understanding of the sector's economic landscape, future prospects, and the factors influencing its development, in-depth interviews with 18 stakeholders and four focus group discussions were held from February to July 2024. Additionally, an SSP webinar was conducted on July 4th, 2024, to further broaden the range of insights and perspectives gathered. These insightful discussions proved invaluable in identifying the 2024 hard-to-fill vacancies, skills gaps, and providing insights on the skills priority actions in the sector. For a complete record of MQA studies incorporated within this SSP, please refer to Table 1 below.

Table 1: Primary research completed as functional imperatives by the MQA in addition to the 2025-2030 SSP

Project name	Research purpose	Research design	Target population & sample Size	Data collection instruments	Data sources	Study timeframe	Chapter application	
1. MQA Three-Year WSP-ATR Submissions Trends Analysis (2021-2023)	To track trends and patterns with respect to key issues influencing demand and supply of skills over a three-year period	Quantitative	Mining companies that submitted WSP & ATRs between 2021-2023 and number of employees	WSP & ATR source data template	WSP & ATR data	August 2023-February 2024	Chapter 1 & 3	
			Companies that submitted WSP & ATRs					2021: N = 827
								2023: N = 801
			Employees					2021: N = 425341
			2023: N = 448003					
2. Exploring the State And Future of the Adult Education And Training Programmes across the Mining and Mineral Sector Subsectors	To explore the current state and future of AET programmes in the MMS subsectors.	Mixed methods	Learners and MMS stakeholders	Questionnaire and interview schedule	MQA I-Share database	January 2023-September 2023	Chapter 1, 3 & 4	
			Learners (Survey)					n = 470
			MMS stakeholders (In-depth interviews)					n = 36
3. Investigating the State of the MQA Funding Policy with Respect to	To conduct research on the state of the MQA's	Mixed methods research design	Implementors and beneficiaries learnerships, the RPL for Non-Artisans, OHS, Candidacy, and Work Experience and Coach	Questionnaire and interview guide	MQA I-Share database	January 2023-September 2023	Chapter 3, 4 & 6	

Project name	Research purpose	Research design	Target population & sample Size	Data collection instruments	Data sources	Study timeframe	Chapter application	
Grants (Learnerships including RPL for Non-Artisans, Occupational Health and Safety (OHS), Candidacy Work Experience and Coach Programmes	funding policy with respect to grants for Learnerships, RPL for Non-Artisans, OHS, Candidacy, Work Experience and Coach programmes across subsectors in the MMS.		programmes across MMS subsectors					
			Survey					n = 722
			In-depth interviews					n = 26
4. Exploring Employers' Perceptions about the Technical Vocational and Training (TVET) System in South Africa: A case study of Northern Cape, Mpumalanga, Limpopo, and Gauteng provinces	To assess employer perceptions of the TVET system on skills development in the MMS.	Mixed methods research design	Employers in the MMS	Questionnaire, interview and discussion guide			Chapter 3 & 4	
			Survey					n=158
			In-depth interviews					n=23
			Focus group discussions					n=3
5. Factors Impeding attainment of equity targets	The study aimed to investigate the barriers to	Qualitative	MMS stakeholders	Interview and discussion guides	WSP & ATR data & SDF Master	October 2023- April 2024	Chapter 1	
			In-depth interviews					28

Project name	Research purpose	Research design	Target population & sample Size		Data collection instruments	Data sources	Study timeframe	Chapter application
with respect to People with disabilities within the MMS	achieving disability equity targets within the MMS in South Africa.		Focus group discussions	3		list		
6. Assessment of the Effectiveness of the Partnership between the Community Education & Training Centres (CETs)	To evaluate the effectiveness of the partnerships between the MQA and the CETs in the MMS.	Mixed methods research design	Employers, Learners, CETC representatives and MQA representatives		Questionnaire, interview and discussion guide	CETC capacity building workshop hosted by the Department of Higher Education and Training, CET beneficiary database and SDF master list	January 2024- May 2024	Chapter 4
			Survey	71				
			Interviews	6				
			Focus group discussions	3				
7. Investigation of the nature of 4IR and related impact on occupational profiling in the subsectors within the MMS	The research aimed to understand the impact and the nature (positive or negative) of the impact of the 4IR on the MMS, specifically in terms of skills requirements and	Mixed methods research design	Employers and Training Providers across the 9 subsectors of the MMS, Employer Affiliation Bodies, Labour/Union Representatives, the Nelson Mandela Mining Precinct, Centre for Scientific and Industrial Research (CSIR) and the Mining Equipment Manufacturers of South Africa (MEMSA)		Questionnaire, interview and discussion guide	Employer and Training provider databases, relevant internet, books, e-publications and journals	January 2023- February 2024	Chapter 1, 2 & 3
			Survey	348				

Project name	Research purpose	Research design	Target population & sample Size		Data collection instruments	Data sources	Study timeframe	Chapter application
	occupational changes.		In-depth interviews	63				
			Focus group discussions	7 with 34 participants				
8. Investigating the nature of demand and skills supply required with the changing technology within different subsectors in the MMS	The research conducted aimed at investigating the nature of demand and skills supply required with the changing technology (“the Project or “the Research”) in the Mining and Minerals sector (“MMS”)	Mixed methods research design	Employers and Training Providers across the 9 subsectors of the MMS, Employer Affiliation Bodies, Labour/Union Representatives, the Nelson Mandela Mining Precinct, Centre for Scientific and Industrial Research (CSIR) and the Mining Equipment Manufacturers of South Africa (MEMSA)		Questionnaire, interview and discussion guide	Employer and Training provider databases, relevant internet, books, e-publications and journals	January 2023-February 2024	Chapter 2 & 3
			Survey	348				
			In-depth interviews	63				
			Focus group discussions	7 with 34 participants				
9. Developing a framework for future skills in the MMS (applicable across subsectors	The study aimed to develop a comprehensive model (the Framework) that may be adopted to	Mixed methods research design	CSIR, SATCAP, NMMP, MQA & MMS employers				January 2023-February 2024	
			Consultative participatory interviews	53				

Project name	Research purpose	Research design	Target population & sample Size	Data collection instruments	Data sources	Study timeframe	Chapter application
	forecast future skills needs within the sector, providing invaluable insights that empower sectoral planning bodies, such as the MQA, with the opportunity to proactively anticipate and prepare for evolving skills need and thus, ensure that the workforce is equipped with the necessary skills to navigate the evolving landscape		Validation Workshops 3				Chapter 3 &6
10. MQA Tracer Studies	The studies' primary focus of the study was to (1) understand the impact of non-artisan core	Mixed methods research design in the form of quantitative surveys and focus group discussions (FGDs)	Learners and MQA stakeholders	Questionnaires and interview schedule and discussion guides	MQA I-Share database	December 2023–May 2024	Chapter 5
		Artisan	Survey Interviews				

Project name	Research purpose	Research design	Target population & sample Size	Data collection instruments	Data sources	Study timeframe	Chapter application
	learnerships, (2) the impact of jewellery and diamond processing programme on beneficiaries (3) assess the relevance, effectiveness, efficiency, and impact of Plater Boiler maker, Welder, Fitter and Turner, Fitter including Machining, Rigger artisan development programme	Non-artisan (core learnerships)	Survey n = 338				

The SSP encompasses dedicated chapters and responds to all nine subsectors of the MMS. The MQA's leadership, including the Management Team, Executive Committee, Governance and Strategy Committee, and Board, played a pivotal role throughout the entire process of the development of this SSP. Their invaluable input, guidance, and rigorous oversight ensured the development of a robust and comprehensive SSP.

The following section presents Chapter 1, which delves into the sector's sector profile. It outlines the sector's scope of coverage, key role players, employer profile and labour market analysis

Chapter 1 : Sector Profile

1.1 Introduction

This chapter presents an overview of the MMS, highlighting its scope of coverage, key role players, and economic performance, employer profile and labour market analysis of the MMS. The analysis draws on a rich data sources encompassing official statistics from Statistics South Africa (Stats SA), reports and insights from the Minerals Council South Africa. Additionally, the analysis incorporates primary data from the May 2024 WSP and ATR and DHET's Skills Development Levy (SDL) file. The analysis is further enriched by insights gained from industry conferences such as the inaugural MQA Mining Skills Lekgotla, 2024 Africa Mining Indaba, and MINTEK Symposium and the SETA Skills Summit held in April 2024. Additionally, the analysis was also informed by previous MQA studies. This chapter lays the foundation for exploring the key skills required in the sector.

1.2 Scope of Coverage

The MMS is segmented into nine subsectors, each with its own Standard Industrial Classification Code (SIC). The SIC is a system used to classify industries by a numerical code. It was developed to facilitate the organisation and analysis of economic data related to different sectors of the economy. Each industry is assigned a unique numerical code, allowing for straightforward categorisation and comparison across various datasets. Table 1.1 below provides a detailed breakdown of the associated SIC codes for reference.

Table 1.1: MMS Scope of Coverage

Subsector	SIC code
Coal Mining	21000, 22100
Gold Mining	23000, 23001, 23002, 23003
Platinum Group Metals (PGMs)	24240
Diamond Mining	25200, 25201, 25202
Other Mining (includes the mining of iron ore, chrome, manganese, copper, phosphates and salt)	24000, 24100, 24200, 25000, 25102, 25103, 25201, 25202, 25320, 25391
Cement, Lime, Aggregates and Sand (CLAS)	34240, 25101
Services Incidental to Mining	29000, 92004, 87000, 29000, 85291
Diamond Processing	39212, 39219
Jewellery Manufacturing	39210, 39211, 37601

The scope of coverage includes the MMS value chain, as represented in Figure 1.1. The value chain is depicted starting from the exploration of primary operations, progressing through the mineral value addition processes, and incorporating the supportive activities at each stage. Understanding the MMS value chain is crucial for designing effective skills development programmes. By mapping the key stages and players involved in each segment of production, targeted training initiatives can be developed. These programmes would address the specific skill needs across the entire value chain, ultimately leading to increased efficiency, productivity, and competitiveness in the MMS.

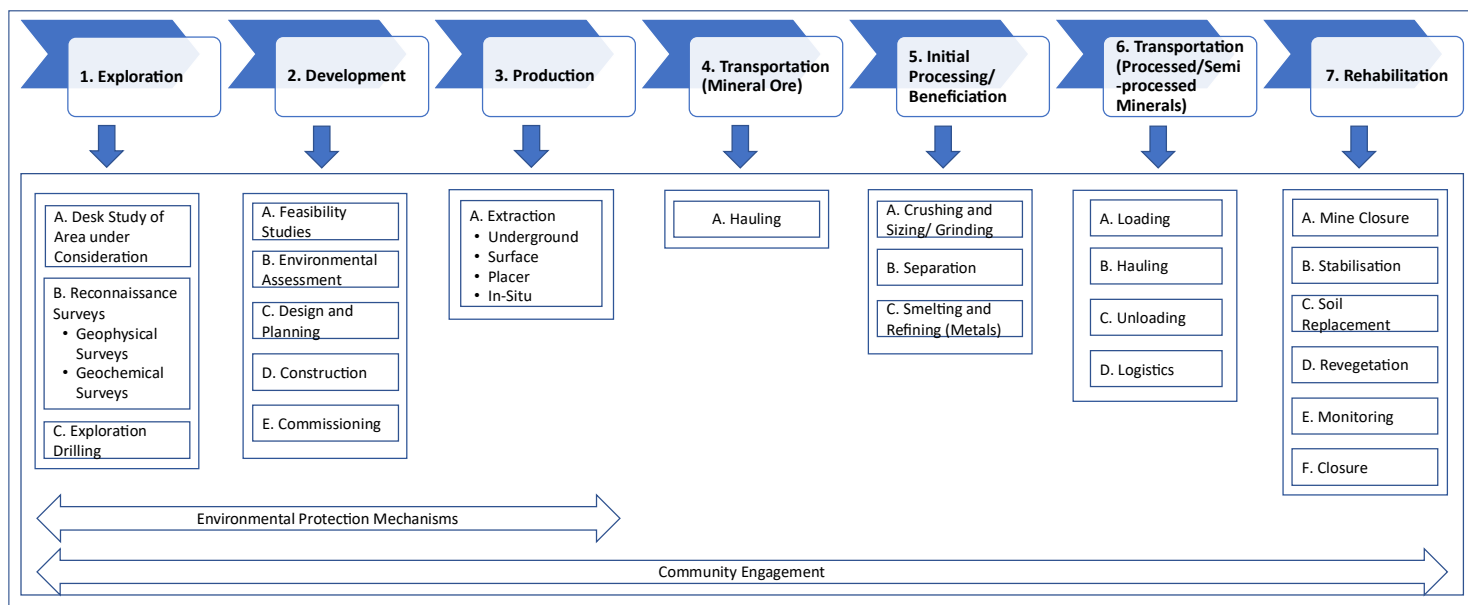


Figure 1.1: The MMS Value Chain

Source: MQA, The Impact of 4IR Research Study (2024)

The next section presents the key role players in the MMS, delving into their role in relation to skills development and relevance to NSDP outcomes.

1.3 Key Role Players

Mapping key role players in the MMS is important to understand the landscape of stakeholders, their contributions, and interactions, which is crucial for effective decision-making, collaboration, and addressing sectoral skills challenges. While numerous stakeholders are involved in the MMS, the provided list is not exhaustive. However, it offers a broader overview of the nature and types of stakeholders influencing skills development within the sector. It is important to note that the contribution of each key stakeholder depends on their specific role context or mandate to influence the attainment of NSDP outcomes and broader national socio-economic goals.

1.3.1 National Government Departments

Table 1.2 details the national government departments that are interconnected within the MMS and play a crucial role in achieving skills development and their relevance to the NSDP outcomes. This section elaborates on the role of each key stakeholder within the MMS, their function in relation to the MMS, and their relevance to NSDP outcomes.

Table 1.2: National Government Department Key Role Players

Department	Role in Skills Development	Relevant NSDP Outcome(s)
DMR	<ul style="list-style-type: none"> * Drives policy (Mining Charter) focusing on skills & transformation. * Shares data/statistics (public labour statistics, GCC reports). * Supports the MQA in encouraging companies to submit WSP & ATRs. 	<ul style="list-style-type: none"> * Improves skills levels in the South African workforce, focussing on skills matters in relation to targets set by the Mining Charter.

Department	Role in Skills Development	Relevant NSDP Outcome(s)
DHET	<ul style="list-style-type: none"> * Implements legislation & develops strategies (aligned with NSDP) for post-school education. * Supports the MQA (research, frameworks, data) for skills planning. * Develops policies for a quality and accessible post-school education system. * Encourages and supports worker-initiated training. * Supports the growth of public TVET and CET programmes. 	<ul style="list-style-type: none"> *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. *Link education and the workplace.
DBE	<ul style="list-style-type: none"> * Oversees the quality of basic education provision (aligned with national policy). * Supports career development initiatives. 	<ul style="list-style-type: none"> *Increase the level of skills in the South African workforce.

1.3.2 State-owned Entities, Research, Quality Councils and Professional Bodies

Table 1.4 provides details on state-owned entities, their role, as well as their relevance in addressing skills development in the MMS envisaged in the NSDP. Table 1.3: State Entities and MMS Councils.

Table 1.4: State-owned Entities, Research, Quality Councils and Professional Bodies Key Role Players

Entity	Role in Skills Development	Relevant NSDP Outcome(s)
National Skills Fund	<ul style="list-style-type: none"> *Funds skills development initiatives aligned with the National Skills Development Plan, mandated by the Skills Development Act, or initiatives recognised as efforts by the Minister to uphold standards of excellence in skill development. 	<ul style="list-style-type: none"> *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. *Supports career development initiatives.
Mine Health and Safety Council (MHSC)	<ul style="list-style-type: none"> *Promotes a culture of health and safety through awareness, research, and training to supports initiatives that reduce injuries and fatalities in the MMS. 	<ul style="list-style-type: none"> *Improves the level of skills concerning health and safety training. *Supports skills development programmes aimed at occupational health and safety.
Minerals Council South Africa	<ul style="list-style-type: none"> * Plays a proactive role in advocating for the advancement of the MM by supporting various initiatives related to communities, education, health, labour, policy and regulations, safety, and women in mining. *Facilitate the development of a highly skilled and trainable MMS workforce, ready for deployment and career advancement. 	<ul style="list-style-type: none"> *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. *Supports career development initiatives.
Council for Geoscience	<ul style="list-style-type: none"> *Through its mine project, identifies and promotes skills development related to remediation or rehabilitation of mines. *Supports public colleges for higher learning and recommends relevant learning programmes. 	<ul style="list-style-type: none"> Identify and address the production of skills in high demand by supporting and contributing towards the growth of public colleges as a key provider of higher learning

Entity	Role in Skills Development	Relevant NSDP Outcome(s)
		and recommend learning programmes within its scope of work.
Quality Council for Trades and Occupations (QCTO)	<ul style="list-style-type: none"> * Oversees development, implementation, and quality assurance of occupational qualifications in TVET. * Sets quality standards and guidelines for training providers. * Oversees accreditation of training providers, assessment centres, and moderators. * Develops occupation-specific qualifications to address skills gaps. * Works with industry to identify occupations in high demand. 	<ul style="list-style-type: none"> * Improves the skill levels of the workforce by identifying high-demand occupations. * Increase production of high-demand occupations by developing curriculum. * * Link education and the workplace by developing occupational qualifications which are directed at providing occupationally specific skills for tackling skills gaps.
Council for Scientific and Industrial Research (CSIR)	<ul style="list-style-type: none"> * Applies R&D in 4IR to enhance the technological capabilities of the MMS. * Creates a demand for upskilling the MMS workforce in new technologies, potentially leading to collaboration with training providers. * Conducts targeted research that addresses national imperatives and leverages its expertise in science, engineering, and technology to support both public and private sectors. 	Improves the technological base of the sector through the application of 4IR.
Mandela Mining Precinct (MMP)	<ul style="list-style-type: none"> * Improves training resources. Conducts research to develop improved training resources and inform training programme development. * Focuses on pre-competitive research addressing industry-wide needs, ultimately leading to a more skilled workforce. * Facilitates knowledge sharing within the industry, keeping training providers and employers updated on advancements and required skills. 	<ul style="list-style-type: none"> * 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. * Skills development support for entrepreneurship and cooperative development
Mintek	<ul style="list-style-type: none"> * Provides technical expertise, training, and equips employees with knowledge of emerging technologies and industry best practices. * Provides technical support, expertise, and training to enhance competitiveness and growth of artisanal and small-scale mining. * Develops and provides cost-effective mineral recovery and beneficiation technologies. * Assists the MMS to operate more effectively by developing and making available, the most appropriate and cost-effective mineral recovery and mineral beneficiation technologies. 	<ul style="list-style-type: none"> * Improves the level of skills in the South African mining workforce. * Increase access to occupationally directed programmes. * Skills development support for entrepreneurship and cooperative development. * Identify and increase production of occupations in high demand.
MQA	<ul style="list-style-type: none"> * Provides funding and programmes (learnerships, internships, bursaries, artisanship, career guidance) for skills transformation. * Facilitates access to industry experience through workplace programmes. * Conducts research to identify occupations in high demand within the MMS and to also inform labour market intelligence for the MMS. * Encourages and supports worker-initiated training programmes. * Bridges skills gaps through artisanship, internships, and learnerships. 	<ul style="list-style-type: none"> * 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 * Improve career development initiatives * Link education and the workplace

Entity	Role in Skills Development	Relevant NSDP Outcome(s)
20 South African SETAs	<ul style="list-style-type: none"> * The 20 South Africa SETAs, including the MQA share a common mandate of administering skills development in country. However, there are complimentary assignments that can be undertaken, e.g. promoting and facilitating apprenticeship and learnership programmes specifically designed for artisan development. This mandate dovetails with the mandate of the MQA to jointly implement SIHIP (SETA Integrated high impact programmes). 	<ul style="list-style-type: none"> *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 *Improve career development initiatives *Link education and the workplace.
Association of Mine Managers South Africa (AMMSA)	<ul style="list-style-type: none"> *Facilitates discussions and knowledge sharing among industry professionals on skills development. *Connects mining companies, training providers, and government to work together on skills development initiatives. * Facilitating mentorship programmes linking experienced professionals with new entrants, fostering knowledge transfer and skill development. 	<ul style="list-style-type: none"> *Improve career development initiatives *Skills development support for entrepreneurship and cooperative development *Increase the level of skills in the South African workforce
Mining Equipment Manufacturers of South Africa (MEMSA)	<ul style="list-style-type: none"> *Advocates for local technology and innovation, facilitating entry for original equipment manufacturers. * Facilitates collaboration between mining companies, research institutions, and government to identify skills gaps and develop training programmes. * Highlights changing skills needs in the MMS due to technological advancements. * Advocates for high standards in mining equipment, potentially requiring a more skilled workforce for operation and maintenance. 	<ul style="list-style-type: none"> *Increase the level of skills in the South African workforce *Identify and increase production of occupations in high demand *Improve career development initiatives
Statistics South Africa (Stats SA)	<ul style="list-style-type: none"> *Publishes reports and datasets that provide insights into the labour market, including skills shortages and the demand for specific occupations within the MMS. * Informs policy decisions by government bodies related to skills development initiatives. * Allows comparisons between sectors and regions to identify critical skill shortages within the MMS. 	<ul style="list-style-type: none"> *Improved planning and implementation of skills development initiatives
Industrial Development Corporation (IDC)	<ul style="list-style-type: none"> *Offers financing products tailored to the MMS, including financing ASM. * Allocate funds to support skills development programmes, targeting priority areas artisan skills. * Collaborate with training providers to co-fund or sponsor programmes aligned with industry needs. * Encourage small and medium-sized mining companies to invest in workforce training through their support for enterprise growth. * Contribute to skills development for HDSAs by supporting their entry and advancement in the MMS through investment in relevant training programmes. * Increase the level of skills in the South African workforce 	<ul style="list-style-type: none"> * Improve career development initiatives. * Improve career development initiatives. * Skills development support for entrepreneurship and cooperative development
Southern African Institute of Mining and Metallurgy (SAIMM)	<ul style="list-style-type: none"> * Offers programmes and courses to keep mining professionals updated on advancements and best practices * Acts as a voluntary association for mining professionals, registering engineers and technicians based on their qualifications and experience. This registration process promotes professionalism and helps maintain high standards within the MMS workforce. 	<ul style="list-style-type: none"> * Increase the level of skills in the South African workforce. * Improve career development initiatives. *Promote professionalism and ethics within the workforce. * Improve career development initiatives.

Entity	Role in Skills Development	Relevant NSDP Outcome(s)
	* Plays a role in setting and promoting technical standards, ensuring training programmes align with industry needs.	

1.3.3 Educational institutions, Skills Development Providers, Mine Communities & Organised Labour

In addition to the national government departments, state-owned entities and industry key role players, there are additional key role players who contribute to skills development in the MMS. Their role in relation to skills development and relevance to the NSDP outcomes are discussed in Table 1.5 below.

Table 1.5: Educational institutions, Skills Development Providers and Mine Communities Role Players

Role Player	Contribution to Skills Development	Relevant NSDP Outcome(s)
Schools (primary and secondary)	<ul style="list-style-type: none"> * Provides a foundation in core subjects such as literacy, numeracy, and critical thinking is crucial for future learning and grasping technical concepts relevant to the MMS. * Encourages an interest and proficiency in Science, Technology, Engineering, and Math (STEM) subjects which are particularly important for the MMS. * Schools also play a role in developing general transferable skills valuable in any career path, including the MMS. These skills may include communication, problem-solving, teamwork, and digital literacy. 	<ul style="list-style-type: none"> * Improves the level of skills in the South African workforce. * Improve access to occupationally directed programmes.
PSET Institutions (Universities, TVETs, and CETs)	<ul style="list-style-type: none"> * Universities offer qualifications in various disciplines relevant to the MMS, such as mining engineering, geology, metallurgy, and environmental science. * Universities conduct research on topics critical to the advancement of the MMS, such as new mining technologies, sustainable practices, and safety improvements. This research and development contribute to innovation within the sector and can inform the curriculum of future skills development programmes. * TVET colleges offer vocational training programmes for the MMS. These programmes provide students with the practical skills and job-ready qualifications needed for various technical occupations. * TVET colleges often collaborate with mining companies to offer practical training and workplace experience programmes. * CETs provide customised training programmes tailored to the specific needs of a particular mining company and community. * CETs offer short-term, specialized courses designed to upskill or reskill existing employees within the MMS. 	<ul style="list-style-type: none"> * Increase quality of education and training * Increase the level of skills in the South African workforce. * Improve career development initiatives. * Attract, develop and retain scarce and critical skills. * Improve access to occupationally directed programmes.
Accredited private training providers	<ul style="list-style-type: none"> * Delivery of training programmes to address relevant skills gaps and equip graduates with industry-demanded competencies. * Focus on specific skills and shorter programmes that address immediate industry needs, * Provision of training that adheres to quality standards, with qualified instructors, up-to-date curriculum, and proper assessments, resulting in graduates with a higher level of preparedness for MMS careers. * Offers potentially more cost-efficient solutions and delivery training on-site at mining companies for minimal disruption. 	<ul style="list-style-type: none"> * Improve access to occupationally directed programmes. * Increase quality of education and training. * Increase the level of skills in the South African workforce. * Identify and increase production of occupations in high demand
Civil Society (CSOs) (NGOs, Lobby and Advocacy Groups)	<ul style="list-style-type: none"> * Mobilizes communities for support of the MMS, fostering stability and positive relationships. * Can advocate for increased government and industry investment in skills development programmes relevant to the MMS. 	<ul style="list-style-type: none"> * Links education and the workplace.

Role Player	Contribution to Skills Development	Relevant NSDP Outcome(s)
	<ul style="list-style-type: none"> * Some CSOs might directly facilitate or support learnerships and apprenticeship programmes within the MMS. * Hold mining companies accountable for ensuring the effectiveness and accessibility of training programmes. 	<ul style="list-style-type: none"> *Improves the level of skills in the South African workforce. *Increase access to occupationally directed programmes. *Skills development support for entrepreneurship and cooperative development. *Identify and increase production of occupations in high demand.
Mine Communities	<ul style="list-style-type: none"> * House a significant population that can potentially contribute to the future workforce of the MMS. * Some mine communities might collaborate with NGOs, government agencies, or mining companies to establish local skills development initiatives. These initiatives can offer basic skills training, career guidance, or mentorship programmes to equip community members with the foundational skills needed to pursue careers within the MMS. * May advocate for increased access to skills development programmes relevant to the specific needs of their local area. 	<ul style="list-style-type: none"> * Increase the level of skills in the South African workforce. * Improved planning and implementation of skills development initiatives. * Links education and the workplace. Increase access to occupationally directed programmes.
Organised Labour (NUM, NUMSA, AMCU, Solidarity & UASA)	<ul style="list-style-type: none"> *Promotes the interests of employees in the MMS *Supports the MQA in encouraging companies to submit WSP & ATRs. 	<ul style="list-style-type: none"> * Increase the level of skills in the South African workforce. * Improved planning and implementation of skills development initiatives.

The next section discusses the MMS’ employer profile, followed by the labour market analysis.

1.4 Employer Profile

This section leverages data from the DHET skills development levy file to provide an analysis of employers in the MMS. Key insights are provided regarding the geographical distribution of employers, their subsector and company size. Figure 1.2 below illustrates the trends pertaining to the number of registered levy-paying companies operating within the MMS over the past five years (2020-2024).

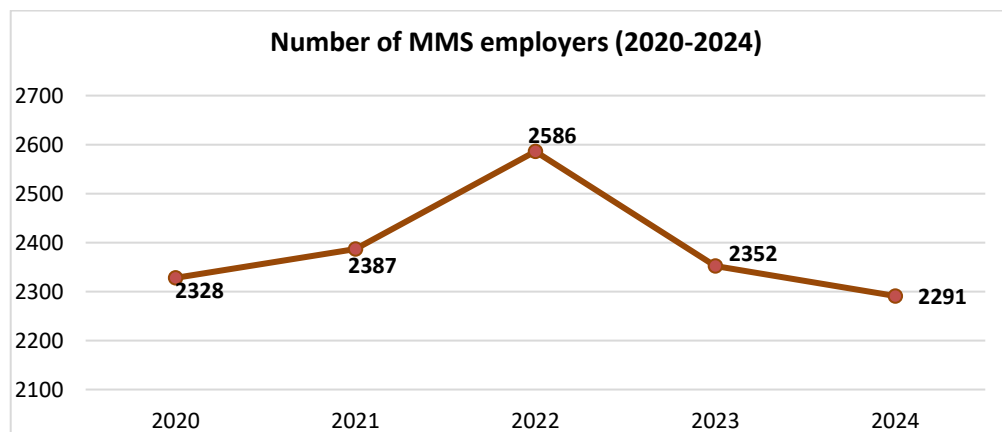


Figure 1.2: Number of MMS employers (2020-2024)
Source: DHET registration file (May 2024)

The employer trends indicates a fluctuation in levy-paying companies in the South African MMS. The MMS experienced growth in employers from 2020 to 2022. However, a decline was experienced in 2023 and again 2024, highlighting the sector's dynamic nature and susceptibility to market fluctuations. Considering these companies contribute skills development levies to the MQA, the decline has potential implications for workforce development. This volatility necessitates adaptable skills development programmes that can respond to both growth and contraction periods, focusing on attracting and onboarding new talent during upswings and emphasising upskilling and reskilling during downturns. Prioritising transferable skills is crucial to enhancing employability and ensuring employees' resilience in the face of sector instability.

1.4.1 Employer by Company Size

Table 1.6 below displays the proportion of employers in the MMS, categorised by company size (small, medium, and large), spanning from 2020 to 2024. Small companies are defined as those with less than 50 employees, medium companies have 50-149 employees, and large companies have 150 or more employees.

Table 1.6: Employers by company size (2020-2024)

Company size	2020	2021	2022	2023	2024	Average employers
Small	1309	1863	2059	1882	1803	1783
Medium	247	234	231	212	196	224
Large	250	290	296	259	292	277
Unknown	522	–	–	–	–	N/A
Total	2328	2387	2586	2352	2291	2389

Source: DHET registration file (May 2024)

The above data presents a multifaceted and dynamic picture of the MMS from 2020 to 2024, revealing distinct trends across different company sizes. Small companies, while consistently representing the majority of employers, experienced a significant surge in numbers of registered levy paying companies from 2020 to 2022, growing by 42% and 11% year-on-year, respectively. This initial growth signifies increased participation and potential empowerment of smaller players in the sector. However, this positive trend was followed by a decline of 9% in 2023 and a further 4% in 2024. These fluctuations underscore the vulnerability of small companies to economic shifts, and competition from larger players. It highlights the need for continued support and targeted interventions from the MQA to ensure their sustainability and growth in the sector.

Medium-sized companies experienced a consistent decline from 2020 to 2024, with an average 22% decrease in the number of employers over the past five years. Similarly to small companies, this downward trend may indicate challenges faced by mid-sized companies in adapting to a changing industry landscape or competing with larger, more established players.

Large companies, while demonstrating the most stability, also experienced fluctuations. After a significant increase of 16% in 2021, their numbers declined by 13% in 2022, only to recover in 2023 and 2024 with growth rates of 13% and 18%, respectively. This suggests that even large companies are not immune to the dynamic nature of the sector and are navigating their own set of challenges and opportunities.

Overall, these trends underscore the need for a comprehensive and nuanced approach to skills development within the MMS. In light of this, in the next five years, the MQA will also be prioritising initiatives that support

the growth and resilience of small companies, while also addressing the evolving needs of medium and large companies. This necessitates a focus on developing a diverse range of skills, from technical and operational expertise to managerial and leadership capabilities, to ensure a skilled and adaptable workforce for the future of the sector.

1.4.2 Employer by geographic location

Table 1.7 below illustrates the geographic distribution of the MMS’ employers, focusing on the past five years (2020-2024).

Table 1.7: Employer by geographic location (2020-2024)

Province	2020	2021	2022	2023	2024	Average
Gauteng	796	1078	1093	993	1056	1003
Mpumalanga	227	327	379	334	346	323
North-West	217	293	328	308	254	280
Western Cape	187	217	229	205	187	205
Northern Cape	134	169	201	176	125	161
Limpopo	99	120	150	136	147	130
KwaZulu-Natal	74	88	100	101	88	90
Free State	46	55	62	56	49	54
Eastern Cape	37	40	44	42	39	40
Unknown	511					102
Total	2328	2387	2586	2352	2291	2389

Source: DHET registration file (May 2024)

An analysis of the geographic distribution of employers over the past five years revealed that Gauteng consistently leads in employer numbers, primarily due to its concentration of head offices rather than actual mining operations. While Mpumalanga, a key mining province, saw growth until 2022, it experienced a decline in 2023, possibly due to economic fluctuations or industry-specific challenges. However, the rebound in 2024 indicates a degree of adaptability and recovery in the province. Conversely, North-West, another major mining hub, experienced a more pronounced decline (-21%) in employer numbers in 2024, suggesting the need for closer examination of the factors affecting this province's mining sector. These could include mine closures or company mergers.

On the other hand, provincial disparities are evident, with the Eastern Cape and Free State consistently reporting low employer numbers. This highlights the need for targeted interventions to stimulate economic activity and employment opportunities in these provinces. Despite these fluctuations, the sector demonstrates resilience, as seen in the relatively stable average number of employers over five years.

For the MQA, these insights are crucial for shaping effective skills development planning. The data underscores the need for:

- ✓ Tailored programmes: Developing province-specific skills development programmes, considering the unique operational needs and challenges of each province, particularly the recent declines in Mpumalanga and North-West.
- ✓ Adaptation: Creating flexible and adaptable training programmes that can respond to the sector's evolving needs, particularly during economic fluctuations and regional shifts.

The MQA's role becomes even more crucial in fostering collaboration with industry stakeholders to understand the reasons behind company fluctuations and tailor skills development programmes to the specific needs of each province, especially in areas with active mining operations. By analysing data, understanding trends, and working with stakeholders, the MQA can ensure that the mining workforce remains equipped with the skills needed to thrive amidst challenges and opportunities in the sector.

1.4.3 Employer Distribution by Subsector (2020-2024)

Table 1.8 below illustrates the subsectoral distribution of the MMS' employers, focusing on the past five years (2020-2024).

Table 1.8: Employer distribution by subsector

Subsector	2020	2021	2022	2023	2024	Average employers
CLAS	128	129	132	120	109	124
Coal Mining	217	241	259	249	291	251
Diamond mining	43	24	20	35	46	34
Diamond Processing	48	60	43	28	40	44
Gold mining	98	140	85	71	91	97
Jewellery Manufacturing	157	170	175	143	152	159
Other mining	813	1062	1202	936	1028	1008
PGM mining	25	28	21	35	34	29
Services Incidental to Mining	455	533	649	734	500	574
Unknown	344	–	–	–	–	N/A
Total	2328	2387	2586	2352	2291	2389

Source: DHET registration file (May 2024)

The subsectoral five-year trends analysis presents a nuanced picture with varying trends across subsectors. Coal mining emerged as a leading force, experiencing consistent growth throughout the period, likely driven by increased global demand and favourable market conditions. Despite the global shift towards renewable energy sources, Coal remains a cornerstone of the South African economy, serving as its primary source of electricity and contributing significantly to its export revenue (MCSA, 2024).

Conversely, Diamond mining faced fluctuations, with a sharp decline in the number of companies in 2021 and 2022, followed by a partial recovery from 2023. This volatility could be attributed to challenges in the global diamond market or specific operational difficulties within South Africa. The number of registered Gold mining companies has been fluctuating, potentially due to resource depletion or rising production costs, signalling a need for innovation or strategic adjustments in this sector.

The Other mining subsector experienced growth until 2022 before declining in 2023, reflecting the overall trend in the sector. PGM mining companies remained relatively stable, meanwhile, the Services Incidental to mining saw significant growth, particularly in 2023, before contracting in 2024, highlighting its vulnerability to fluctuations in the broader MMS. Finally, Jewellery Manufacturing showed steady growth, indicating a potential opportunity for South Africa to add value to its mineral resources through local processing and manufacturing.

1.5 Labour Market Analysis

This section examines the labour market analysis of the MMS, considering the economic performance and employee profile. It provides a sectoral lens on the sector's workforce, examining critical trends in employment patterns, evolving skill demands, and workforce demographics. By gaining insights into these factors, the MMS can develop effective workforce planning strategies. These strategies will focus on attracting and retaining top talent, fostering the development of critical skills, and cultivating a dynamic and adaptable workforce that thrives in a constantly changing economic environment. The analysis will commence by examining the economic performance of the MMS, with a focus on production and sales of minerals, the sector's contribution to GDP and economic performance in relation to employment. Subsequent analysis will delve deeper into the sector's employee profile, highlighting their representation by subsector, occupational levels, age, gender, disability, race and highest qualification.

1.5.1 Economic Performance

The economic performance of the MMS plays a crucial role in shaping skills development needs. This section delves into the key economic indicators that impact skills within the sector. It presents the trends in mining production and sales to assess industry activity levels. In addition, the influence of the Not in Education, Employment, or Training (NEET) population on skills development is explored, considering potential recruitment pools and training requirements. The section then examines the sector's contribution to the Gross Domestic Product (GDP) to gauge its economic significance. Finally, employment creation and retrenchment trends are investigated to understand their impact on the demand for specific skills and potential reskilling needs. This comprehensive analysis aims to provide valuable insights for developing targeted skills development strategies that are aligned with the evolving economic landscape of the MMS.

1.5.1.1 Mining Production and Sales

While the production and sales of minerals in the MMS do not directly deliver skills training, they play a vital role in shaping the skills development landscape. Increased demand for minerals often leads to the expansion of existing mines or the opening of new ones, creating a need for a wider range of skilled employees. Additionally, the constant adoption of new technologies necessitates a skilled workforce to operate and maintain them. These demands often translate into funding for skills development initiatives through SETAs and royalties from mining companies, or through their Corporate Social Responsibility efforts focused on training local communities. The type of minerals being produced also influences the specific skills needed, prompting companies to invest in targeted training programmes. Finally, the evolving skill demands within the MMS can influence the curriculum of training institutions, ensuring graduates have the necessary skillset for success in the industry. However, challenges such as fluctuating commodity prices and short-term company focus can create instability in the investment for skills development within the MMS. The table below indicated trends patterns of production and sales between 2019-2023.

Table 1.9: MMS production and sales (2019-2023)

Year	2019	2020	2021	2022	2023	Average
Mining Production (per index)	100	89.1	100.4	93.2	92.8	94.2
Mining Sales (R Million)	552 880.90	613 191.60	857 279.90	883 542.90	792 596.90	739 898.44

"Index of the volume of mining production: The index of the volume of mining production, also known as the production index, is a statistical measure of the change in the volume of production. The production index of a mineral group is the ratio between the volume of production of a mineral group in a given period and the volume of production of the same mineral group in the base period. The current base period is 2019. The production in the base period is set at 100."

Table 1.9 above illustrates the volume of mining production in South Africa from 2019 to 2023, with a baseline of 100 set for 2019. The index shows that the volume of mining production has fluctuated over these years. While 2019 serves as the baseline with an index of 100, there has been a decline in production volume over this period. By 2023, the volume had dipped to 92.8, representing a 7.2% decrease. This decline was not consistent year-to-year, with a slight increase observed in 2021 compared to 2020. However, the overall downward trend suggests a potential contraction within the sector.

The decline in mining production volume has implications for skills development in the sector. A shrinking industry typically translates to a lower demand for new employees. Existing skills development initiatives may need to adapt their programmes to address the specific needs of a potentially smaller workforce. Additionally, with less revenue coming from production, funding for skills development programmes could be impacted, creating challenges in maintaining a pipeline of skilled workers for the future.

1.5.1.2A Missed Opportunity: Including the NEET in the MMS Through Skills Development

The MMS plays a crucial role in the South African economy in general. Despite its own unique challenges, broader challenges affecting the country has an adverse effect on the sector. Unemployment remains a challenge within the sector. A significant challenge hinders the MMS' full potential – a sizeable unemployed population, particularly among those not currently in education, employment, or training NEET. Neglecting this segment of the population represents a missed opportunity for both the workforce and the MMS itself.

While unemployment presents a significant challenge, it can also be seen as an opportunity to bridge skill gaps within the MMS workforce. The NEET population represents a pool of untapped potential for the MMS. The following are skills development strategies that can be leveraged to accommodate the NEET cohort into the MMS:

- 1. Targeted retraining and upskilling programmes:** Develop and implement skills development programmes specifically designed for the NEET population. These programmes should equip them with the technical skills required for mining-related roles, enhancing their employability and promoting their successful integration into the MMS workforce.
- 2. Entrepreneurship and business development support:** Encourage and empower individuals within the NEET population to create their own opportunities within the MMS. This can be achieved by providing training in entrepreneurial skills and business management knowledge, alongside support for the development of Small, Medium and Micro-Sized Enterprises (SMEs) and cooperatives in the MMS. Focus this support on marginalised groups such as NEET youth, women, and people with disabilities to foster economic inclusion and a more diverse MMS landscape.
- 3. Transferable skills development:** A focus on fostering transferable skills such as communication, problem-solving, and teamwork can significantly enhance employability across the MMS. These skills are valuable

not only in mining-specific roles but also in various other sectors of the economy, providing individuals with broader career options.

1.5.1.3 GDP

Figure 1.3 below illustrates the Gross Domestic Product (GDP) of the MMS, which quantifies the total value of all goods and services produced within South Africa over a specific period (2024 Q1) in comparison to other sectors of the economy. According to Stats SA (2024), the first quarter of 2024 witnessed underperformance in six of the ten sectors of the economy. These include construction (-3.1%), mining and quarrying (-2.3%), manufacturing (-1.4%), transport, storage, and communication (-0.5%), electricity, gas, and water (-0.4%) and general government services (-0.1%).

Agriculture, forestry, and fishing emerge as the most significant contributor to GDP growth, with a positive contribution of 13.5%. While the trade, catering, accommodation, personal services, finance, real estate, and business services sectors experienced some growth, their performance was minimal.

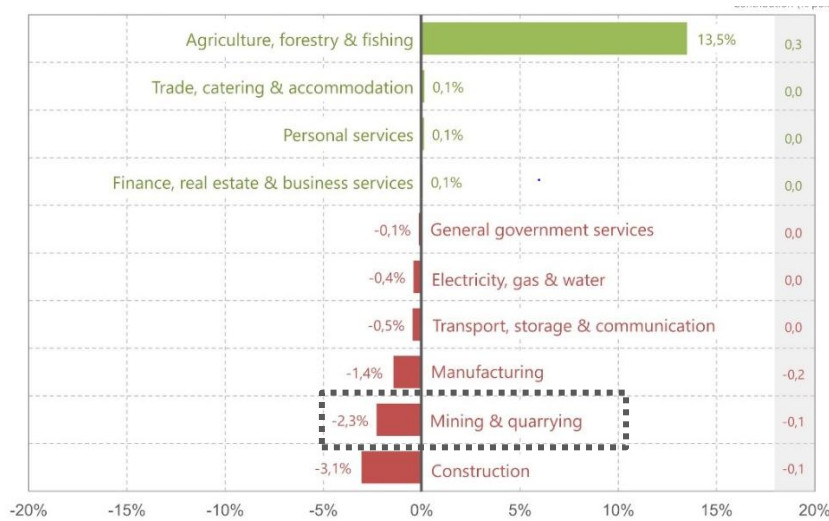


Figure 1.3: Q1 2024 GDP Contribution

Source: Stats SA Q4 GDP Contribution by Economic Sectors (2024)

Mining output declined by 2.3% due to significant production losses in platinum group metals, coal, gold, and manganese ore. This downturn has implications for skills development, including reduced job opportunities, skill mismatches and decreased funds allocated to training and development. To mitigate these challenges, diversifying the economy, investing in transferable skills, fostering entrepreneurship, and strengthening social safety nets are crucial steps.

1.5.1.4 Employment creation and retrenchments in the MMS

The South African MMS presented a complex picture in 2023. While the sector emerged as a beacon of job creation, adding an estimated 7 650 jobs and employing a significant portion of the workforce (477 000 excluding those employed in Services Incidental to Mining), it simultaneously faced retrenchments that threatened to undermine this progress. News reports throughout 2023 highlighted the potential for job losses due to factors such as infrastructure bottlenecks and fluctuating commodity prices (Miningmx, 2023). These retrenchments pose a significant challenge for skills development in the MMS. Disruptions caused by retrenchments can create uncertainty and discourage displaced workers from investing in new skills.

Additionally, companies facing financial pressures might prioritise short-term solutions over long-term investments in skills development, potentially leading to future skills gaps.

However, collaborative efforts can ensure skills development remains a priority. The MQA can play a crucial role by supporting displaced employees through portable skills and retraining programmes to facilitate their transition to new roles or unfortunate realities of unemployment. Collaborative efforts between mining companies, organised labour, and educational institutions can lead to the development of flexible and adaptable skills development programmes. These programmes should prioritise not only technical skills specific to high-value minerals or new technologies but also essential transferable skills that enhance overall employability. By fostering transferable skills, skills development programmes can equip employees with a broader skillset applicable in various sectors, improving their employability even if they are retrenched. The next section presents the labour market profile of the MMS.

1.6 Labour Market Profile: Reflections and insights on the evolving landscape of the South African MMS (2020-2024) and the MQA’s response to shifting demographics

The labour market profile was constructed using the 2024 WSP-ATR May submissions. This data sheds light on the current employment landscape within the MMS. The data was contrasted using the Minerals Council Facts and Figures 2024 report, which provides a comprehensive overview of the industry's performance and trends, allowing for a deeper analysis of the insights revealed in the WSP-ATR data. The analysis provides a five-year trend analysis of MMS employment, delving deep into demographics such as gender, race, disability, age, occupational level and higher education. The first section sets the scene by providing the overall employment figures of the workforce, establishing a baseline against which subsequent demographic breakdowns can be assessed.

1.6.1 Number of employees in the MMS (2020-2024)

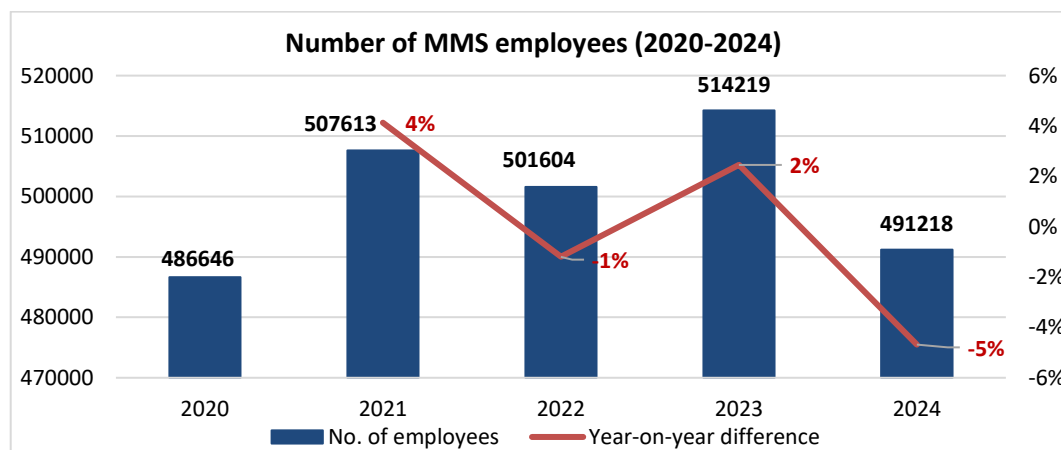


Figure 1.4: Number of employees in the MMS (2020-2024)

Source: MQA WSP and ATR (31 May 2024)

Figure 1.4 above illustrates the number of employees in the South African MMS from 2020-2024. The MMS experienced a general decline in employment over the five-year period. The highest number of employees (514 219) was recorded in 2023, while the lowest 486 646 was observed in 2020. This sharp decrease suggests a potential acceleration of the negative trends affecting the sector. This represents an overall decrease of approximately 5.4% over the five years.

Despite the overall decline, employment levels remained relatively consistent year-over-year, with only minor fluctuations. This suggests that the sector, while facing challenges, has not experienced drastic workforce reductions. The relatively stable employment figures throughout the period suggest a degree of resilience within the sector.

1.6.2 Employment by subsector

Table 1.10 below presents the employment profile of the MMS workforce by subsector.

Table 1.10: Employment by subsector (2020-2024)

Subsector	2020	2021	2022	2023	2024	Average difference
CLAS	10746	6829	12275	12275	9947	-8%
Coal mining	89775	91271	91123	94437	98431	9%
Diamond mining	15888	13889	13489	15825	11620	-37%
Diamond processing	1461	1626	1408	1408	448	-226%
Gold mining	94152	93537	92452	93988	81357	-16%
Jewellery manufacturing	1853	1811	2317	2317	1642	-13%
Other mining	71198	77210	78494	79545	107203	34%
PGM mining	166367	165308	177780	182158	151369	-10%
Services incidental to mining	35206	56132	32266	32266	29201	-21%
Total	486646	507613	501604	514219	491218	1%

Source: MQA WSP and ATR (31 May 2024)

Despite having fewer employer companies compared to other subsectors such as Other Mining, PGM mining emerges as the largest employer in the sector. This indicates that PGM mining companies tend to be larger in scale, employing a significant workforce for extraction and processing activities. However, there has been a notable decrease in PGM employment of 10% over the five years. The Other Mining subsector boasts the highest number of employers, suggesting a prevalence of smaller-scale operations involved in diverse mineral extraction. However, its employment figures do not match the PGM subsector. Nevertheless, Other Mining has seen a substantial 34% increase in employment over five years, highlighting its growing importance in job creation within the sector.

Coal mining exhibits a steady increase in both employer numbers and employment figures, reflecting its continued importance in the South African energy landscape. The Diamond Processing subsector witnessed the most dramatic decline (-226%), signalling major challenges and a substantial loss of jobs. This could be due to the increasing prevalence of synthetic diamonds, shifting consumer preferences, or relocation of processing activities.

While not as drastic as Diamond processing, other subsectors such as Diamond mining and Gold mining also experienced declines in employment, potentially due to factors such as resource depletion, automation, and global market fluctuations. This could necessitate a focus on reskilling and upskilling initiatives by the MQA to assist employees in transitioning to other sectors or emerging areas within the MMS.

The Services Incidental to Mining subsector demonstrates fluctuations in employment that correlate with the overall health of the MMS. This highlights the interdependence between mining operations and the supporting services they rely on.

1.6.3 Employment by Gender

Table 1.11 below illustrates the gender distribution trend of employees in the South African MMS from 2020 to 2024.

Table 1.11: Gender distribution trends analysis (2020-2024)



Gender distribution	Male	No. of employees (Males)	Female	No. of employees (Females)	Total no. of employees
2020	83,9%	408296	16,1%	78350	486646
2021	83,0%	421319	17,0%	86294	507613
2022	81,6%	409309	18,4%	92295	501604
2023	80,8%	415489	19,2%	98730	514219
2024	79,8%	391992	20,2%	99226	491218

Source: MQA WSP and ATR (31 May 2024)

The MMS workforce is predominantly male, with males consistently accounting for the vast majority of employees throughout the five-year period. The percentage of male employees ranged from 83.9% in 2020 to 79.8% in 2024. While the sector remains male-dominated, there is a gradual increase in the representation of female employees. From 16.1% in 2020, it grew to 20.2% in 2024.

It is important to note that the total number of employees in the MMS fluctuated throughout the period, with a peak in 2023 followed by a decline in 2024. However, the number of female employees continued to increase despite the overall decrease in workforce size. This indicates a positive, albeit slow, trend towards gender diversity in the sector. This upward trend aligns with national imperatives for transformation within the MMS. Industry leaders at the 2024 Africa Mining Indaba echoed this need for inclusivity, emphasising the importance of attracting and empowering more women to the MMS. Supporting women in the mining industry is essential, not only for those working in large-scale mines, but also for those in artisanal and small-scale mining (ASM).

Recognising the underrepresentation of women in mining, the MQA is implementing targeted initiatives to bridge the gap. These include developing specialised skills development and training programmes that equip women with the technical, operational, and leadership capabilities needed to excel in the sector. For example, financial assistance is provided to HDSA and female students pursuing mining-related qualifications at universities and TVET colleges, increasing the pool of qualified candidates for technical and managerial positions. This not only expands the pool of qualified candidates for technical and managerial roles, but also fosters diversity within the sector. Beyond skills development, the MQA champions gender diversity through advocacy and awareness campaigns. The SETA organises workshops and conferences such as the Mining Skills

Lekgotla that showcase the achievements of successful women in mining, inspiring others to consider careers in this dynamic field. Additionally, the MQA fosters collaboration with various stakeholders, including mining companies and educational institutions. This collaborative approach facilitates the development and implementation of effective strategies to promote gender diversity and inclusivity across the MMS.

1.6.4 Employment by Race

Table 1.12: Employment by race (2020-2024)

Year	African	Coloured	Indian	White
2020	88,0%	6,0%	1,0%	5,0%
2021	87,0%	3,0%	1,0%	9,0%
2022	88,4%	2,5%	0,5%	8,7%
2023	87,9%	2,8%	0,6%	8,7%
2024	87,4%	3,5%	0,6%	8,5%

Source: MQA WSP and ATR (31 May 2024)

The data reveals a significant dominance of African employees in the MMS, consistently representing around 87-88% of the workforce throughout the five-year period. This aligns with the demographic composition of South Africa and the historical context of the mining industry. The representation of Coloured, Indian, and White employees remains relatively low and stagnant over the years. While there are slight fluctuations, the overall percentage of these groups remains under 10%. By focusing on attracting and retaining a diverse workforce, alongside skills development initiatives, the MMS can build a more representative and future-proof workforce.

The MQA is committed to increasing the representation of HDSAs within the mining workforce, particularly in leadership roles. Targeted learnerships and apprenticeships designed specifically for HDSAs provide them with the necessary technical and managerial skills to thrive in the industry. Financial assistance through bursary and scholarship programs further broadens the talent pool of qualified HDSA candidates for technical and managerial positions.

1.6.4.1 Employment by Management and Race (2020-2024)

Table 1.13: Employment by management and race

Management Level	Year	African	Coloured	Indian	White
Skilled technical and academically qualified workers, junior management, supervisors, foremen and superintendents	2020	68,8%	5,4%	0,9%	24,8%
	2021	69,2%	5,4%	1,0%	24,4%
	2022	73,2%	4,1%	0,9%	21,9%
	2023	73,2%	4,1%	0,9%	21,9%
	2024	73,4%	4,4%	1,0%	21,1%
Professionally qualified and experienced specialists and middle management	2020	48,3%	5,7%	3,2%	42,8%
	2021	48,9%	5,5%	3,8%	41,8%
	2022	52,5%	4,6%	3,8%	39,0%
	2023	52,5%	4,6%	3,8%	39,0%
	2024	54,3%	4,6%	4,0%	37,1%
Senior management	2020	33,7%	4,0%	5,7%	56,7%
	2021	34,7%	3,7%	5,3%	56,3%
	2022	42,6%	3,3%	5,0%	49,2%

Management Level	Year	African	Coloured	Indian	White
	2023	42,6%	3,3%	5,0%	49,2%
	2024	40,9%	3,8%	5,3%	50,0%
Top management	2020	28,1%	3,5%	4,7%	63,7%
	2021	32,2%	4,2%	4,5%	59,1%
	2022	35,6%	4,1%	4,4%	55,9%
	2023	35,6%	4,1%	4,4%	55,9%
	2024	40,5%	3,5%	3,7%	52,3%

Source: MQA WSP and ATR (31 May 2024)

The data illustrated in Table 1.13 above reflects a positive trend in the representation of Historically Disadvantaged South Africans (HDSAs) in management positions, particularly in skilled technical and junior management roles. This aligns with the objectives of the 2018 Mining Charter to increase the inclusion of HDSAs in decision-making positions. However, the progress is slower at higher management levels. While African employees constitute the vast majority of the overall workforce (around 87-88%), their representation decreases significantly as the management level rises.

While there is a noticeable increase in African representation in senior and top management, White employees, although a small minority in the overall workforce (5-9%), are disproportionately represented in top management positions, occupying over 50% of these roles. This disparity raises concerns about equitable access to leadership opportunities for historically disadvantaged groups. This indicates a persistent underrepresentation of Africans in leadership and decision-making positions within the MMS.

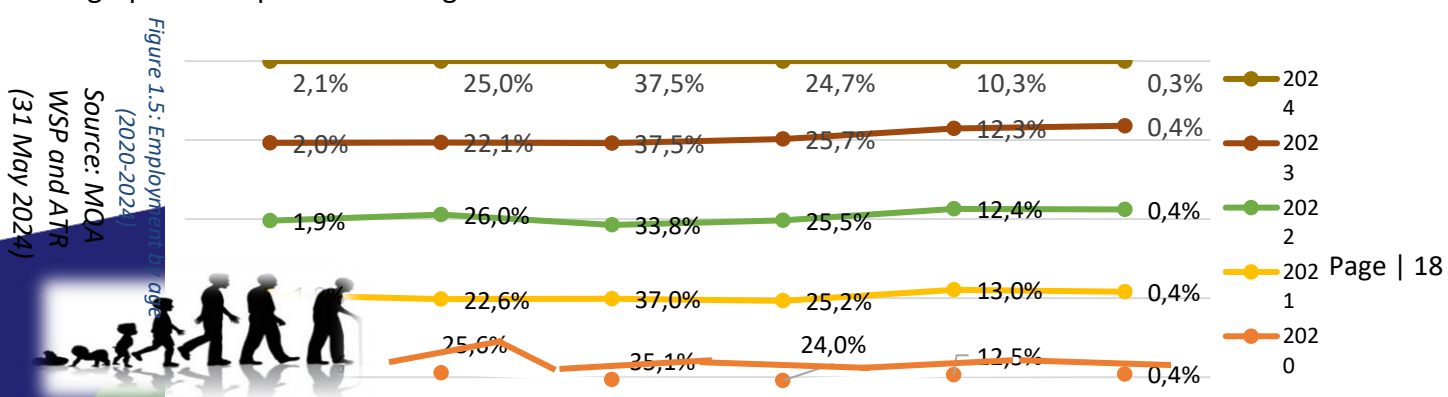
The Mining Charter (2018) as will be seen in Chapter 2, emphasises the importance of HDSA participation in leadership positions. The lack of diversity in management might indicate difficulty meeting these requirements. On the other hand, a previous study conducted by the MQA (2023) on factors hindering HDSAs into managerial roles indicated that there could be unconscious bias or systemic barriers hindering the advancement of HDSA employees into management roles. Since this has been a persistent reality in the sector, it also indicate that current efforts to achieve diversity in mining management might be ineffective.

The MQA recognises the value of mentorship and leadership development in empowering HDSAs. Over the past years, the SETA established mentorship programmes that connect aspiring HDSA managers with experienced professionals, offering guidance, support, and access to valuable networks. Furthermore, the MQA collaborates with industry partners to deliver leadership development programmes tailored to the specific needs of HDSAs. These programmes enhance their leadership skills, confidence, and decision-making abilities, preparing them for success in higher-level management roles.

There is a need for a more focused and strategic approach, the need to develop clearer metrics and enforcement mechanisms to address these challenges. Above offering funding for bursaries, internships, learnerships etc., the MQA should partner with mining companies and industry stakeholders to develop and implement effective diversity and inclusion initiatives. This could involve co-creating training programmes, mentorship networks, or best practice guidelines for achieving a more representative management structure.

1.6.5 Employment by Age

The graph below presents the age distribution of the MMS workforce from 2020 to 2024.



The data reflected in Figure 1.5 above suggests a relatively middle-aged workforce, with the largest age group being 36-44 years old (37.7%). This indicates a significant portion of the workforce approaching or in mid-career stages. While the 35-44 age group remains the largest, there is a slight decline in its proportion over time. This is coupled with a minor increase in the 55-64 age group, suggesting a gradual aging of the workforce. As this workforce ages, their knowledge and expertise could become less readily available, potentially leading to a skills gap. By focusing on upskilling and mentorship programmes, the MMS can bridge the potential skills gap, leverage the existing experience within the workforce, and ensure a smooth knowledge transfer as the workforce evolves.

The proportion of workers under 25 remains consistently low (below 2.5%), indicating challenges in attracting and retaining young talent in the sector. Employees aged 65 and above constitute a negligible portion of the workforce (less than 0.5%), suggesting a trend of retirement or limited opportunities for older workers in the industry. The aging workforce necessitates proactive succession planning by the MQA and mining companies. This involves identifying and developing younger talent to fill the skills gap as experienced workers retire.

1.6.6 Employment by disability

Figure 1.6 below presents an analysis of employment of people with disabilities (PWDs) in the MMS over the past five years (2020-2024).

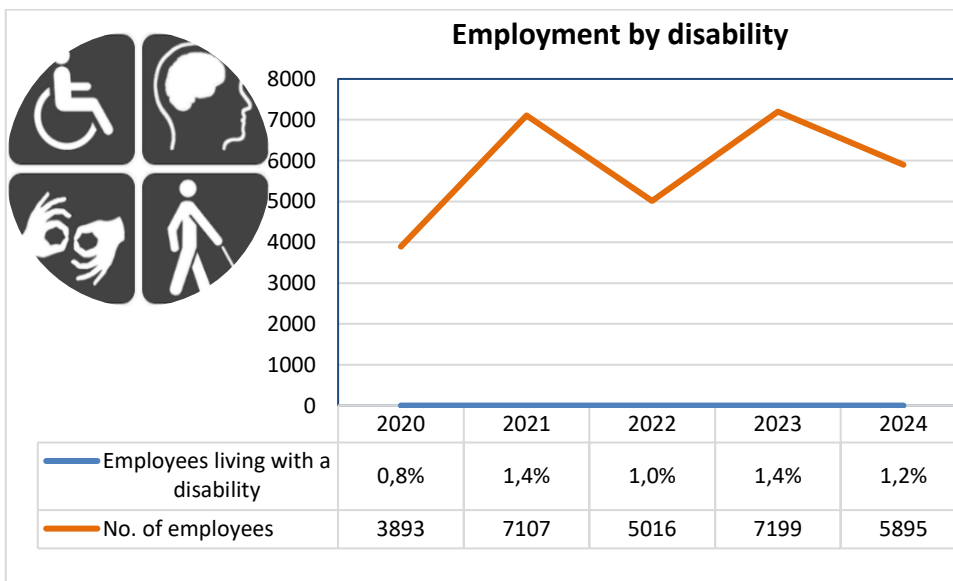


Figure 1.6: Employment by disability
 Source: MQA WSP and ATR (31 May 2024)

The data reveals a consistently low representation of PWDs in the MMS workforce throughout the analysed period (2020-2024), ranging from 0.8% to 1.4%. The proportion of PWD employees has fluctuated over the years, with a peak in 2021 and 2023 (1.4%) and a decline in 2022 and 2024. This falls significantly short of the 1.5% target set by the 2018 Mining Charter, indicating that the mining sector has considerable room for improvement in fostering the inclusivity for PWDs.

The MQA’s study on “Factors impeding the attainment of equity targets with respect to people with disabilities (PWDs) in the MMS” highlights a gap between the MMS's efforts to train individuals and its goal of attracting and retaining PWDs in the sector. The study points out the absence of training programmes

designed specifically to address the challenges faced by PWDs in the mining sector.

The key skills issues for PWDs in the MMS stem from a lack of training designed for their specific needs. Standard training focuses on core mining skills, which may not be suitable for PWDs to excel in specific roles. This creates a skills gap, hindering their ability to fully participate in the workforce. Moreover, training providers and employers might overemphasise physical requirements, overlooking the transferable skills and cognitive abilities PWDs bring. This could be problem-solving, data analysis, or strong communication skills, which are all valuable assets in the MMS. By addressing these issues and actively promoting the inclusion of PWDs, the MQA can contribute to a more diverse, equitable, and socially responsible MMS that aligns with the transformation goals outlined in the Mining Charter.

1.6.7 Employment by Occupational Level

Table 1.14: Employment by occupational level (2020-2024)

Source: MQA WSP and ATR (31 May 2024)

Major OFO	No. & % of employees	Employment by occupational level				
		2020	2021	2022	2023	2024
Managers	N	11952	9206	12402	13370	14024
	%	2%	2,7%	2,5%	2,6%	2,9%
Professionals	N	22999	17072	24239	24 683	24902
	%	5%	5,0%	4,8%	4,8%	5,1%
Technicians and Associate Professionals	N	55499	43307	77975	73 533	72260
	%	11%	12,6%	15,5%	14,3%	14,7%
Clerical Support Workers	N	22240	14386	19769	21 597	20170
	%	4%	4,2%	3,9%	4,2%	4,1%
Service and Sales Workers	N	6550	3796	5636	7 199	6633
	%	1%	1,1%	1,1%	1,4%	1,4%
Skilled Agricultural, Forestry, Fishery, Craft and Related Trades Workers	N	45305	26517	42590	48 337	46022
	%	9%	7,7%	8,5%	9,4%	9,4%
Plant and Machine Operators and Assemblers	N	204540	137688	196262	188 204	184878
	%	41%	40,0%	39,1%	36,6%	37,6%
Elementary Occupations	N	117078	85885	109706	137 296	103449
	%	23%	24,9%	21,9%	26,7%	21,1%
Learner	N	12388	6464	–	–	18880
	%	2%	1,9%	–	–	3,8%
Total	N	498551	344321	501604	514 219	491218

Plant and Machine Operators and Assemblers, along with Elementary Occupations, consistently constitute the majority of the workforce, ranging from 64,1% (2020) to 58,7% (2024). This highlights the physically demanding and operationally intensive nature of the sector. While manual labour remains prevalent, there is a notable increase in Technicians and Associate Professionals, growing from 11% in 2020 to 14,7% in 2024. This suggests a gradual shift towards a workforce requiring more specialised technical skills, likely driven by technological advancements and automation.

Managers and Professionals consistently represent a small percentage of the workforce, with Managers ranging from 2% to 2,9% and Professionals from 5% to 5,1%. This indicates a hierarchical structure with limited opportunities for career advancement into higher-level positions, raising concerns about potential talent

shortages in leadership and specialized roles.


Overall, the current skillset needs to evolve to embrace technical advancements, sustainability practices, and potentially, entrepreneurial ventures in the MMS. Given the potential shift towards more skilled roles due to automation and technological advancements, the MQA will be prioritising training programmes that will equip employees with the necessary technical and digital skills. The reality of 4IR in the MMS also necessitates upskilling current operational staff in data analysis and automation. This will ensure the workforce remains relevant and competitive in the face of evolving industry demands.


Furthermore, given the push for a just transition demands expertise in sustainable practices and mine reclamation. This current workforce will also require training in these areas. Additionally, the potential rise of small-scale mining due to factors such as renewable energy demands could create a gap in business and marketing expertise, currently underrepresented by Service and Sales (1,4%) and Clerical Support (4,1%) workers. On the other hand, the increase in learners in 2024 presents a positive opportunity for the MQA to invest in and expand learnership and apprenticeship programmes. This will create a pipeline of skilled workers to meet the future needs of the sector.

Moreover, the limited number of individuals in managerial and professional roles highlights the importance of leadership development programs. Nurturing talent within the existing workforce and preparing them for leadership positions is crucial for ensuring the sector's long-term sustainability.

1.6.8 Employment by Higher Education

Table 1.15: Employment by Highest Education

 n	2020	2021	2022	2023	2024
No Schooling	0,8%	0,8%	2,2%	2.0%	1,1%
AET Level 1 / Grade 1-3	2,0%	2,0%	3,8%	2.4%	1,6%
AET Level 2 / Grade 4-6	3,1%	3,1%	3,2%	3.3%	2,6%
AET Level 3 / Grade 7-8	5,2%	5,2%	5,2%	4.0%	3,6%
AET Level 4 / Grade 9 / Standard 7 / Form 2 / Level 1 Occupational Certificate	4,2%	4,2%	3,6%	5.9%	5,6%
Grade 10 / Standard 8 / Form 3 / National Certificate Vocational (NCV) Level 2 / Level 2 Occupational Certificate / N1(NATED Level 1) / Elementary Certificate	10,0%	10,0%	9,0%	7.2%	8,0%
Grade 11 / Standard 9 / Form 4 / National Certificate Vocational (NCV) Level 3 / Level 3 Occupational Certificate / N2 (NATED Level 2) / Intermediate Certificate	8,6%	8,6%	9,8%	10.4%	11,0%
Grade 12 / Standard 10 / Form 5 / National Senior Certificate / Matric / National Certificate Vocational (NCV Level 4) / Level 4 Occupational Certificate / N3 (NATED Level 3)	29,8%	29,8%	37,1%	39.5%	40,4%
N4, N5 or N6 (NATED 4, 5 or 6) or NTC 4, 5 or 6 or Higher Certificate or Artisanal Trade Certificate	5,6%	5,6%	2,9%	1.9%	7,4%
				1.8%	
				2.7%	

 n	2020	2021	2022	2023	2024
Diploma / National Diploma / N Diploma / Advanced Certificate	2,2%	2,2%	6,9%	3,2%	3,7%
Bachelor's Degree / Higher Diploma / B-Tech Diploma / Advanced Diploma	1,0%	1,0%	2,7%	3,0%	3,2%
Honours Degree / Postgraduate Diploma	–	–	0,8%	0,9%	1,0%
Master's Degree	0,3%	0,3%	0,4%	0,4%	0,5%
Doctorate	0,0%	0,0%	0,0%	0,1%	0,1%
Other	–	–	–	2,4%	2,7%
Unknown	19,4%	19,4%	12,4%	8,9%	7,6%

Source: MQA WSP and ATR (31 May 2024)

Table 1.15 above highlights a significant transformation in the educational landscape of the South African MMS workforce over the past five years. Historically, the industry was characterised by a high prevalence of illiteracy, but this has changed dramatically. The proportion of illiterate employees in the MMS has plummeted to a mere 0.1% in 2024. This indicates substantial progress in education and skills development within the sector, aligning with broader national efforts to improve literacy rates.

While illiteracy has significantly decreased, the majority of employees (40.4% in 2024) still possess only a basic education level (Grade 12 or equivalent). This suggests that while progress has been made, there is still a considerable portion of the workforce with limited formal education.

The percentage of employees with tertiary qualifications, such as diplomas or degrees, has seen minimal growth, from 3,5% in 2020 to 7,65% in 2024 collectively. This suggests that the sector is still heavily reliant on a workforce with basic skills, and there's a need to encourage and facilitate further education for employees.

The current mining landscape demands a more diverse skillset compared to the past. Some of these key areas include:

- ✓ **Technical Expertise:** Data analysis, automation, drone piloting and robotics maintenance
- ✓ **Operational Knowledge:** Understanding of mining processes, safety protocols, and equipment operation
- ✓ **Sustainability Practices:** Knowledge of environmental regulations and responsible mining techniques

The data suggests a potential mismatch between the current educational qualifications and the evolving skills required in mining. This indicates that need in the investment for upskilling programmes, i.e., Invest in targeted training programmes to equip current employees with the technical skills needed for 4IR and sustainability practices. By acknowledging the potential skills gap and taking proactive steps to address it, the South African MMS can ensure a future workforce equipped to handle the technical complexities and sustainability challenges of the industry.

1.7 Conclusion

The chapter presented the sector profile of the MMS, highlighting its scope of coverage and key role players. Following this, an employer profile and thorough labour market analysis was presented, highlighting the sector's economic performance and employee profile by different demographics. The analysis of the MMS profile paints a complex picture with significant implications for skills development. Geographically, while Gauteng is a central hub, the SETA needs to ensure its programmes reach miners and employers across all provinces. This might involve utilising online learning platforms that can bridge geographical distances and strengthening existing partnerships with regional training providers to offer accessible in-person training.

The chapter demonstrated that the South African MMS is undergoing a dynamic shift. The demographics of the MMS workforce paint a picture of a middle-aged workforce (36-44, =37.7%) with a significant gender imbalance (females= 20.2%). Furthermore, the high proportion of employees in Plant and Operator roles (37.6%) reflects the industry's current focus on operational and labour-intensive tasks. However, future-proofing the workforce requires a shift towards skills development in areas critical for the sector's future success. This includes digital literacy to navigate the increasing automation of mining processes, data analysis to make data-driven decisions, and expertise in renewable energy as the industry transitions towards more sustainable practices. Moreover, the low representation of people with disabilities (1.2%) suggests a lack of inclusivity within the MMS. To tap into this underutilised talent pool and create a more diverse and representative workforce, the sector can implement disability awareness training, and explore possibilities for job redesign to accommodate employees with disabilities.

Demographic changes present both challenges and opportunities. Moreover, the prevalence of small mines within the MMS necessitates a shift towards cost-effective and accessible skills development programmes. Traditional lengthy training modules might not be suitable for these resource-constrained operations. Leveraging technology for remote learning can further enhance accessibility for geographically dispersed miners working in small mines. To address this, the MQA is at the forefront of addressing these shifts, with a strategic vision for a more inclusive and future-oriented workforce.

The MQA's commitment to addressing demographic shifts within the MMS extends beyond simply increasing representation. It entails building a future-proof mining industry in the country. By fostering a more inclusive and skilled workforce, the MQA is laying the groundwork for long-term sustainability and growth. A one-size-fits-all approach to skills development will not work for the diverse subsectors within the MMS. "Other Mining" and "Services incidental to mining" for example, have distinct operational needs and require specific skillsets. To optimise the impact of training initiatives, the SETA should tailor programmes to address the high-demand skills within each subsector. Collaboration with mining companies, can provide valuable insights into these specific skills needs. By working collectively, the MQA and mining companies can develop targeted training programmes that effectively address these industry gaps and ensure miners have the necessary qualifications to succeed in their specific roles.

Chapter 2 : Change Drivers

2.1 Introduction

This chapter examines the key change drivers and presents the policy framework affecting skills demand and supply in the MMS. Key drivers constitute fundamental and influential factors significantly impacting and shaping processes, trends, and the overall performance of the sector. These in turn, affect skills supply and demand. The key change drivers are extracted from the literature, previous MQA studies, inputs from different social actors within the MMS in platforms such as Mining Indaba, Inaugural MQA' Skills Lekgotla, the MINTEK Symposium 2024, SETA Skills Summit 2024, interviews and focus group discussions, as well as the MQA SSP webinar.

Analysing policies and strategies affecting skills demand and supply in the MMS, alongside change drivers provides a comprehensive understanding of the forces at play in the MMS skills landscape. Understanding these combined elements is essential for stakeholders in the MMS to stay informed about current skill needs, anticipate future demands, and develop targeted training programmes, policies, and strategies. This proactive approach allows for effective resource allocation and interventions to address occupational shortages and skill gaps, ultimately enhancing workforce capabilities and ensuring the continued growth and competitiveness of the MMS. As we reflect on the transformative period from 2020 to 2024, it is clear that the sector has undergone significant shifts. The first section reflects on the sector's key skills change drivers over the past five years.

2.2 A reflection of the past five years

The past five years (2020-2024) have been transformative for the MMS, marked by technological advancements, a growing emphasis on environmental sustainability, and shifts in global market dynamics. The increasing adoption of automation and digital technologies has led to a decline in manual labour roles and a surge in demand for technical specialists, data analysts, and professionals with expertise in renewable energy and environmental management as will be discussed in the sections that follow. The evolving nature of work has also underscored the importance of digital literacy, soft skills, and adaptability across all levels of the workforce. As the sector looks towards 2025-2030, these trends are expected to intensify, necessitating a continued focus on upskilling and reskilling initiatives to ensure a workforce that is equipped to meet the challenges and opportunities of a rapidly changing industry landscape. The focus on environmental sustainability and the just transition will require a concerted effort to develop and retain expertise in green technologies, circular economy practices, and social impact management, ensuring that the MMS contributes to a sustainable and equitable future for all.

Building upon these past experiences and looking ahead to the years 2025-2030, several key change drivers have emerged that will continue to influence the MMS. These drivers not only impact the operational aspects of the sector, but also have profound implications for the skills and competencies required of its workforce. In the following sections, we delve into these key skills change drivers, exploring their significance and outlining their associated skills implications for the MMS.

2.3 The Future Landscape: Change Drivers in the MMS (2025-2030) and their Skills Implications

2.3.1 Technological innovation and application

The MMS is on the cusp of a significant evolution driven by Fourth Industrial Revolution (4IR) technologies. Cloud computing, artificial intelligence (AI), robotics, and the Internet of Things (IoT) are rapidly transitioning from novel concepts to operational realities of the sector (MQA, 2024). Findings from the MQA (2024) impact of 4IR

study revealed that employers are optimistic about the potential benefits of advanced technologies. They believe these technologies, including automation and others, can lead to significant improvements in both efficiency and safety. Increased efficiency translates to streamlined operations, reduced time spent on tasks, and ultimately, higher overall productivity. Additionally, automation holds the promise of enhancing safety standards by minimizing worker exposure to hazardous environments. However, these benefits are likely to be realised in the long term, as stakeholders also acknowledge financial constraints as a major hurdle to the immediate adoption of these technologies.

The key concerns include job displacement and widened skill gaps. This indicates that new technologies may automate some tasks, potentially displacing employees in low- and semi-skilled roles (Frey & Osbourne, 2013, MQA, 2024). On the other hand, emerging technologies create demand for new skills, potentially outpacing the education system's ability to produce qualified employees (DHET, LMI: 2022). Private training providers in the MMS asserted a concern that existing training materials, often focused on traditional methods, fail to equip employees with the necessary skills for the sector's evolving technological landscape. This necessitates a swift update of training materials and a focus on standardisation across institutions. Furthermore, while e-learning adoption is rising due to safety benefits, challenges such as a lack of basic literacy and digital skills require attention.

The critical challenge lies in achieving a symbiotic relationship between mitigating potential job losses and capitalising on the benefits of technological transformation within the MMS. This necessitates a two-pronged approach:

- 1. Upskilling and reskilling the workforce:** Equipping the existing workforce with the necessary skills to navigate the evolving workplace is paramount. This proactive approach will minimise job displacement and ensure a smooth transition to a technology-driven future for the sector's employees.
- 2. Adapting training programmes to industry needs:** Training programmes must undergo continuous adaptation to reflect the latest technological trends and the specific skill sets required by the mining and minerals sector. This ensures graduates possess the necessary knowledge and abilities to seamlessly integrate into the workforce upon entering the industry. By addressing these challenges, the MMS can harness the power of technology to enhance its competitiveness and ensure a skilled workforce for the future.

In light of the above, the following table provides an overview of the sectoral and skills implications of technological innovation and its application in the MMS.

Table 2.1: Sectoral and skills implications of Technological innovation and application

Sectoral and skills implications of Technological innovation and application			
Aspect	Sectoral Impacts	Supply Skills implications	Demand Skills Implications
4IR Adoption	<ul style="list-style-type: none"> * Increased efficiency & productivity. * Improved safety standards. * Potential for new tech-related jobs. 	<ul style="list-style-type: none"> * A need for collaboration with education and training faculties to institute learning outcomes that feature 4IR Adoption. 	<ul style="list-style-type: none"> * Demand for data analysis, AI, robotics, automation skills. * Importance of problem-solving, critical thinking. * Digital literacy across all workforce levels.
Outdated Training	<ul style="list-style-type: none"> * Reduced competitiveness, difficulty attracting skilled employees. 	<ul style="list-style-type: none"> * Implementation of occupational training initiatives to replace legacy initiatives. 	<ul style="list-style-type: none"> * Skills gap widens, job insecurity for unskilled employees.

Sectoral and skills implications of Technological innovation and application

Aspect	Sectoral Impacts	Supply Skills implications	Demand Skills Implications
E-learning Challenges	* Hindered skills development & workforce modernisation.	* Need for training materials and equipment to facilitate learning.	* Limited effectiveness for employees with low literacy/digital skills. * Investment needed in infrastructure & instructor training.
Job Displacement	* Short-term unemployment, potential social unrest if not addressed.	* Increase for an alternative form of labour such as automated machinery.	* Automation displaces low/semi-skilled roles. * Retraining needed for displaced employees.

2.3.2 The Dual Engine of Growth: Support for Artisanal and Small-Scale Mining and Mineral Beneficiation

Beyond the focus on 4IR, the future of the South African MMS increasingly recognises the importance of artisanal and small-scale mining (ASM). The ASM industry holds promise for promoting sustainability and fostering a more inclusive industry. It is believed that ASM has the potential to promote economic development, community empowerment, and potentially, a more sustainable mining landscape.

The MQA Inaugural Mining Skills Lekgotla identified ASM as one of the key drivers of change within the South African MMS. Stakeholders highlighted the potential of ASM to drive inclusive growth, especially in areas lacking large-scale mining. By empowering local communities and contributing to the alleviation of South Africa's "quintuple challenges" (unemployment, poverty, inequality, gender-based violence, and femicide), ASM has the potential to become a significant driver of positive social change. However, stakeholders from the Lekgotla highlighted critical challenges hindering ASM's full potential.

A key finding was the largely informal nature of the ASM industry. The lack of proper documentation and operation outside regulatory frameworks presents difficulties for both miners and authorities. For miners, informality restricts access to vital resources, markets, and opportunities for formalisation. Conversely, authorities struggle with effective administration, regulation, and compliance oversight. This informality can be counterproductive to the sector's development, limiting its ability to contribute meaningfully to the broader MMS.

Discussions at the Lekgotla identified several areas where optimising the legal framework governing ASM was reported as a tool that could unlock significant benefits. Firstly, establishing clear and concise definitions for "Artisanal" and "Small-Scale Mining" would provide a foundation for consistent application of regulations and support initiatives. Secondly, categorising ASM activities based on scale, impact, and resource type would enable a more targeted approach to regulation and support. This ensures appropriate requirements are applied without overly burdening small-scale operators.

Furthermore, stakeholders emphasised the importance of local participation. Encouraging and facilitating the involvement of local communities in ASM activities fosters a sense of ownership and promotes responsible mining practices within these communities. Finally, stakeholders recommended exploring the possibility of linking the duration of mining permits to the project lifecycle. This could provide the necessary operational flexibility for small-scale miners while ensuring responsible closure practices are followed.

By addressing these areas, the legal framework for ASM can be optimised to facilitate a more formal and sustainable industry. This will unlock the economic potential of the sector and ensure it contributes to a more inclusive and environmentally responsible MMS. The MQA, in collaboration with key role players such as Mintek

and Minerals Council can play a crucial role in facilitating these changes and supporting the development of a thriving ASM sector in South Africa.

Furthermore, alongside ASM, the MQA Mining Skills Lekgotla identified mineral beneficiation as a key driver. Mineral beneficiation refers to the process of transforming raw ore into higher-value products. This often involves crushing, grinding, separating, and concentrating minerals, followed by further refinement to meet market specifications. This process plays a critical role in boosting the economic potential of the MMS by adding value to raw materials. Skilled professionals are vital in identifying opportunities for value addition, designing beneficiation processes, and optimizing operations for maximum profitability.

Stakeholders at the Lekgotla highlighted specific challenges within diamond beneficiation. The global economic climate and demand for certain diamond qualities can limit the types of rough stones (ROM selections) that are commercially viable for local processing. Pricing methodologies and a focus on solely local sales may also hinder growth. Therefore, emphasis should be placed on developing the downstream diamond value chain within South Africa, as encouraged by existing legislation. This will not only stimulate business development within the diamond industry but also create a ripple effect on related sectors. However, a decline in diamond production poses a risk to the beneficiation industry. This highlights the importance of De Beers and Petra's expansion plans, which could inject renewed vigour into the sector.

The MQA plays a crucial role in partnering with entities such as the State Diamond Trader, who prioritise skills development within the jewellery manufacturing subsector. Some of the programmes offered by the State Diamond Trader respond to the country's transformation agenda. For example, they offer programmes that empower young people and foster innovation-driven growth, inclusive development, and sustainable livelihoods within the sector. Additionally, the State Diamond Trader focuses on empowering local economies and helping beneficiation clients access relevant markets. These collaborative efforts are essential for promoting the continued growth of South Africa's diamond and beneficiation industries.

The table below highlights the sectoral and skills implications associated with the support for ASM and mineral beneficiation.

Table 2.2: Sectoral and skills implications for supporting ASM and mineral beneficiation

Sectoral and skills implications for supporting ASM and mineral beneficiation		
Aspect		
	Sectoral Implications	Demand and Supply Skills Implications
Potential Benefits	ASM <ul style="list-style-type: none"> * Economic development in resource-rich areas. * Community empowerment through job creation and business activity. * Contribution to addressing South Africa's "quintuple challenges" (unemployment, poverty, inequality, gender-based violence, and femicide). * Promotion of a more sustainable mining landscape. *The diversification of minerals extraction due to small-scale mining 	Support training programmes to address skills gaps: <ul style="list-style-type: none"> *Business development skills for ASM operators. * Technical mining skills for safe and responsible practices. * Entrepreneurial skills for identifying and accessing market opportunities. * Capacitation of skills technology integration *Basic environmental impact assessment, land reclamation and rehabilitation techniques and sustainable mining practices *Basic financial literacy (income/expenditure, budgeting, record-keeping), cost estimation (mining costs, profitability) and marketing and sales of mined products,

Sectoral and skills implications for supporting ASM and mineral beneficiation			
Aspect	Sectoral Implications	Demand and Supply Skills Implications	
	Mineral beneficiation	<ul style="list-style-type: none"> * Adds significant value to mineral resources, leading to higher export earnings, job creation and overall economic growth. * Reduces reliance on raw mineral exports, fostering diversification within the sector and potentially attracting new technologies and innovations in processing methods. 	<ul style="list-style-type: none"> * The beneficiation process demands expertise in various areas such as mineral processing skills for crushing, grinding, separating, and concentrating minerals. Metallurgical engineers are crucial for optimising these processes, while chemical engineers apply their knowledge of reactions to enhance beneficiation. * Beyond technical expertise, business development skills are essential for establishing and managing beneficiation operations. * Marketing and sales expertise are also necessary to effectively market the higher-value beneficiated products.
Challenges	ASM	<ul style="list-style-type: none"> * Informal nature of the industry limits access to resources and hinders formalization. * Difficulty in effective administration, regulation, and compliance oversight. 	–
	Mineral beneficiation	<ul style="list-style-type: none"> * Beneficiation processes often require significant energy inputs. Access to affordable and reliable energy sources is crucial for cost-effectiveness. This could be a challenge given South African’s unstable energy supply * Establishing beneficiation plants requires significant capital investment, which can be a major hurdle for new entrants. * Global competition: Beneficiation industries in other countries pose stiff competition. To succeed, South Africa needs a skilled workforce and efficient operations. 	<ul style="list-style-type: none"> * A readily available and skilled workforce is critical for operating and maintaining beneficiation plants. This includes maintenance engineers to ensure equipment upkeep. * Developing and implementing beneficiation projects requires strong project management skills. * Financial modelling and analysis skills are necessary to assess the feasibility of beneficiation ventures and secure investment.

The combination of a thriving ASM sector and a robust mineral beneficiation industry presents a powerful engine for economic growth and development within the South African MMS. By addressing the challenges and capitalising on existing and future opportunities, South Africa can unlock the full potential of both these sectors, creating a more sustainable and prosperous future for the sector.

2.3.3 Limited energy supply and the demand for renewable energy sources (solar, wind, hydrogen etc)

The MMS faces a pressing challenge due to limited and unreliable energy supply. Recent years have seen electricity scarcity, rising prices, and load-shedding, all of which significantly disrupt mining operations. In response, the MMS is turning to renewable energy sources such as solar, wind, and hydrogen power. For instance, certain mining companies announced at the Africa Mining Indaba that they were constructing solar farms. This shift necessitates a skilled workforce capable of installing, repairing, and maintaining these alternative energy systems. Existing training initiatives and research & development programmes can be harnessed to develop these specialised skills, creating new employment opportunities in the sector. Investing in infrastructure and skills development for alternative energy sources is crucial for ensuring the resilience and long-term sustainability of the MMS.

Hydrogen energy for example, possesses particular promise in addressing the energy challenges within the MMS. It presents a clean and versatile solution for power generation, transportation, and industrial processes (Mining Indaba, 2024). However, South Africa's nascent hydrogen economy faces a skills gap, as no undergraduate hydrogen qualifications are currently offered (DHET LMI, 2024). The effective implementation of hydrogen energy also requires significant infrastructure investment. Building hydrogen production facilities, storage sites, and distribution networks necessitates substantial resources (Metcaife et al., 2020).

Despite these hurdles, hydrogen offers exciting opportunities for the MMS. It can diversify the energy mix, reduce reliance on fossil fuels, and contribute to a more environmentally sustainable future. Additionally, hydrogen can become a valuable export commodity, propelling South Africa into a global leadership position in green hydrogen production and trade (Metcaife et al., 2020). By embracing renewable energy sources and investing in the necessary skills and infrastructure, the MMS can navigate the current energy challenges and build a more secure and sustainable future. Below is a table demonstrating the sectoral and skills implications of limited energy supply and the demand for renewable energy sources.

Table 2.3: Sectoral and skills implications of limited energy supply & the demand for renewable energy

Sectoral and skills implications of limited energy supply & the demand for renewable energy sources			
Aspect	Sectoral Implications	Demand Skills Implications	Supply Skills Implications
Positive Sectoral Impacts	<ul style="list-style-type: none"> * Reduced disruptions from load shedding * Lower operating costs in the long term * More sustainable mining practices 	<ul style="list-style-type: none"> * Creates new employment opportunities 	<ul style="list-style-type: none"> * Requires a new form of education and training faculties.
Challenges	<ul style="list-style-type: none"> * High upfront infrastructure costs * Grid integration and storage solutions * Potential land-use issues 	<ul style="list-style-type: none"> * Collaboration needed for training development 	<ul style="list-style-type: none"> * Adoption of new skills development initiatives will require coordination on a large scale across all entities in the sector.
New Skillsets	<ul style="list-style-type: none"> * The existing workforce may lack expertise specific to renewable energy systems. * A lack of relevant skills could render some existing employees unemployable in the new energy landscape, leading to job losses and economic hardship. 	<ul style="list-style-type: none"> * Data analysis skills for performance optimisation * Solar PV installation & maintenance technicians * Wind turbine service technicians * Hydrogen specialists * Renewable energy project managers & engineers 	<ul style="list-style-type: none"> * Institution of training for new skillsets or upskilling on the existing one, from a foundational level, which may take time until skillsets are present and sufficient
Upskilling Existing Workforce	<ul style="list-style-type: none"> * Without proper upskilling, the transition to renewable energy could lead to operational inefficiencies, delays, and potential safety hazards. * Inadequate upskilling efforts can slow down the MMS's transition to renewable energy, delaying the realization of environmental and economic benefits. 	<ul style="list-style-type: none"> * Research & development for MMS-specific applications * Training for electrical & mechanical technicians * Safety training specific to renewable energy 	
Overall Impact	<ul style="list-style-type: none"> * Increased energy security and resilience * Potential cost savings on energy * Environmental benefits 	<ul style="list-style-type: none"> * New skillsets required * Upskilling existing workforce 	<ul style="list-style-type: none"> * A revision of education and training institutions to implement new forms of training that covers renewable energy.

Sectoral and skills implications of limited energy supply & the demand for renewable energy sources

Aspect	Sectoral Implications	Demand Skills Implications	Supply Skills Implications
	* Potential for attracting new investments		
Additional Considerations	* Community buy-in for social & environmental concerns		

2.3.4 Youth Migration and the Challenge of NEETs: A Skills Gap for Rural Development

South Africa's growing youth population faces a high rate of unemployment in the country. According to Stat SA (2024), a concerning number of young South Africans classified as NEETs, particularly concentrated in disadvantaged rural areas. There are approximately 3.7 million NEETs out of a population of 10.2 million young people aged 15-24. This translates to a NEET rate of roughly 36.1% for this age group in South Africa. (Stats SA, 2024). While many young people migrate to cities seeking opportunities, this creates a drain of talent from rural areas. This phenomenon, coupled with the high number of youth classified as NEETs as presented in Chapter 1, presents a significant challenge for both rural development and the national skills gap. Limited employment prospects in these areas further incentivise migration to urban centres, creating a vicious cycle of skills depletion in rural communities.

Youth migration from rural areas to urban areas and the high number of NEETs create a double threat to the South African MMS. Firstly, a shrinking talent pool in rural mining areas makes it challenges to employ skilled employees. Secondly, the untapped potential of NEET youth represents a missed opportunity for the MMS. These demographic trends can lead to recruitment challenges, increased training costs, and a reliance on external employees from other provinces to be employed.

The MQA, plays a crucial role in addressing this challenge. By identifying the specific skill needs of NEETs, particularly youth and marginalised communities in rural areas, the MQA can develop targeted training programmes and apprenticeships. The MQA should strengthen its partnerships with rural TVET Colleges and CETs to develop targeted training programmes and apprenticeships, specifically aimed at NEET youth in these areas. This will equip young people with the skills needed to contribute to the MMS, boosting the local workforce and fostering economic development in rural communities. This approach is key to tackling the triple challenge of poverty, inequality, and unemployment. The table below details the specific sectoral and skills implications of the youth migration and the challenge of the NEETs.

Table 2.4: Sectoral and skills implications for Youth Migration and the Challenge of NEETs

Sectoral and skills implications for Youth Migration and the Challenge of NEETs			
Aspect	Sectoral Implications	Demand Skills Implications	Supply Skills Implications
Shrinking Talent Pool in Rural Areas	<ul style="list-style-type: none"> * Difficulty recruiting skilled employees for critical mining operations. * Potential hindrance to future growth in rural mining areas. * Increased competition for skilled labour, potentially driving up wages. 	<ul style="list-style-type: none"> * Existing skills gap in the MMS may widen. * Need for the MMS to become more competitive in attracting skilled employees to remote locations. 	<ul style="list-style-type: none"> * Decrease in individuals to undertake training and facilitate new skills.
Limited Local Workforce Development	<ul style="list-style-type: none"> * Missed opportunity to tap into a potentially skilled workforce from rural communities. 	<ul style="list-style-type: none"> * Focus on transferable skills development that can be applied within the MMS, even for those 	

Sectoral and skills implications for Youth Migration and the Challenge of NEETs

Aspect	Sectoral Implications	Demand Skills Implications	Supply Skills Implications
	* Increased reliance on automation or importing skilled labour from outside rural areas.	without prior mining experience. * Collaboration with educational institutions to develop training programmes aligned with the specific needs of the MMS.	

2.3.5 Navigating the Global Shift: Skills Development for the MMS in a Changing World

The contemporary world is characterised by an undeniable interconnectedness, driven by advancements in technology, transportation, and communication. This phenomenon, known as globalisation, plays a significant role in shaping the skills landscape of the South African MMS. Globalisation opens doors to new markets and opportunities for mining companies. This, in turn, fosters demand for a skilled workforce equipped to navigate diverse cultural and regulatory environments. Operating internationally necessitates employees with cross-cultural communication skills, language proficiency, and a deep understanding of international business practices.

Global interconnectedness facilitates knowledge exchange and collaboration among mining professionals across borders. This fosters innovation in the sector by sharing best practices in mining techniques, encouraging collaboration on safety standards, and promoting advancements in environmental sustainability.

While globalisation presents opportunities, it also carries risks. The recent retrenchments in the PGMs subsector due to the "platinum crisis" illustrate this point (Mining.com, 2024). Declining global metal prices have resulted in job cuts and diminished profits for South African platinum producers, a vital export industry employing hundreds of thousands. South Africa's dependence on coal for electricity generation creates a precarious situation in the face of the global trend towards decarbonisation. This opposition to coal creates uncertainty for future investment decisions, necessitating the MMS to adapt to green energy initiatives and evolving global energy trends. Below is a table illustrating the sectoral and skills implications of globalisation.

Table 2.5: Sectoral and skills implications of globalisation

Sectoral and skills implications of globalisation			
Aspect	Sectoral Implications	Demand Skills Implications	Supply Skills Implication
Market Expansion & Diversification	*Increased production & export opportunities	* Cross-cultural competence * Business acumen in international trade & logistics	* Increased influence on education and training forms to facilitate for global competence.
Investment & Technological Advancements	*Modernisation & improved efficiency	* Technical expertise in advanced mining technologies & data analysis	* Increased investment in automation and technical skillsets for mining technologies.
Competition & Price Fluctuations	*Pressure to reduce costs & improve efficiency	* Adaptability & problem-solving skills * Understanding of international financial markets	* Increased investment in skillsets in relation to competitiveness, cost-efficiency and regulatory laws and policies.
Regulatory Landscape	Stricter environmental & labour standards	* Compliance skills for international regulations	

2.4 Policy Frameworks Affecting Skills Demand and Supply

Effective skills planning for the South African MMS requires careful consideration of national policies and strategies. This chapter delves into the intricate interplay between national policies and the evolving skills landscape within the MMS. Over the past five years, the MQA has demonstrated a proactive response to the skills implications of key national strategies and plans. This responsiveness has manifested in various initiatives aimed at aligning skills development with national objectives, addressing sector-specific needs, and fostering a more inclusive and skilled workforce. Furthermore, the chapter examines the broader policy framework that shapes skills demand and supply within the MMS, providing a comprehensive understanding of the factors influencing the sector's skills development in the 2025-2030 planning cycle.

2.4.1 MQA's Response to National Strategies and Plans: A Focus on Skills Development in the Evolving Mining and Minerals Sector

Over the past five years, the MQA has actively responded to the skills implications of several national strategies and plans, including the Mineral and Petroleum Resources Development Act (MPRDA), Mining Charter (2018), National Skills Development Plan (NSDP), HRD Strategy for South Africa, and the Economic Reconstruction and Recovery Plan (ERRP). These responses have focused on aligning skills development initiatives with national objectives and addressing the evolving needs of the MMS.

Specifically, the MQA has implemented various measures to support the ERRP Skills Strategy, such as engaging with stakeholders to determine skills required for growth and recovery, updating technical and vocational education programmes, increasing access to qualifications in priority sectors, and providing targeted skills programmes and workplace experience opportunities. Additionally, the MQA has supported entrepreneurship and innovation through its small-scale mining programme. The MQA has also taken steps to address the Presidential Youth Employment Intervention (PYEI) by placing TVET college graduates in workplaces for valuable industry exposure.

Furthermore, the MQA has implemented a range of portable skills programmes aimed at youth, focusing on construction, agriculture, and electrical engineering. These initiatives are designed to enhance the employability of young people and address skills shortages not solely in the MMS, but other sectors as well. In addition to these efforts, the MQA is committed to facilitating transformation within the sector by prioritising skills development for HDSAs, including women and people with disabilities. By collaborating with stakeholders and implementing targeted interventions, the MQA aims to create a more inclusive, skilled, and sustainable workforce for the MMS.

2.4.2 Policy Frameworks Affecting Skills Demand and Supply

The following table outlines key policies and strategies that affect MMS skills supply and demand. Of particular import is the Draft 2024-2029 Medium Term Development Plan which highlights the priorities of the Government of National Unity. The table below highlights the MQA’s efforts to articulate its interventions with the priorities of the Draft MTDP.

Table 2.6: Draft MTDP 2024-2029 MQA Contributions

MTDP priority	Outcome	Outcome Focus Areas	Interventions	DHET 2029/30 end-term targets	MQA plans in contribution to MTDP
Strategic Priority 1: Inclusive growth and job creation	A Just Energy Transition	<ul style="list-style-type: none"> Identifying Skills to support the Just Energy Transition Investment Plan for the hydrogen economy, new electric vehicles, electricity sectors. Training and testing learners in occupations linked to Occupations in High Demand and Critical skills so that inclusive economy is supported by relevant skills. Training lecturers to support 4IR related Programmes in TVET colleges 	<ul style="list-style-type: none"> Establish the JET Skills Desk to inform the skills pipe-line for identified sectors. Establish a JET Advisory Forum through HRDC to build partnerships across stakeholders for the implementation of the JET Skills plan. Implement a Programme to build the institutional capacity of TVET colleges to train and test artisans linked to Occupations in High Demand and Critical skills so that inclusive economy is supported by relevant skills. <p>Implement national Initiatives to train at least 500 lecturers each year to support 4IR-related Programmes in TVET colleges</p>	<ol style="list-style-type: none"> Graduates in JET skills produced (n) Graduates absorbed in JET industries (%)*Actual targets on the percentage on production and absorption of graduates will be determined once the JET Skills Desk is established) 2 000 lecturers trained to support 4IR related Programmes in TVET colleges (cumulative 10 000 of learners trained and tested in occupations linked to Occupations in High Demand and Critical skills so that inclusive economy is supported by relevant skills. 	<ol style="list-style-type: none"> MQA in partnership with CHIETA and TETA is in the process of establishing hydrogen energy centre of specialisation. The MQA continues conducting research on Just Energy Transition. The MQA offers 95 TVET lecturer exposure to the industry through skills development support programme and 250 TVET colleges lecturers bursaries. However, the choice of the programme depends on what the lecturer requires. The Hydrogen Centre of Specialisation will offer 4IR

MTDP priority	Outcome	Outcome Focus Areas	Interventions	DHET 2029/30 end-term targets	MQA plans in contribution to MTDP
					related skills Programmes to TVET Lecturers. 4. MQA to continue maintaining a target of learners' link to Sector Priority Occupation Interventions (SPOI).
	Increased employment opportunities	<ul style="list-style-type: none"> Ensure a stronger and more cooperative relationship between education and training institutions and the workplace 	<ul style="list-style-type: none"> Strengthen the partnership with the private sector to unlock the deployment of artisans and TVET graduates through workplace-based placements and work integrated learning opportunities. Develop Sector Skills Plans in support of skills required in various sectors of the economy through the relevant SETAs 	1. 600 000 (Cumulative) learners or students placed in Workplace Based Learning Programmes disaggregated as follows: <ol style="list-style-type: none"> Internships: 60 000 (Cumulative) Learnerships: 310 000 (Cumulative) TVET students or graduates placed in Work Integrated Learning: 110 000 (Cumulative) Universities students or graduates placed in Work Integrated Learning: 21 100 (Cumulative) Learners or students placed in Candidacy Programmes: 	MQA Strategic Plan targets for 2025/26-2029/30: <ol style="list-style-type: none"> 22 102 (Cumulative) learners or students placed in Workplace Based Learning Programmes disaggregated as follows: <ol style="list-style-type: none"> Internships 2 950 (5%) Learnership for Employed and Unemployed learners 6 800 (2%) TVET (WIL) 3 000 (3%) University Work integrated Programme 2 650 (13%) Candidacy Program

MTDP priority	Outcome	Outcome Focus Areas	Interventions	DHET 2029/30 end-term targets	MQA plans in contribution to MTDP
				6 400 (Cumulative) 6. Apprenticeships: 92 500 (Cumulative) 2. 352 500 learners registered in skills development programmes (Cumulative)	me 720 (11%) 6. Artisans 5 982 (6%) 2. Skills Programme 27 320 (8%)
	Re-industrialisation, localisation and beneficiation	<ul style="list-style-type: none"> Preferential Procurement: Procuring from qualifying businesses owned by person that are women, black, youth, SMMEs and disabled selected through SCM Requests for Quotations and Tender processes 	<ul style="list-style-type: none"> Implement policy directives on preferential procurement to achieve specific transformation to advance and promote businesses owned by persons that are black, women, youth, SMMEs and disabled 	Public procurement set aside for: <ol style="list-style-type: none"> Women owned business: 40% Youth owned businesses: 30% Black owned businesses: 70% People living disabilities: 7% SMMEs: 30% 	MQA SP 2025/26-2029/30: <ol style="list-style-type: none"> Women owned business: 29% Youth owned businesses: 15% Black owned businesses: 52% People living disabilities: 5% SMMEs: 17%

MTDP priority	Outcome	Outcome Focus Areas	Interventions	DHET 2029/30 end-term targets	MQA plans in contribution to MTDP
Strategic Priority 2: Reduce poverty and tackle high cost of living	Skills for the economy	<ul style="list-style-type: none"> Increase access, improve the quality and efficiency of the PSET system 	<ul style="list-style-type: none"> Implement an infrastructure Programme to refurbish and/or build new TVET college campuses and establishment of new universities. Implement an infrastructure Programme for improving Community Education and Training colleges. Implement blended learning in TVET colleges 	<ol style="list-style-type: none"> Two new universities, namely University of Science and Innovation in Ekurhuleni Metro and the University of Policing and Crime Detection in Hammanskraal established: <ul style="list-style-type: none"> Funding agreement for the establishment of the two universities approved by 31 March 2026 10% of construction completed by 31 March 2027 20% of construction completed by 31 March 2028 10 new TVET campuses built (cumulative) by 31 March 2030 14 (Cumulative) Community Learning Centres built by 31 March 2030 	1 & 2. The MQA in partnership with other entities and providers plans to pilot hydrogen centres in university of technologies and TVET colleges.
			<p>Develop annual enrolment plans for universities, TVET and CET colleges</p> <ul style="list-style-type: none"> Introduce accredited QCTO skills Programmes to improve the responsiveness of the CET college sector 	<ol style="list-style-type: none"> 1 219 259 students enrolled in universities annually* 5 139 Doctoral graduates from universities annually* 17 961 Research Masters graduates annually* 600 000 students enrolled in TVET 	MQA APP targets for 2025/26: 1, 2 & 3 Bursaries for 70 employed learners and 430 unemployed learners in 2025/26 financial year. (0,04%). 4. 150 work integrated learning Programme

MTDP priority	Outcome	Outcome Focus Areas	Interventions	DHET 2029/30 end-term targets	MQA plans in contribution to MTDP
				annually 5. 193 180 students enrolled in CET colleges	for TVET learners in 2025/26 financial year.(0,03%) 5. 1 440 CET learners accessing AET Programmes – SP Target. (1%)
	Improved education outcomes and skills	Increase access, improve the quality and efficiency of the PSET system	<ul style="list-style-type: none"> Reform NSFAS into a tiered system of bursaries and loans and establish an effective debt collection system by collaborating with the South African Revenue Services, the Credit Bureau, and potential employers. Implement an increased scope of programmed offerings at CET colleges to include skills, occupational Programmes and non-formal Programmes using funding from the NSF and SETAs. 	1. 460 324 eligible university students receiving funding through NSFAS bursaries annually 2. 321 531 TVET college students receiving funding through NSFAS bursaries annually. 3. 34 284 eligible university students receiving NSFAS loans. 4. Success rates at universities* (86,7%) 5. 11 000 students complete NC(V) L4 qualification 6. TVET throughput	MQA APP targets for 2025/26 & SP 2025/26-2029/30: 1, 2 & 3, 70 employed learners' bursaries and 430 unemployed learners' bursaries for 2025/26 financial year. 5. 1 200 learners completing NC(V) L4 in the MTDP period. (11%) 7. 6 350 learners completing AET Programme and 1 440 CET learners accessing AET

MTDP priority	Outcome	Outcome Focus Areas	Interventions	DHET 2029/30 end-term targets	MQA plans in contribution to MTDP
				rate (22%) 7. 12 688 students complete GETC qualifications 8. 20% of CET students enrolled in QCTO accredited skills programmes skilled	
		<ul style="list-style-type: none"> Improve the responsiveness of the PSET System and produce graduates in scarce skills areas 	<ul style="list-style-type: none"> Produce Lists of Occupations in High Demand and Critical Skills biennially to: <ul style="list-style-type: none"> ✓ Inform choices of young people when selecting careers, subjects, or fields of study. ✓ Influence provision of bursaries and scholarships by relevant funding institutions Inform the review of Programme and Qualification Mix (PQMs) at institutional level 	1. 15 992 Graduates in Engineering Sciences from universities annually* 2. 10 661 Graduates in Human Health annually* 3. 718 Graduates in Animal Health from universities annually* 4. 557 Graduates in Ocean Economy Studies (cumulative)* 5. 39 499 Graduates in initial Teacher Education from universities annually* 6. 30 000 Artisans	MQA APP targets for 2025/26: 1. 80% Engineering 2, 3, 4 & 5. 20% of the MQA bursaries fund learners qualifications from non-core qualifications. 6. 5 550 Artisans for the MTDP period.

MTDP priority	Outcome	Outcome Focus Areas	Interventions	DHET 2029/30 end-term targets	MQA plans in contribution to MTDP
				produced per annum (Cumulatively, 140 000 artisans produced by 2030)	
	Social cohesion and nation-building	<ul style="list-style-type: none"> Oversight of PSET Policy Framework on Gender Based Violence 	<ul style="list-style-type: none"> Implement and report on the Transforming MENTalities initiative in the PSET system through policies, advocacy and capacity-building initiatives Implement and report the National Civic Education and Health Skills Programme 	<ol style="list-style-type: none"> Number of students and staff in PSET institutions trained through the Civic Education and Health skills Programme Number of interventions/initiatives on the Transforming MENTalities implemented 	1 & 2. 625 career guidance workshops to be conducted in urban and rural areas in the MTDP period
Strategic Priority 3: Build a capable, ethical and developmental state	Improved governance and performance of public entities	<ul style="list-style-type: none"> Review of legislations to address national policy imperatives including rectifying ambiguities, inconsistencies, changing circumstances as well as legal complexities to enhance the effectiveness of the legislative framework of the PSET sector. 	<ul style="list-style-type: none"> Implement a Legislative Review Programme to improve the quality and responsiveness of the PSET Sector. Roll out a Programme to strengthen governance and administration in line with legislation. 	<ol style="list-style-type: none"> Higher Education Act, Act No. 101 of 1997, Skills Development Act, Act No. 97 of 1998, Continuing Education and Training Act, Act No.16 of 2006, NSFAS Act, Act No. 56 of 1999 	<p>The MQA will provide inputs to legislative review should it be required.</p> <p>60 CET Managers receiving training on curriculum related studies to improve governance in the MTDP period.</p>
	A capable and	<ul style="list-style-type: none"> Increase the percentage 	<ul style="list-style-type: none"> Support existing 	<ol style="list-style-type: none"> Proportion of university lecturers 	MQA SP 2025/26-2029/30:

MTDP priority	Outcome	Outcome Focus Areas	Interventions	DHET 2029/30 end-term targets	MQA plans in contribution to MTDP
	professional public service	<p>of PhD qualified staff in the higher education sector and increasing the number of lecturers appointed in universities</p> <ul style="list-style-type: none"> • Increase the pipeline of available scholars qualified (at least with a Master's degree) to apply for available vacant posts and assume roles of academics in higher education system. • Improve the qualifications of TVET lecturer qualifications. • Improve the qualifications of CET lecturer qualifications. 	<p>permanent academics and professional staff at universities through the Staff Development Programme (USDP) to achieve doctoral degrees through full scholarships.</p> <ul style="list-style-type: none"> • Support universities to recruit new permanent university academics, improve staff demographic profiles, and addressing the ratio of permanent to temporary staff members through the New Generation of Academics Programme (nGAP). • Implement scholarships or internships at universities through the Nurturing Emerging Scholars Programme. • Implement a Programme on the professionalization of TVET lecturers through a national 	<p>(permanent instruction or research staff) who hold doctoral degrees (58%)</p> <ol style="list-style-type: none"> 2. 58 nGAP posts allocated to universities every year* (Cumulatively, 290 posts will be allocated to universities for the new generation of academics). *The need for qualified academics in South African universities is huge. More resources are needed to increase the number of lecturers in universities to produce quality graduates) 3. 57 scholarships/internship positions offered through the Nurturing Emerging Scholars Programme annually (Cumulatively, 285)* 4. 600 professionally unqualified TVET college lecturers acquire a Adv DipTVT qualification annually 5. 1 000 CET lecturers trained annually 	<ol style="list-style-type: none"> 1. The MQA offers bursaries for learners that wish to study towards doctoral qualification. 2. 100 HDSA HET lecturers entering lecture development management. <p>MQA APP targets for 2025/26:</p> <ol style="list-style-type: none"> 4. 40 bursaries for TVET lecturers in 2025/26 financial year. However, the choice of the qualification is solely dependent on the lecturers. 5. 15 CET lecturers awarded skills development programme for

MTDP priority	Outcome	Outcome Focus Areas	Interventions	DHET 2029/30 end-term targets	MQA plans in contribution to MTDP
			Initiative to fund professionally unqualified lecturers to study for the Adv Dip TVT. <ul style="list-style-type: none"> Implement a training Programme to improve the qualifications of CET lecturers 		2025/26 financial year

This framework serves as a vital roadmap for the MQA. By analysing these policies, the MQA gains valuable direction, identifies potential resource allocation, and fosters collaboration among stakeholders. Ultimately, this approach ensures the MMS workforce develops the necessary skills to achieve sectoral goals and navigate future challenges. The table further details the specific skills planning implications associated with each policy and strategy.

Table 2.7: Frameworks Affecting Skills Demand and Supply

Policy / Strategy	Purpose	Skills Planning Implications for the MMS
Draft 2024 -2029 Medium-Term Development Plan	Foster inclusive growth & job creation; reduce poverty and tackle the high cost of living; build a capable, ethical & developmental state.	<ul style="list-style-type: none"> * Identifying Skills to support the Just Energy Transition Investment Plan for the hydrogen economy as applicable to the MMS. * Training and testing learners in occupations linked to Occupations in High Demand and HTFVs so that an inclusive economy is supported by relevant skills. * Training lecturers to support 4IR related programmes in TVET colleges *Strengthen the partnership with the private sector to unlock the deployment of artisans and TVET graduates through workplace-based placements and work integrated learning opportunities. * Develop Sector Skills Plans in support of skills required in the MMS * Support the implementation of policy directives on preferential procurement to achieve specific transformation to advance and promote businesses owned by persons that are black, women, youth, SMMEs and disabled in the MMS * Support the implementation of an infrastructure programme to refurbish and/or build new TVET college campuses and establishment of new universities that supply skills to the MMS. * Support the implementation of an infrastructure programme for improving Community Education and Training colleges that supply skills to the MMS.

Policy / Strategy	Purpose	Skills Planning Implications for the MMS
		<ul style="list-style-type: none"> * Introduce accredited QCTO skills programmes to improve the responsiveness of CET colleges that supply skills to the MMS * Implement and report on the Transforming MENTALITIES initiative in stakeholder PSET institutions through advocacy and capacity-building initiatives
Mining Charter (2018)	Promote transformation of the South African mining industry towards greater ownership, participation, and development of HDSAs	<ul style="list-style-type: none"> * Continue to conduct skills analysis to identify the existing skills profile of the MMS workforce, with a specific focus on identifying gaps in HDSA representation across all occupational levels. Develop targeted recruitment and training programmes to address these gaps, focusing on attracting and skilling HDSA candidates for priority occupations in the MMS. * Integrate mentorship and career development programmes into training initiatives to support HDSA graduates in transitioning into successful careers within the MMS. * Bursaries offered should continue supporting HDSA students pursuing MMS-related qualifications.
White Paper for Post School System	Outlines a plan for a transformed South African education system. This system prioritises both inclusivity and career readiness. It aims to be accessible to all age groups (youth-focused and adult user-friendly) while offering a diverse range of programmes tailored to different needs. These programmes should be practical and directly applicable to the world of work.	<ul style="list-style-type: none"> * Potential for a larger pool of skilled individuals entering the MMS workforce. * Need to assess alignment between new training programmes and the specific skills required by the MMS. * Increased availability of graduates with the necessary technical and soft skills for the MMS. This will be an opportunity to strengthen collaboration with educational institutions to develop targeted training programmes specific to the MMS needs.
Mineral Beneficiation Strategy	Develop mineral value chains & beneficiation initiatives	<ul style="list-style-type: none"> * Conduct industry consultations to identify the most in-demand beneficiation techniques (e.g., mineral sorting, leaching, smelting). * Partner with Mintek, State Diamond Trader, DMR, Council for Geoscience & Minerals Councils to establish skills development taskforces focused on beneficiation. * Develop competency-based curriculum for beneficiation process operation and maintenance in collaboration with TVET institutions. Offer these programmes in modular formats to allow for flexible learning and upskilling of the existing workforce. * Pilot certificate programmes in specialised areas of mineral beneficiation, working with industry partners to ensure graduates possess the necessary skills for real-world job requirements.
National Development Plan (NDP) (2030)	Reduce poverty & inequality through education & training	<ul style="list-style-type: none"> * Prioritise funding for programmes and interventions aligned with NDP goals, with a focus on recruiting candidates from historically disadvantaged communities. * Integrate sustainability principles into all MMS training programmes, including environmental management practices, resource efficiency, and social responsibility. This could involve incorporating case studies of successful sustainable mining operations.
National Skills Development Plan (NSDP) 2030	Adequate skills for economic growth, employment creation	<ul style="list-style-type: none"> * Reassess funding policy to support high-demand occupations with high growth potential in the MMS (e.g., data analysis, automation specialists).

Policy / Strategy	Purpose	Skills Planning Implications for the MMS
		<ul style="list-style-type: none"> * Develop targeted training programmes to address these skill gaps, focusing on a blend of both technical skills (e.g., data analysis tools, automation software) and digital literacy (e.g., data interpretation, problem-solving using technology). *Partner with tech companies to ensure these programmes incorporate the latest industry tools and practices. * Pilot competency-based assessments to evaluate the effectiveness of training programmes and ensure graduates possess the required skillsets for success in the labour market.
HRD Strategy for South Africa (2010-2030)	Improve individual competencies for productivity & quality of life	<ul style="list-style-type: none"> * Promote a culture of lifelong learning within the MMS workforce by establishing partnerships with online learning platforms to offer relevant courses and micro-credentials in specialised MMS skills. * Encourage participation in skills development programmes by offering flexible learning schedules (e.g., online learning modules, evening classes) and exploring financial assistance options through bursary programmes.
Economic Reconstruction and Recovery Skills Plan (ERRP)	Balance short & long-term skills needs, strengthen skills system	<ul style="list-style-type: none"> * Expand access to workplace training opportunities (apprenticeships, learnerships, internships) in critical areas identified as experiencing occupational shortages. * Align skills development initiatives with Centres of Specialisation (CoS) to create focused training hubs. * Increase funding for bursaries to ensure equitable access to training programmes across all demographics, encouraging participation from women, minorities, and people from disadvantaged communities. * Continue to organise career guidance workshops and industry exposure tours for youth in mining communities to raise awareness of the diverse career paths available in the MMS.
Just Energy Transition Framework (JETF)	Address environmental & social concerns in transitioning to low-carbon energy	<ul style="list-style-type: none"> * Conduct a skills gap analysis in collaboration with the DMR, Minerals Council, and CSIR to identify the skills required for a smooth transition to low-carbon energy sources in the MMS. * Partner with institutions specialising in renewable energy to develop training programmes in areas such as solar, wind, and geothermal energy relevant to the MMS (e.g., renewable energy integration for mine operations, maintenance of renewable energy infrastructure). * Integrate renewable energy technologies and energy management practices into existing MMS training curriculums. This could involve collaborating with universities to develop specialized modules or short courses focused on these emerging areas. * **Offer reskilling
Hydrogen South Africa Strategy (HySA)	Develop a hydrogen economy in South Africa to promote clean energy, economic growth, and job creation.	<ul style="list-style-type: none"> * Conduct a skills gap analysis to identify the specific skills required across the hydrogen value chain (e.g., electrolysis, fuel cell technology, hydrogen storage, pipeline infrastructure). Partner with allied SETAs, professional bodies, universities, and industry stakeholders to develop training programmes in these areas.

Policy / Strategy	Purpose	Skills Planning Implications for the MMS
		<ul style="list-style-type: none"> * Focus on attracting and skilling engineers, scientists, technicians, and project managers with expertise in hydrogen technologies. * Explore opportunities for collaboration with international hydrogen hubs and training providers to leverage global knowledge and best practices. * Develop competency-based standards for hydrogen-related occupations to ensure graduates possess the necessary skills for real-world job requirements. * Offer reskilling and upskilling programmes for existing employees in the mining and energy sectors to transition them into hydrogen-related jobs.
<p>Green Hydrogen Commercialisation Strategy</p>	<p>Reflects several priorities which are, a desire to decarbonise the economy, create economic growth, pursue a just transition away from coal, and to fully exploit its critical mineral resources</p> <p>Accelerate the development and commercialisation of green hydrogen production in South Africa to position the country as a global leader in this clean energy solution.</p>	<ul style="list-style-type: none"> * Build on the skills gap analysis conducted for the HySA to identify the specific needs for the green hydrogen production segment (e.g., expertise in electrolysis using renewable energy sources, hydrogen production plant operation and maintenance). * Partner with renewable energy companies and electrolyser manufacturers to develop targeted training programmes focused on the integration of these technologies. * Emphasise skills in data analytics and process optimisation to ensure efficient green hydrogen production. * Encourage collaboration with international green hydrogen projects to facilitate knowledge transfer and skills development.
<p>Artisanal and Small-Scale Mining Policy 2021</p>	<p>Formalise and support the ASM industry to promote responsible practices, improve livelihoods, and contribute to the South African economy.</p>	<ul style="list-style-type: none"> * Conduct a skills needs assessment within the ASM sector to identify the skills required for sustainable and safe mining practices. * Partner with NGOs and community organisations to deliver training programmes in local communities where ASM is prevalent. * Explore the use of mobile training units or blended learning approaches to reach geographically dispersed ASM miners. * Promote the integration of digital technologies into ASM operations for improved resource management and safety (e.g., mobile apps for mine planning and data collection). * Establish mentorship programmes to connect experienced miners with new entrants to the ASM sector.

2.5 Conclusions

This chapter has underscored the critical role of skills planning in fostering a competent and adaptable workforce for the South African MMS. By analysing both key change drivers and the policy framework presented, stakeholders gain valuable insights into current and future skill needs. These policy implications highlight the need for a multi-pronged approach. On one hand, there is a crucial emphasis on equipping the workforce with future-oriented skills such as digital literacy, data analysis, and renewable energy expertise to navigate the technological advancements and the transition to a low-carbon economy. On the other hand, policies aimed at transformation and environmental sustainability necessitate addressing historical imbalances and upskilling the

existing workforce in these areas. This proactive approach, informed by a comprehensive understanding of the skills landscape, allows for the development of targeted training programmes and interventions. By addressing skill gaps and equipping the workforce with the necessary capabilities, the MMS can navigate future challenges, ensure continued growth, and solidify its competitive edge.

Chapter 3 : Sectoral Skills Demand and Supply Analysis

3.1 Introduction

This chapter primarily focuses on understanding occupational shortages and skills gaps, as well as the extent and nature of skills supply, including sectoral priority occupations and interventions (SPOI). It draws upon various data sources, including the hard-to-fill vacancies (HTFV) section of the WSP and ATR, DHET's HEMIS and TVETMIS, MQA's APR, DMR's GCC, and Minerals Council South Africa Certificate statistics. Additionally, the insights that are presented are informed by literature from studies conducted within the sector, the MQA's research findings, as well as outcomes and recommendations from various fora and workshops that are conducted with stakeholders such as the Annual General Meeting/ Mining Skills Lekgotla, Annual Mining Indaba Forum, and interactive sessions such as interviews and focus groups discussions that are held with members of the Mining and Minerals sector. By integrating these diverse sources, the chapter aims to provide a comprehensive and evidence-based analysis.

3.2 Hard-to-fill Vacancies

HTFV is a metric to measure occupational shortages / demand and refer to occupations that an employer was unable to fill within 12 months (DHET, 2019). The analysis of the HTFV entailed a frequency run of the top 10 most identified occupations by companies through the WSP and ATR submissions. This was then cross tabulated by province and subsector in order to validate its sectoral demand, instead of company specific demand.

Table 3.1: 2024 HTFVs

Occupation Name	OFO Code	Vacancies	Main reason for hard-to-fill
Human Resource Manager *	2021-121201	13	Lack of relevant experience and unsuitable working hours
Engineering Manager	2021-132104	100	Lack of relevant experience
Mining Manager *	2021-132201	224	Lack of relevant experience
Mining Engineer *	2021-214601	89	Lack of relevant qualifications (desired level of study not attained or inappropriate field of study or inappropriate subject specialisation)
Electrical Engineer (Mines) *	2021-215101	226	Lack of relevant qualifications (desired level of study not attained or inappropriate field of study or inappropriate subject specialisation)
Mine Surveyor	2021-216502	10	Lack of relevant experience
Occupational Hygienist *	2021-226302	12	Lack of relevant experience
Chief Safety Officer Mining	2021-226302	17	Poor remuneration and unsuitable job location
Training Officer *	2021-242401	30	Lack of relevant experience
Instrumentation Technician *	2021-311401	28	Poor remuneration
Mining Production Supervisor *	2021-312101	245	Lack of relevant experience
Miner *	2021-312102	251	Lack of relevant experience
General Engineering Supervisor (GES) *	2021-312103	13	Lack of relevant qualifications (desired level of study not attained or inappropriate field of study or inappropriate subject specialisation)
Mine Safety Officer *	2021-325705	28	Lack of relevant qualifications (desired level of

Occupation Name	OFO Code	Vacancies	Main reason for hard-to-fill
			study not attained or inappropriate field of study or inappropriate subject specialisation)
Boilermaker *	2021-651302	48	Lack of relevant qualifications (desired level of study not attained or inappropriate field of study or inappropriate subject specialisation)
Diesel Mechanic	2021-653306	157	Lack of relevant experience and lack of relevant qualifications (desired level of study not attained or inappropriate field of study or inappropriate subject specialisation)
Electrician	2021-671101	49	Lack of relevant experience
Millwright *	2021-671202	61	Lack of relevant experience
Auto Electrician *	2021-671208	50	Lack of relevant qualifications (desired level of study not attained or inappropriate field of study or inappropriate subject specialisation)
Instrument Mechanician *	2021-672105	26	Lack of relevant experience
Drill Rig Operator *	2021-711301	63	Lack of relevant experience

**Based on their equal number of sectoral and provincial frequency, these occupations were counted as one.*

Source: MQA WSP and ATR (31 May 2024)

The 2024 WSP-ATR data presents hard-to-fill vacancies that are prevalent in four major occupational groups, managers, professionals, technicians, and artisans. These occupations are high to medium skilled and therefore, require education beyond matric. Employers contend that the primary reasons why these occupations are deemed hard-to-fill, is due to the lack of relevant qualifications and experience. The latter reason is of particular significance as it suggests that in all cases, while qualifications may be held by potential employees, it is more so the lack of practical know-how that renders the labour force unfit to take up these roles. This argument was corroborated by employers in interviews and focus groups, adding further reasons such as remuneration and equity considerations. This implies that candidacy programmes must be intensified by the MQA in order to facilitate skills transfer within the MMS, and thus inch closer to closing these gaps. Interview and focus group data fortified these findings by mostly citing **Diesel Mechanics, Engineers (Mechanical, Electrical, Civil with postgraduate Geotechnology specialisation)** and Mine Manager as the occupations that are hard-to-fill.

Interestingly, the 2024 WSP-ATR data also identified Human Resource Management as a hard-to-fill vacancy within the MMS. Consultations with the Quality Assurance Unit of the MQA revealed that HR roles in the MMS require a unique blend of skills. In addition to expertise in psychological, labour and human resource development matters, HR professionals in mining require a deep understanding of mining-specific regulations, such as the Mining Charter, Social Labour Plans, and the Mining Health and Safety Act. This specialised knowledge, coupled with the lack of experience in the field, contributes to the difficulty in filling these positions.

In a final attempt to further triangulate these findings, the MQA administered an online survey inviting employers in the MMS to provide inputs in the validation of the final hard-to-fill vacancies for 2024-2-25. Out of a sample of 62 respondents from the MMS' nine subsectors, 44% of the respondents indicated that Engineering Manager is a hard-to-fill, 40% Training Manager, 35% for Mining Engineer and 27% respectively for Mining Manager and Occupational Hygienist. While employers varied in their contextual needs, by virtue that none of the occupations identified by the WSP-ATR data was deemed irrelevant, suggesting much confidence can be placed in the HTFVs presented.

As the MQA consider planning for the next five years, a retrospective approach yields various insights. The overall top ten HTFV across a five-year period are detailed in Table 3.2 below.

Table 3.2: Table 10: Hard to Fill Vacancies (2020-2024)

HTFV	2020	2021	2022	2023	2024
Diesel Mechanic	11	77	59	153	157
Engineering Manager	10	31	28		100
Fitter And Turner	7				
Goldsmith					10
Mechanical Engineer (Mines)	9	15	27	31	-
Mine Manager	8		54	42	224
Mine Overseer (Production)	7				10
Mine Production Supervisor		91	42		245
Miner			21	34	251
Mining Engineer	7	50	47	33	18
Mining Operations Manager		59			
Mining Technician		27	27		12
Occupational Hygienist	7				9
Production Manager	7			16	
Rock Engineer				27	12
Safety, Health, Environment And Quality (SHE&Q) Practitioner		78	21		
Section Engineer				34	20

Source: MQA WSP and ATR (31 May 2024)

Table 3.2 above provides insights into the HTFVs reported within the MMS over the past five years (2020-2024). While all these occupations are considered crucial, the past five years have revealed a persistent challenge in filling five specific roles. These stand out due to their consistent presence on the HTFV list.

- 1 Mine Manager**
- 2 Mechanical Engineer**
- 3 Mining Engineer**
- 4 Engineering Manager**
- 5 Diesel Mechanic**

Commonly cited reasons for hard-to-fill vacancies are the lack of relevant experience, Poor remuneration, lack of relevant qualifications (desired level of study not attained or inappropriate field of study or inappropriate subject specialisation) and equity considerations.

Furthermore, qualitative data collected from employers sheds additional light on these challenges, highlighting:

“It's difficult to recruit certain occupations because the competition is paying much higher salaries, so we're gonna have to review our salary structure in order to fit in with it. I'm comparing, we're looking for diesel mechanics and the guys available are coming out of the Rustenburg area. The Rustenburg areas are taking home as much as double”

“Oh, Diesel Mechs, it's what the first thing is, there's not a lot of them, good actual skilled Diesel Mechs. So there's

a high competition in terms of, you know, pay. So I think we're struggling to afford them.”

“We're also struggling to fill diesel mechanics and more around the employment equity targets... And we also are struggling to find and source JCC ticketed engineers in the different areas. The reason around the ticketed engineers is more in terms of remuneration, as well as a little bit of employment equity, finding the right fit for the organization.”

These occupations all require a unique blend of technical knowledge and practical skills often specific to the MMS. For instance, a Mechanical Engineer in mining might need expertise in maintaining specialised mining equipment, while a Mining Engineer needs to understand geological principles and extraction techniques relevant to the specific minerals being mined. These specialised skillsets can take time and focused training to develop, limiting the readily available talent pool.

Over the past year, the MQA noticed that employers are training more Heavy Equipment Mechanics (HEM) rather than the diesel mechanics. The MQA's observation suggests a potential shift in the industry's needs. There might be a growing demand for skills related to operating and maintaining heavy equipment compared to traditional diesel mechanics. If employers are focusing more on HEM training, it might indicate a shortage of qualified HEMs compared to diesel mechanics. This might also signify a merging of traditional mechanic roles. HEMs might be expected to have a broader skillset encompassing both diesel mechanics knowledge and the ability to handle heavy equipment. MQA could establish an RPL system for experienced diesel mechanics. This would allow them to leverage their existing skills and knowledge while acquiring additional training specific to HEMs in mining.

A significant challenge in filling mining engineering roles is the competitive remuneration offered by other industries. As highlighted in the MQA's 2024 study "*Nature of Demand and Skills Supply Required with the Changing Technology in the MMS*", employers mentioned that engineers can often command higher salaries outside of the MMS. This financial disparity renders the MMS less attractive to skilled engineers, potentially leading to a talent pool shortage. To address this, mining companies may need to strategically adjust their compensation packages.

3.3 Skills Gaps

Skills gaps refer to skills inefficiencies of 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. The term ‘top-up skills also refers to skills gaps. Skills gaps usually require short training interventions (DHET, 2019).

Table 3.3: Skills Gaps by Major Occupational Level

Major Occupational level	Occupation Name	Ofo Code	Most Common Skills Gaps
Managers	Mine Manager	2021-132201	Leadership
	Human Resource Manager	2021-121201	
	Engineering Manager, Mining Engineering Manager	2021-132104	Leadership, Legal, governance and risk, Technical (job-specific)
Professionals	Training Officer	2021-242401	Mine Production Process

Major Occupational level	Occupation Name	Ofo Code	Most Common Skills Gaps
	Health and Safety Officer / Coordinator / Professional	2021-226302	Occupational health & safety skills
Technicians And Associate Professionals	Engineering Foreman	2021-312103	Leadership
	Team Leader (Mining)	2021-312102	Technical (job-specific)
	Mining Operations Supervisor, Mining Production Supervisor, Shift Supervisor (Mining), Mine Overseer (Production), Shift Foreman/ Boss (Mining)*	2021-312101	Leadership, Planning and Organising, Supervisory
	Mining Technician	2021-311701	Technical (job-specific)
	Production Plant Supervisor	2021-312201	Leadership, Planning and Organising, Supervisory, Technical (Job Specific)
Clerical Support Workers	Administrative Assistant	2021-411101	Communication (Written), Management, Computer Literacy, Customer Service Skills, Interpersonal
	Administrator	2021-441903	Office administration, Communication (written), Computer literacy
Craft & Related Trades Workers (Artisans)	Diesel Mechanic	2021-653306	Technical (Job Specific)
	Boilermaker	2021-651302	
	Millwright	2021-671202	
	Auto Electrician	2021-671208	
	Electrician (Engineering), Electrician	2021-671101	

Source: MQA WSP and ATR (31 May 2024)

The data in Table 3.2 clearly indicated that Mine Manager and Diesel Mechanic occupations are consistently hard to fill. These roles have also been identified as having ongoing skill gaps. This reinforces the need for targeted interventions in these areas during the upcoming planning cycle, as previously suggested.

An analysis of the past five years reveals that Mine Manager vacancies have appeared three times (2020/21, 2023/24 & 2024/25) while Diesel Mechanic vacancies appeared four times (2019/20, 2021/22, 2023/24 and 2024/25). This consistently high demand emphasizes the importance of prioritising these occupations for targeted efforts in the new planning cycle.

Looking beyond historical data, a crucial takeaway from the previous financial year's skills gap analysis is twofold.

First, stakeholders see a strong emphasis on soft skills such as leadership, teamwork, and interpersonal skills as essential for employees across all major occupational groups. This point was also reiterated by stakeholders during interviews citing other soft skills such as supervisory skills, legal training and mine health and safety skills as serious gaps in their labour force. The MQA needs to explore opportunities for cross-industry collaboration programmes involving other SETAs to leverage their existing training networks and infrastructure. These programmes could involve joint funding where employees from different sectors, but with relevant soft skills needs can participate in shared learning experiences. This could also involve utilising a pool of certified trainers,

training facilities, or online learning platforms from allied SETAs. Secondly, there is a concerning trend of skill gaps in technical ability reported for all artisan roles. This highlights the urgent need for the MQA to strengthen upskilling and reskilling efforts for artisans moving forward.

3.4 Emerging Occupations in the MMS

The MMS is no stranger to change. While core roles remain essential, the industry is embracing digitisation, national sustainability strategies, and evolving global demands. This confluence of factors have fostered a wave of emerging occupations requiring new skillsets. This section delves into these exciting new roles, exploring how they address the changing landscape of mining.

3.4.1 Emerging occupation as a result of 4IR

The graph below illustrates the projected increase in demand for various occupations within the MMS due to the influence of 4IR.

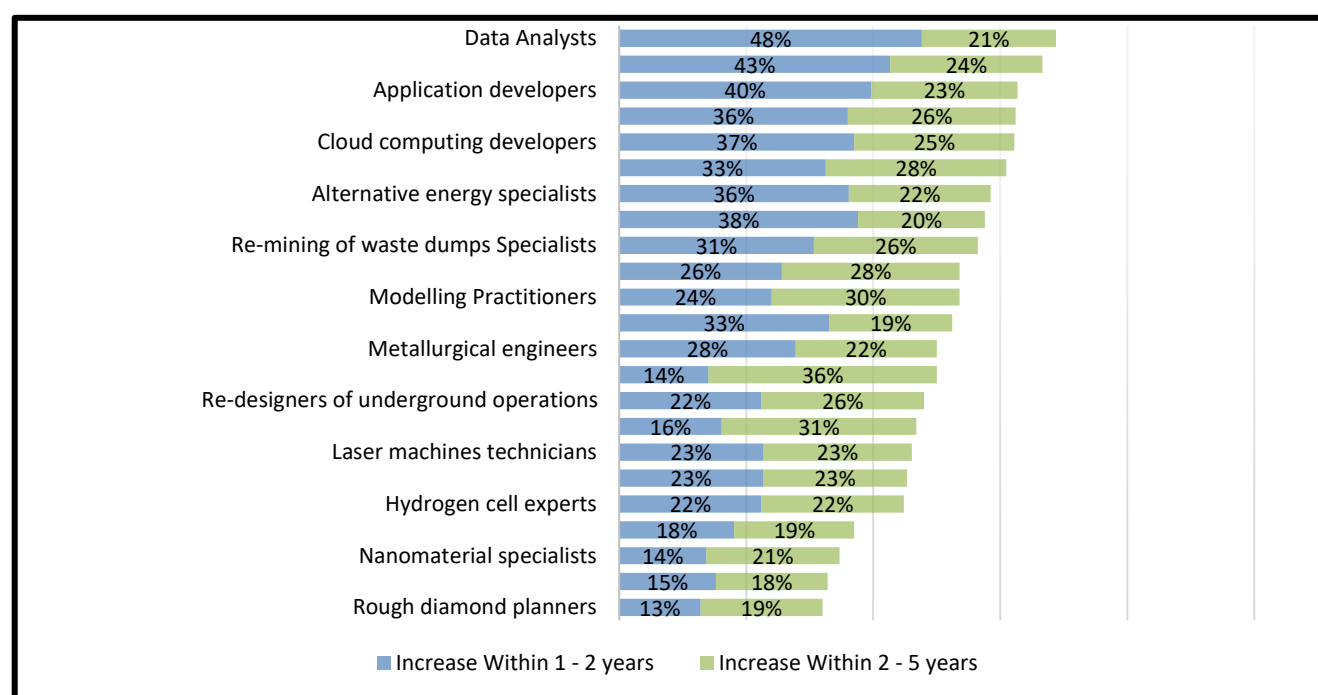


Figure 3.1: Emerging 4IR occupations

Source: MQA 4IR Impact on Skills Demand and Supply Research (2024)

According to industry stakeholders, emerging occupations as a result of 4IR include in the short term:

- ✓ Data analysts
- ✓ Information systems specialists
- ✓ Application developers

Table 3.4 below tables these occupations to highlight the rationale for why they are deemed to increase in demand over the next one to two years. This need stems from the increased challenges mining organizations face due to the vast amounts of data generated daily, necessitating strategies to manage this data effectively. Qualitative data supports this, with many employers noting a growing demand for data analysts and systems specialists. Due to their nascent nature, these occupations do not currently have OFO codes and vacancy numbers.

Table 3.4: Emerging 4IR Occupations

Emerging Occupation	OFO Code	Vacancies	Rationale
Data Analyst	-	-	Data management was identified as being key for organisations to make informed and data-driven decisions, underscoring the demand for individuals in data and/or systems related roles.
Information Systems Developer	-	-	
Application Developer	-	-	

Source: MQA 4IR Impact on Skills Demand and Supply Research (2024)

It is imperative to note that in this year’s qualitative data collection sessions, about 60% of employers noted Data Analysts and Software or Applications developers as occupations that are increasingly becoming critical for mining operations. It is also important to note that due to their novelty, employers do not yet possess the language to articulate or name many of these occupations which is why some of them have more than one title. The inclusion of roles such as laser machine technicians and artisanal skills emphasises the continuing importance of skilled trades in the MMS. These technicians will be responsible for maintaining and operating the new technologies being introduced. This enduring significance was echoed in interviews and focus groups with occupations such as Drone Surveying/Piloting and Autonomous Mobile Technician (and Operators) as emerging occupations in mining companies. These emerging occupations are a result of technological changes being instituted in the MMS in line with the increasing adoption of autonomous technologies to replace many of the manual operations. Since stakeholders are mostly of the view that these occupations will become increasingly demanded within the next 1-2 years, it is imperative that the MQA formulate interventions that are specifically designed to facilitate the provision of skills in the domains of information technology and digitisation.

The MQA should develop training programmes for specialists such as re-designers of underground operations. These programmes should cover robotics technology, automation principles, and safe integration of autonomous systems in mining environments.

3.4.2 Emerging Occupations as a result of the hydrogen economy

The emerging occupations as a result of the nascent hydrogen economy in South Africa are tabled below.

Table 3.5: Skills Needed for the Hydrogen Economy In South Africa

Occupational Group	Identified	Existing	Unsure of existence	Non-existing
Engineers	35	20	9	6
Technicians and tradespersons	39	11	24	4
Specialists	38	21	16	0
Management	15	12	3	0
Elementary Skills	11	11	0	0
Total	138	75	52	10

Source: Identification of the Skills Needed for the Hydrogen Economy, DHET (2024)

A recent report by the Labour Market Intelligence Project (LMIP) found that South Africa's developing hydrogen economy will require a workforce with a wide range of skills (DHET, 2024). They identified 138 specific occupations that will be crucial for its success, spanning from engineering roles to those requiring more basic skillsets. Looking closer at these occupations, LMIP determined that 75 already exist within South Africa's current workforce. Another 52 occupations already exist, however, unclear if the specific skillsets they involve will directly translate to the hydrogen economy. The remaining 10 occupations are deemed essential for the green

hydrogen economy, but there are currently no employees in South Africa with the necessary qualifications.

Table 3.6 below depicts the 10 emerging occupations created by green hydrogen, a major transformation within the MMS (as discussed in chapter 2). The reasons behind the projected demand for these occupations in the MMS can be categorised into two areas. The left column delineates what the occupation will contribute to the synthesis of green hydrogen whereas the column to the far-right states what end-uses each occupation will support. For example, while Cavern Engineers will contribute towards the storage of green hydrogen, Refuelling Station Engineers will be responsible for the design of the green hydrogen fuelling stations. Since the green hydrogen economy is still in its infancy, most of the OFO codes and all of the vacancy numbers cannot be provided.

Table 3.6: Emerging occupations as a result of the Hydrogen Economy

Emerging Occupation	OFO Code	Vacancies	Rationale (Production VS End-Use Applications)	
Gas Engineer	2021-214607	-	Production, Storage, Distribution and Transportation.	Heating, Power generation, Transport and Industrial processing (oil refineries, steel, and iron production and chemical production)
Cavern Engineer	-	-	Storage	-
Locomotive (train) Engineer	-	-	-	Transport
Refuelling Station Engineer	-	-	-	Transport
Electrolysis Engineer	-	-	Production, Storage and Power Generation	-
Electrochemical Engineer	-	-	Production, Storage, Distribution and Transportation.	Transport
Marine Engineering Technician	311501	-	Distribution and Transportation	Industrial processing (oil refineries, steel, and iron production and chemical production)
Reservoir Technologist	-	-	Storage	-
Electrolyser Technician	-	-	Production	-
System Integration Technician	-	-	Production, Storage, Distribution and Transportation.	Heating, Power generation, Transport and Industrial processing (oil refineries, steel, and iron production and chemical production)

Source: Identification of the Skills Needed for the Hydrogen Economy, DHET (2024)

Green hydrogen presents a transformative opportunity for the MMS (as discussed in Chapter 2). These roles focus heavily on engineering and technical expertise, suggesting a significant shift in the skillset required for the future MMS workforce. This sentiment was echoed by one employer in the stakeholder interviews arguing that:

“So, we are offsetting that electricity... So definitely we'll need people who are going to man that and process that, process controllers for all of those things. Green energy is also the next big thing that we are trying to upskill our employees on, especially our artisans and so on, since they are the ones who must fix and install these things...”

Key Skills Implications:

- Strong foundation in core engineering principles remains crucial, especially for adapting existing roles such as Locomotive Engineer to operate hydrogen-powered technologies.
- In-depth knowledge of electrolysis technology and its applications in mining contexts will be essential for Electrolysis Engineers and Electrolyser Technicians.
- Understanding how to integrate green hydrogen systems with existing mining operations will be paramount for System Integration Technicians.
- Depending on the specific application, some roles (e.g., Reservoir Technologist) may require expertise in areas such as hydrogen storage within the geological context relevant to mining.
- Upskilling and reskilling opportunities will be crucial for existing MMS workforce to adapt to the demands of green hydrogen technologies (e.g., traditional mechanics learning to maintain hydrogen-powered mining vehicles).

To address the skills gap for the new green hydrogen occupations, the MQA should collaborate with relevant education and training authorities in the new planning cycle. These authorities include CHIETA, EWSETA, MerSETA, and TETA, which already offer qualifications for technicians and tradespeople, and universities, which provide engineering degrees. Through collaboration, they can share best practices to inform the development and support of training programmes that directly target the skills needed for these emerging green hydrogen jobs in the MMS.

Having conducted a thorough analysis of occupational shortages and skills gaps within the MMS, it is now pertinent to evaluate the existing skills supply and its alignment with the sector's skills development initiatives. This critical assessment forms the basis of the following section, which reflects on the adequacy of the current skills supply in meeting the evolving needs of the MMS.

3.5 Supply-side Analysis

The potential growth and sustainability of the MMS hinges on its ability to cultivate a highly competent workforce. In recognition of this critical factor, an assessment of the skills supply is paramount. This assessment will determine the efficacy of current skill sets in meeting the evolving demands of the industry. Figure 3.2 illustrates the prominent entities responsible for facilitating the supply of skills in the MMS. Each stakeholder plays a distinct and vital role within various stages of the skills supply process. Furthermore, their collaborative efforts are mutually reliant upon one another to effectively address the sector's ever-changing skills requirements. The subsequent section delves into a detailed examination of the types and extent of skill provision undertaken by these entities. This analysis will place a particular emphasis on the enrolment and throughput rates within this co-dependent supply pipeline. Following this, the next section will proceed to consider a number of critical challenges currently faced on the supply side, including those reported by employers within the sector. In conclusion, the section will culminate with a presentation of the interventions planned by the MQA to address the supply-side hurdles, ultimately aiming to ensure a robust and future-proof workforce for the MMS.

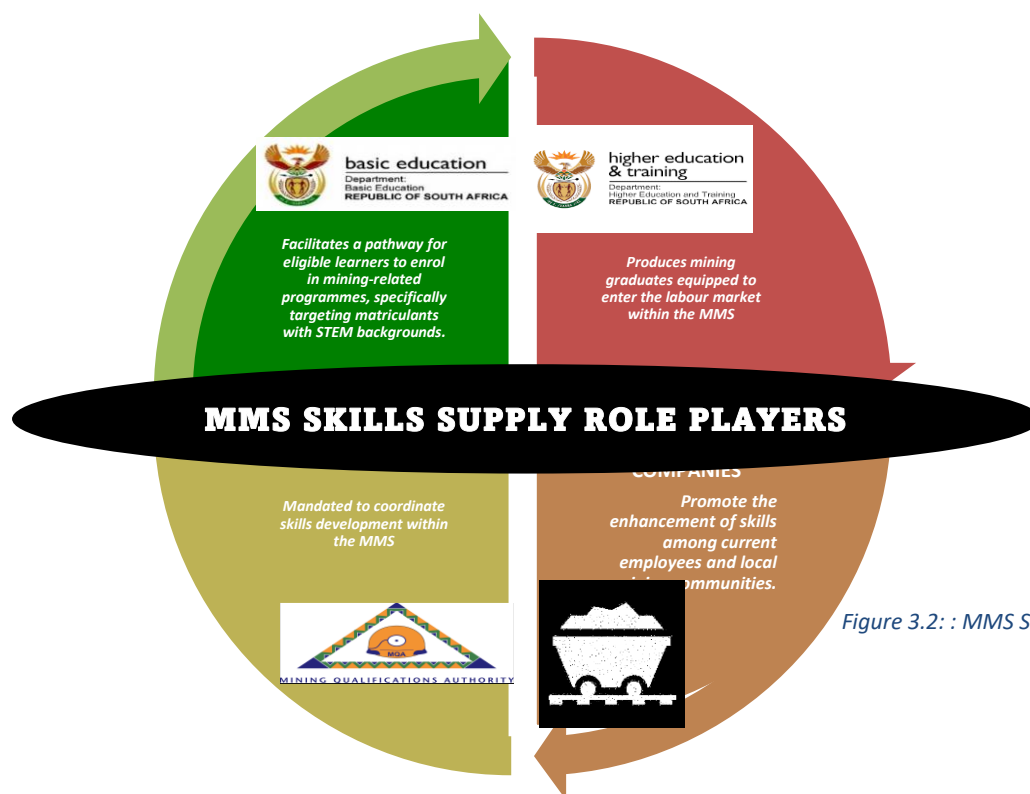


Figure 3.2: : MMS Skills Supply Key Role Players

3.5.1 Education and Training

The South African skills development system is multifaceted, designed to enhance human capital across various sectors. Education and training functions as a pipeline, beginning with basic education that provides foundational knowledge and skills. This acts as the base upon which further education is built. Tertiary education institutions such as universities, universities of technology, TVET Colleges, and Community Education and Training (CET) colleges then equip individuals with specialised knowledge and skills relevant to the MMS. Private training providers also play a role by offering targeted courses and qualifications. Finally, industry itself, through employer-led skills training, facilitates practical skill acquisition and real-world experience, solidifying the knowledge gained through formal education. This interconnected system aims to address the diverse skills needs of the MMS labour market, ultimately fostering a skilled workforce capable of driving economic growth and innovation. Each of these components, from basic education to industry training, will be examined in more detail in the subsequent sections.

3.5.2 Basic Education

Basic education offers foundational knowledge in subjects such as languages, mathematics, and sciences (South African Government 2024 & DBE, 2021). Secondary education provides a more specialised curriculum building upon primary education. Learners in grades 10-12 have elective subject options to align with their interests and career goals. Success in STEM subjects (Science, Technology, Engineering, and Mathematics) during the matriculation year serves as a crucial indicator for pursuing careers within the MMS. The national pass rate for the Class of 2023 reflects positive progress, reaching 82.9%. This marks a 2.8% increase compared to the 80.1% achieved in 2022. For a comprehensive analysis of the Class of 2023's performance, including provincial achievements and rankings, please refer to Table 3.7 below (DBE, 2024).

Table 3.7: National Performance in the 2023 NSC Examinations

Province	2023			
	Total Enrolled	Total Wrote	Total Achieved	% Achieved
Eastern Cape	98 418	95 697	77 917	81.42
Free State	35 634	34 451	30 673	89.03
Gauteng	132 570	127 697	109 030	85.38
KwaZulu-Natal	167 247	157 911	136 366	86.36
Limpopo	94 424	93 533	74 400	79.54
Mpumalanga	67 995	65 534	50 429	76.95
North West	42 287	41 418	33 808	81.63
Northern Cape	13 032	12 842	9 740	75.84
Western Cape	64 112	62 077	50 620	81.54
National	715 719	691 160	572 983	82.90

Source: DBE (2024)

The national increase in the 2023 NSC pass rate (82.9%) signifies progress for skills development in the MMS (Mining and Minerals Sector). However, significant disparities exist between provinces. Provinces such as Free State, Gauteng, and KwaZulu-Natal offer a stronger foundation due to higher pass rates, creating an opportunity to build upon this strength by encouraging students towards STEM careers relevant to the MMS. Targeted interventions are crucial for provinces below the national average, where lower pass rates indicate challenges hindering access to skills development. These interventions could address the root causes by focusing on improving educational quality, providing bursaries, and implementing early intervention programmes to incentivise pursuing STEM education and MMS careers. Additionally, focusing on national standardisation of education quality, enhancing career guidance programmes, and fostering partnerships between the MQA, DBE, and industry stakeholders are all crucial steps. By acknowledging these provincial disparities and taking targeted action, a more robust national skills development pipeline can be established for the MMS, ensuring a future workforce with a strong foundation in STEM subjects, regardless of location.

Furthermore, Noticeable improvements in performance have been observed across all subjects, apart from a few. In Table 3.8 below, which outlines subjects with high enrolment, improvements are evident in all areas except History and Mathematical Literacy. In what follows, we illustrate the improvements in subject performance with particular interest in MMS-related subjects which are mathematics, physical science and geography.

Table 3.8: Comparison of Performance in Gateway Subjects 2020-2023

Subject Description	2020	2021	2022	2023
Accounting	75.5%	74.7%	75.4%	76.8%
Agricultural Sciences	72.7%	75.4%	75.8%	80.5%
Business Studies	77.9%	80.5%	76.7%	81.8%
Economics	68.8%	67.9%	71.5%	74.5%
Geography	75.3%	74.3%	81.3%	86.2%
History	92.1%	89.5%	88.2%	87.7%
Life Sciences	71.0%	71.5%	71.5%	75.6%
Mathematical Literacy	80.8%	74.5%	85.7%	82.3%
Mathematics	53.8%	57.6%	55.0%	63.5%
Physical Sciences	65.8%	69.0%	74.6%	76.2%

Source: DBE (2024)

Table 3.8 above highlights trends in gateway subject performance (2020-2023) with significant implications for skills development in the MMS (Mining and Minerals Sector). Positive trends are observed in Agricultural Sciences, Business Studies, Economics, Geography, and Physical Sciences. Agricultural Sciences plays a role in land reclamation and ecological restoration post-mining. Business Studies provides essential skills for project management, financial analysis, marketing, and logistics within mining companies. Economics helps with feasibility studies, analysing market trends for minerals, and navigating the global economic impact on mining. Geography offers valuable skills for identifying potential mining sites, assessing environmental impact, and planning efficient mine layouts. Physical Sciences provides the foundation for understanding minerals, designing extraction processes, and implementing safe and environmentally responsible mining practices. An interesting suggestion from the stakeholder interviews and focus group discussions was the argument that secondary school subjects, while important tend to be too generalist in approach and the introduction of technical jargon only in later levels of education is not efficient. Employers suggested that subject matter related to the MMS should be introduced earlier in the lives of prospective employees. This dovetails with the need for the MQA to intensify engagement with secondary school learners for career guidance into the MMS and formulating a partnership with the DBE in order to consider strategies to enact this early socialisation into the MMS.

Improvement in the performance of these subjects indicate a potentially stronger foundation for students considering careers requiring these skillsets within the MMS. However, concerns remain regarding Mathematics performance, which directly impacts many technical roles in the sector. The potential reintroduction of the MQA's Math and Science support programme for learners emerges as a critical intervention to address this concern. This programme's past success suggests its valuable role in bolstering foundational knowledge in these crucial subjects. Lastly, the stagnation in Life Sciences performance also warrants attention, as some MMS occupations (e.g., environmental specialists) may require a solid understanding of this subject. The next section reflects on higher education as a critical role players of skills supply in the MMS.

3.5.3 Higher Education

Tertiary education, often known as higher education and training, or HET, encompasses education leading to undergraduate and graduate degrees in addition to certifications and diplomas. Although more learners are passing matric with grades suitable for university enrolment, the uptake of mining-related certifications is still very low. Mining engineering, mine surveying, metallurgy, chemical engineering, geology, electrical engineering, mechanical engineering, and jewellery design and manufacture are some of the tertiary qualification that are pertinent to the industry. A five-year trend in the number of graduates enrolling in and completing degrees linked to core mining is presented in Figures 3.3 and 3.4. The data presented on university and TVET enrolment and graduation statistics reflects the most recent information available from the DHET.

3.5.3.1 Universities' Programme Offerings

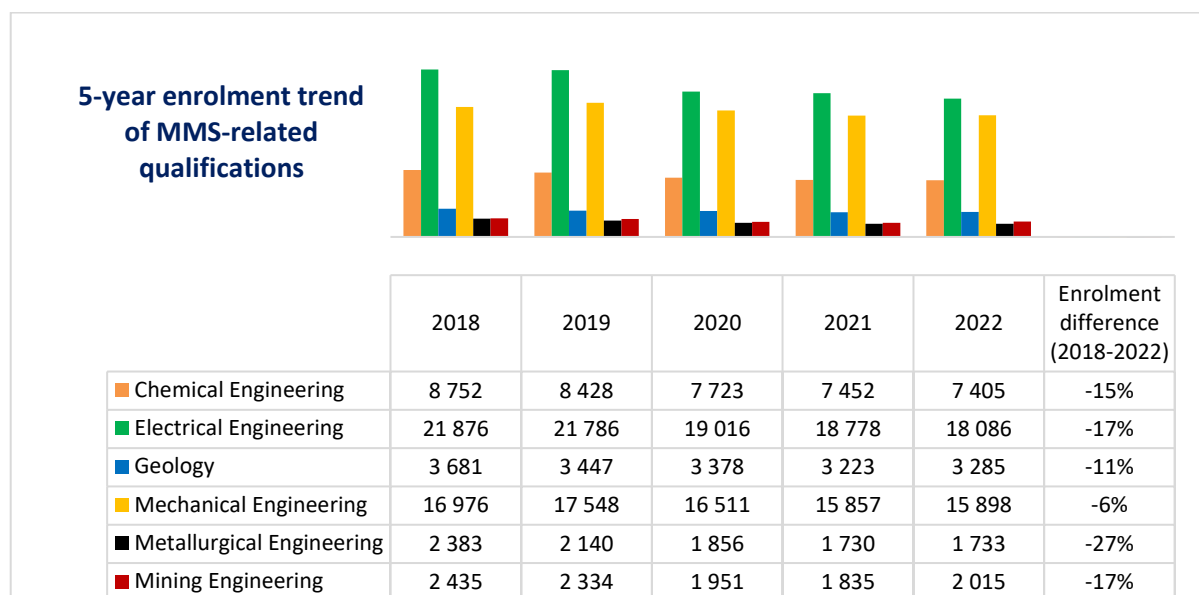


Figure 3.3: Enrolment Trends of MMS Related Qualifications (5 years)

Source: DHET, HEMIS Data (2018-2024)

Figure 3.3 depicts the 5-year enrolment trends for MMS-related qualifications. Despite improvements in gateway subject performance at secondary education suggesting a stronger foundation for STEM careers, all enrolments in mining-related qualifications decreased, with mining engineering and metallurgical engineering experiencing the greatest decline. This suggests that there is less uptake of mining related qualifications among young people. As we head into the new planning cycle, it is imperative for the MQA to aggressively engage in career expos for careers in mining, targeting grade 10-12 learners. This also implies planning a partnership with the DBE in order to increase the outreach to pupils.

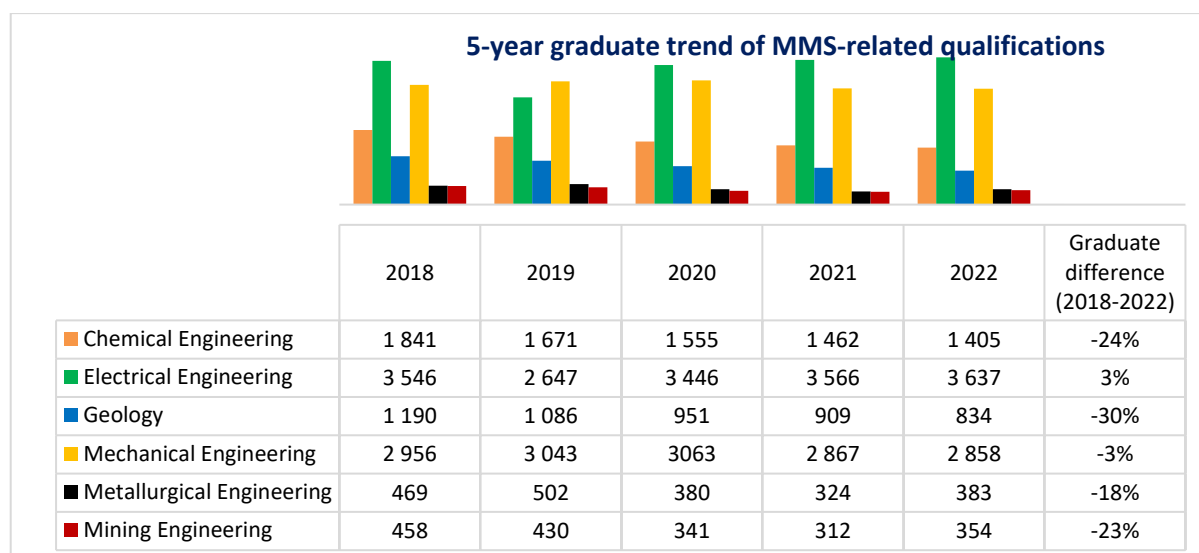


Figure 3.4: Graduation Trends of MMS Related Qualifications (5 years)

Source: DHET, HEMIS Data (2018-2024)

Similarly to enrolment rates, the number of graduates from MMS-related qualifications has also been declining, with metallurgical and mining engineering experiencing the greatest decrease. This trend is concerning, especially considering that mining engineering is identified as both hard-to-fill and facing skill gaps. It

underscores the need for MQA to intensify efforts to boost the uptake of mining-related bursaries. As will be demonstrated in Chapter 5's analysis of MQA interventions supporting skills supply, the provision of bursaries to unemployed individuals increased annually from the 2020/21 to 2022/23 financial years, despite an initial decline caused by the Covid-19 pandemic. It would be critical for the MQA to comprehend the reason why, despite an increase in funding for mining-related qualifications, their demand continue to decline. Given the new planning cycle, it is also opportune to enhance psycho-social support beyond financial assistance for mining-related qualifications. This can be achieved through mentorship programmes for students nearing graduation, career guidance for those leaving school, and an examination of alternative entry points into the MMS. By implementing these multifaceted strategies, the gap between available funding and student enrolment can be bridged, attracting a wider pool of talent to the sector.

3.5.3.2 TVET Programme Offerings

The figure below illustrates the enrolment rates for TVET qualifications between 2010 to 2021.

Table 3.9: TVET Enrolment Rates 2010-2021

Year	Qualification Category						Total
	NC(V)	Report 191 (N1-N6)	Occupational Qualifications	Other/skills programmes	PLP	Level 5 and Level 6 Qualifications	
2020	146 637	274 907	20 130	3 888	5 250	1 465	452 277
2021	141 768	416 949	18 277	6 653	4 581	855	589 083
2022	135 727	356 575	15 837	4 505	4 420	1 520	518 584

Source: Statistics on Post-School Education and Training, DHET, (2024)




In line with the latest available statistics from the DHET, between 2020 and 2022, enrolments in TVET experienced a post-COVID recovery with enrolment increasing by a considerable 136 806 students across the various programmes. Although enrolments rebounded to 589 083 in 2021, further declines were observed in 2022 (518 584). This decrease is concerning, especially considering the NDP's target of 2.5 million TVET registrations by 2030. Additionally, compared to university enrolment rates, which stood at approximately 1.3 million students in 2021, there are evident challenges in attracting school leavers to TVET colleges (DHET, 2023 and MQA, 2024).

The qualification analysis revealed a significant decline in occupational qualification enrolments, programmes directly equipping individuals with practical mining skills, raises concerns about a potential skills shortage in the sector. However, a bright spot emerges with the increase in Level 5 and Level 6 qualifications, indicating a potential shift towards a more highly skilled mining workforce, possibly driven by technological advancements or evolving industry needs.

TVET programmes need to adapt to incorporate new technologies and trends within the mining industry. Moreover, improving data collection and analysis for all TVET qualification categories relevant to mining is crucial for a comprehensive understanding of the skills development landscape.

The throughput¹ rates for NC (V) programmes are shown in the figure below.

Table 3.10: TVET Enrolment Rates 2010-2021

			
PROGRAMME TYPE	NUMBER ENROLLED (NC(V)2, 2019)	NUMBER COMPLETED (NC(V)4, 2021)	THROUGHPUT RATE (%)
1 Civil Engineering and Building Construction	4 353	294	6.8
2 Drawing Office Practice	52	2	3.8
3 Education and Development	1 336	350	26.2
4 Electrical Infrastructure and Construction	7 533	292	3.9
5 Engineering and Related Design	7 685	440	5.7
6 Finance, Economics and Accounting	3 344	271	8.1
7 Hospitality	3 937	577	14.7
8 Information Technology and Computer Science	3 598	139	3.9
9 Management	2 657	309	11.6
10 Marketing	2 267	182	8.0
11 Mechatronics	326	27	8.3
12 Office Administration	11 332	1 988	17.5
13 Primary Agriculture	1 870	292	15.6
14 Primary Health	366	63	17.2
15 Process Plant Operations	198	13	6.6
16 Safety in Society	2 285	248	10.9
17 Tourism	3 769	541	14.4
18 Transport and Logistics	1 531	259	16.9
19 Unspecified	21	–	–
Total	58 460	6 287	10.8

As indicated above, out of 58 460 students enrolled in NC (V) Level 2 programmes, only 6,287 graduated with a NC (V) Level 4 qualification, representing a throughput rate of 10.8%. Low throughput rates reflect inefficiencies in education investment, leading to smaller class sizes in later levels of the NC (V) programmes. Low completion rates raise concerns about a potential skills gap within the MMS. If students are not graduating with NC(V) qualifications, the pool of individuals with these crucial foundational skills shrinks.

In this new planning cycle, the MQA must support marketing campaign with the aim of destigmatising TVET educational pathways to improve enrolment rates. The campaign could entail showcasing TVET graduate success stories on the MQA's communication and digital platforms, conducting roadshows at secondary schools to promote TVET colleges as institutions of choice, increasing their awareness, demonstrating the nature of qualifications available in TVET colleges, as well as the potential career pathways that become available to an individual who studies through the TVET system. The next section discusses the skills supply provided by the industry.

¹ The concept of a throughput rate can be defined as the rate at which a student cohort successfully completes a particular qualification within the stipulated timeframe for said qualification (Department of Higher Education and Training, 2023). It is imperative to note that graduation data for these specific NCV programmes was not available for the years 2022 and 2023 and thus 2021, serves as the latest year of analysis.

3.5.4 Industry Skills Supply

Beyond educational institutions, the industry itself (employers) significantly shape the MMS skills pipeline. Industry actors can offer practical training tailored to specific mining roles. They can also invest in broader skills development initiatives, collaborating with educational institutions or offering bursaries to attract talent. Furthermore, industry partnerships with educational institutions ensure programme content reflects real-world needs. In addition, ongoing training and upskilling programmes within companies keep employees abreast with evolving developments in the sector. The sections below detail the skills supply provided by the industry, including by mining companies, the DMR and Minerals Council South Africa.

3.5.4.1 Mining Companies

Table 3.11: Top 3 MMS Employee Bursaries (2020-2024)

Year	Top 3 bursary types	No. of bursaries
2020	Mining Engineering	32
	Analytical Chemistry	16
	Electrical Engineering (Heavy Current Only)	10
2021	Mining Engineering	32
	Analytical Chemistry	16
	Electrical Engineering (Heavy Current Only)	10
2022	Mining Engineering	60
	Electromechanical Engineering	34
	Electrical Engineering (Heavy Current Only)	11
2023	Mining and Mineral Engineering	67
	Electromechanical Engineering and Engineering Science	64
	Metallurgical Engineering	18
2024	Mining Engineering	130
	Electrical Engineering (Heavy Current Only)	41
	Geology	22

Source: MQA WSP and ATR (May 2024)

The table above demonstrates that the number of bursaries offered by mining companies has increased over the years. Mining Engineering is consistently the most supported bursary type, with a total of 321 bursaries offered across all years. The fact that the number of bursaries offered is increasing is a positive sign for students who are interested in pursuing careers in mining. A significant portion of bursaries offered by mining companies falls under the "other" category, initially raising concerns as these bursaries outnumbered those in the top three mining-related fields of study. However, discussions with skills development facilitators in the MMS, alluded that these bursaries represent a diverse array of fields crucial to supporting core mining operations. These fields encompass various role-specific study assistance programs, such as National Certificates in Bookkeeping, Human Resource studies, Finance, and Supply Chain.

A critical skills gap exists even with the presence of bursary programmes. Over the past decade, Mining Engineering has been consistently reported as a hard to fill and an occupation experiencing skills gaps. In recent engagements with the MQA Learning Programmes Unit offering support to MMS bursars, it was stated that Mining Engineering beneficiaries are being poached out of the MMS and into the ICT sector. To bridge this gap, a multi-pronged approach is recommended. A concerted effort to revamp the industry's image is essential. Highlighting advancements in safety, sustainability practices, and technological integration can foster a more positive perception. This was also emphasised in the 2024 Africa Mining Indaba and MQA Inaugural Skills Lekgotla.

Furthermore, an additional interesting trend revealed by the data is the support of new bursary types in recent years. In 2023, for example, bursaries were offered in Electro-mechanical Engineering and Engineering Science. The MMS's support for bursaries in Electromechanical Engineering and Engineering Science reflects a growing need for a more tech-savvy workforce. Modern mines are complex, relying on automation and intricate machinery. These engineers ensure these systems function smoothly, bridge the gap between traditional mining engineering and modern technological demands, and ultimately contribute to a safer, more efficient MMS. Overall, the data suggests that the mining industry is a growing industry that is investing in the future workforce. This is positive for students who are considering a career in mining.

In addition to bursaries offered to employees, mining right holder are required by the 2018 Mining Charter to contribute meaningfully to mine community development, with a preference for mine communities they serve and in accordance with statutory requirements and social licence to operate principles. This benefits mining communities while preventing unrest that threatens operating licences. The bursary support provided by mining companies to mine communities are presented in table 3.11 below.

Table 3.11: Top 3 MMS Community Bursaries (2020-2024)

Year	Top 3 bursary types	No. of bursaries
2020	Mining Engineering	32
	Analytical Chemistry	16
	Electrical Engineering (Heavy Current Only)	10
2021	Mining Engineering	33
	Electrical Engineering (Heavy Current Only)	32
	Geology	22
2022	Mining Engineering	54
	Electrical Engineering (Heavy Current Only)	44
	Geology	25
2023	Mining Engineering	92
	Electrical Engineering (Heavy Current Only)	60
	Electromechanical Engineering	53
2024	Mining Engineering	60
	Electromechanical Engineering	48
	Electrical Engineering (Heavy Current Only)	47

Source: MQA WSP and ATR (May 2024)

In concert with bursaries provided to employees, a large share of the total number of bursaries offered to community members fall under the 'other' category. While this category initially seems unrelated to mining, it encompasses a range of fields crucial to the industry's broader operations, including Medicine, Law, and Civil Engineering. These "other" bursaries are followed in popularity by those in core mining fields like Mining Engineering, Electrochemical Engineering, and Electrical Engineering.

Similar to bursaries awarded to employees, both analyses point towards a potential skills gap in the mining industry. The bursary focus on core operational skills (Mining & Electrical Engineering) reflects a need to fill these gaps. The bursary programme’s recent inclusion of Electromechanical Engineering highlights a shift towards skills required for a more automated future in mining. This aligns with the need to equip the current workforce with relevant skills through training and development programmes. On the other hand, there might be a discrepancy between bursary focus and support provided.

In addition to the skills supply provided by mining companies, the DMR and Minerals Council South Africa (two of MQA's key role players) play an imperative role in the supply of skills in the MMS. Their contributions are presented in the sections that follow.

3.5.4.2 Minerals Council South Africa Issued Certificates

The introduction of the Minerals Council Chamber of Mines Certificates (CoC) aimed to standardise standalone in-house certifications for individuals employed within the South African MMS. All exams for disciplines such as Survey, Sampling, Ventilation, and Rock Mechanics are coordinated and overseen by the Minerals Council, which also handle the issuance of certifications. These qualifications empowers candidates to execute their roles with heightened confidence and comprehension, facilitating their progression to senior positions. Candidates are required to undergo training in designated subjects and fulfil specified hours before being eligible to sit for examinations leading to the Minerals Council Certificates. In Table 3.12 below, an analysis of the trends that have characterised the issuance of these certificates from 2018 to 2023 are presented.

Table 3.12: Minerals Council South Africa Certification (2018-2023)

Certificate	2018	2019	2020	2021	2022	2023
Certificate in Advanced Mine Surveying	39	21	14	20	20	28
Certificate in Advanced Mine Valuation	16	15	08	11	15	17
Certificate in Advanced Rock Engineering	8	3	02	02	03	2
Certificate in Basic Mine Sampling	59	75	30	58	73	84
Certificate in Basic Mine Surveying	98	78	31	73	72	117
Certificate in Elementary Mine Sampling	11	36	10	10	23	22
Certificate in Elementary Mine Surveying	68	43	25	25	44	12
Certificate in Mine Environmental Control	21	81	31	41	31	14
Certificate in Radiation Protection Monitoring Screening	95	58	72	85	75	113
Certificate in Rock Mechanics	31	14	11	17	14	11
Certificate in Strata Control	32	42	23	44	63	51
Intermediate Certificate in Mine Environmental Control	122	88	58	77	100	72
Certificate in Mine Survey Draughting	13	6	06	04	13	18
Total	613	560	321	467	546	561

Source: Minerals Council South Africa (2024)

The Minerals Council certifications data (2018-2023) indicates a fluctuating demand for certifications. Data reveals that the certificate with the highest uptake in 2023 was Basic Mine Surveying, while the certificate with lowest uptake in the same year was Advanced Rock Engineering. Advanced specialties such as Certificates in Elementary Mine Surveying and Mine Valuation show a decline, suggesting a shift in focus or preference for

university degrees. Conversely, foundational skills such as Basic Sampling and Surveying remain steady, highlighting their continued importance.

A potential skills gap emerges with the general decline in advanced certifications. The MQA should investigate if this reflects a lack of qualified professionals or outsourcing of these specialties.

The above analysis indicates that the MMS requires a balanced approach to foundational and specialised skills, with certifications playing a key role. The industry's environmental focus necessitates prioritising skills for sustainable practices. The MQA's adaptability to these is crucial to ensure a qualified future workforce for the MMS. The next section discusses the DMR Government Certificates of Competency.

3.5.4.3 Government Certificates of Competency

Certain core occupations in the MMS, such as mine engineer and mine manager can only operate upon attainment of a GCC issued by the DMR, which confirms that the employee has the necessary skill set required to perform the job. There is a stringent qualification criterion, which include years of experience and passing examinations to qualify for a GCC. The following table presents the data on the number of collective number of certificates issued by the DMR between 2020-2024.

Table 3.13: Awarded CoCs (2019-2024)

Year	Mine Engineer (Elec & Mech)			Mine Manager (Coal & Metal)			Mine Overseer (Coal & Metal)			Mine Surveyor			Winding Engine Driver			Total number of certificates issued
	M	F	Total	M	F	Total	M	F	Total	M	F	Total	M	F	Total	
April 2019 - March 2020	56	9	65	81	32	113	69	13	82	5	0	5	9	9	18	283
April 2020 - March 2021	26	5	31	10	4	14	40	12	52	5	0	5	0	0	0	102
April 2021 - March 2022	39	10	49	49	20	69	76	15	91	7	3	10	0	0	0	219
April 2022 - March 2023	25	5	30	39	19	58	68	23	91	9	0	9	5	5	10	198
April 2023 - March 2024	103	23	126	48	17	65	86	21	107	4	0	4	17	16	33	335

*M = Males

*F = Females

Source: DMR (2024)

The analysis of the uptake of GCCs over the past five years (2019-2024) reveals a complex picture influenced by the COVID-19 pandemic, institutional challenges within the DMR, and varying industry demand for specific skills. The onset of the pandemic in 2020 led to a significant decline in GCC uptake across all categories, particularly impacting roles such as Mine Manager, Mine Engineer, and Mine Overseer. This decrease was exacerbated by the absence of a Board at the DMR responsible for overseeing learner competency, further hindering progress in areas such as the Winding Engine Driver certification.

However, the easing of COVID-19 restrictions in 2022 and efforts to clear backlogs led to a noticeable recovery in GCC uptake. Despite this positive trend, certain challenges persist. The Mine Surveyor certificate, for instance,

consistently sees the lowest uptake, particularly among women. This is attributed to the low demand for this role within the sector, as one Mine Surveyor can often serve multiple companies. The traditionally male-dominated nature of this occupation further contributes to the low participation of women.

Of particular concern is the fluctuating and overall declining trend in the pass rates of Mine Manager certificates. This is especially worrying considering the persistent identification of this role as a hard-to-fill in recent years. The primary reason cited for this difficulty is the lack of experience, suggesting a reluctance among employers to sponsor individuals for this demanding certification. The gap between theoretical knowledge acquired through education and the practical know-how required for effective management in the MMS remains a significant challenge in filling this crucial role.

Collaboration between the MQA and the DMR remains crucial for the successful implementation of measures aimed at enhancing the uptake and pass rate of GCC candidates in the examination. In this planning cycle, this includes the intensification of internships, candidacy programmes and the support of women to mitigate the scourge of gender stereotyping in the uptake and pass rates of GCCs.

3.5.5 SETA Skills Supply in the MMS

The skills supply of the MQA can be categorised into three main components. Firstly, the MQA focuses on providing skills at the educational level, ensuring that individuals receive the necessary training and knowledge to enter the workforce. Secondly, the MQA offers skills support for novice employees, assisting them in their transition from education to employment and helping them develop the required competencies for their respective roles. Lastly, the MQA also emphasises ongoing skills support for existing employees, recognising the importance of continuous learning and professional development to enhance their performance and adapt to evolving industry demands. Chapter 5 details these interventions through a five-year trend analysis.

3.5.6 An Overview of Supply-Side Challenges

The future of the South African MMS hinges on its ability to develop and maintain a skilled workforce. However, a closer look at various data points reveals a complex landscape with significant challenges regarding skills supply. These challenges are related to skills mismatches due to automation and declining financial support, internal and external factors such as outsourcing and sustainability pressures, skills attrition and skills migration. These are elaborated below.

3.5.6.1 Skills Mismatches: Automation and Declining Financial Support

One major issue is a potential skills mismatch. While educational programmes provide a foundation in core areas such as Mining Engineering, the rise of automation necessitates graduates with expertise in data analysis and automation technologies.

Additionally, a potential shift in industry focus, reflected by declining bursary awards in qualifications such as Geology, could leave employers struggling to find qualified professionals.

3.5.6.2 Internal and External Factors: Outsourcing and the Environmental Question

Outsourcing of specialized roles, suggested by bursary trends and stagnant certifications in advanced specialties, might address immediate needs but weakens the domestic skills base in these crucial areas. This creates a long-term dependence on external providers.

Furthermore, the growing emphasis on environmental practices, evident in the surge for Intermediate Mine Environmental Control certifications, is not matched by a corresponding increase in graduates with these skills. This could leave employers struggling to comply with stricter environmental regulations.

3.5.6.3 Skills Attrition and Skills Migration

The sector also faces challenges due to an aging workforce. As experienced professionals retire, a knowledge gap may emerge if there are not enough skilled younger employees to replace them. Limited training opportunities for existing employees further exacerbates the issue. Without access to upskilling programmes in areas such as automation and environmental practices, employees struggle to adapt and contribute effectively to the changing landscape.

Finally, geographic imbalances in the availability of skilled labour could create challenges for employers in specific provinces to find the workforce they need.

These combined factors paint a complex picture of the supply-side challenges faced by employers in the MMS. Addressing this issue requires a collaborative effort from industry, educational institutions, and the MQA. Implementing focused training initiatives, enhancing the skills existing employees, and ensuring educational programmes are in line with the needs of the industry are essential measures to establish a resilient and competent workforce for South African MMS.

Skills implications of industry skills supply: Mitigating Measures

- The MMS requires a **two-pronged approach** to skills development: attracting new talent with relevant skillsets and upskilling the existing workforce.
- A **collaborative effort** between industry, educational institutions, and the MQA is crucial. Industry can provide insights into skill gaps, educational institutions can develop targeted programmes, and the MQA can ensure proper accreditation.
- The changing landscape necessitates a **data-driven and adaptable** approach to skills development. Regularly monitor trends in bursaries, certifications, university/TVET enrolments, and technological advancements to ensure programmes remain relevant to the sector's current and future needs.
- **Sustainability** is no longer an afterthought. It is a critical skillset that needs to be integrated into the mining workforce development strategy.

3.6 SPOI List

3.6.1 Methods Followed in Compiling the SPOI List

The Sectoral Priority Occupations and Interventions List (SPOI), previously known as the PIVOTAL list, serves as a critical tool for ensuring the MMS has a skilled and competent workforce. The comprehensive approach used to develop this list, incorporating insights from various stakeholders and methodologies, strengthens its credibility and effectiveness. Below is a breakdown of how the SPOI list was developed:

1. **Stakeholder Interviews: Provided Industry Expertise.** Direct engagement with industry stakeholders provided firsthand knowledge of the specific occupations in high demand and the evolving skillsets required for success of the sector. This ensures the SPOI reflects the practical needs of employers.
2. **MQA Project Leader Engagements:** Project leaders from various MQA Units brought a wealth of experience and knowledge from their specific areas of focus. This collaborative approach ensured the SPOI considers the

broader landscape of the MMS, encompassing not SOLELY core operational skills but also regulatory compliance, safety considerations, and environmental sustainability needs.

3. **MQA previous Research studies provided Data-Driven Insights:** MQA-led research projects offer a data-driven perspective on skills needs within the sector. By analysing trends in job postings, skills gaps identified through employer surveys, and potential future disruptions, the MQA was able to identify future skills requirements and ensure the SPOI remains relevant.
4. **Recruitment Agency Validation:** Recruiting agencies, such as PNet and LinkedIn were used to assess the validity of occupations that were reported as hard-to-fill, along with their training complement as reflected in the WSP-ATR data. Job advertisements were analysed to determine the duration of vacancies for specific roles and to ascertain whether employers actively seek external candidates to fill these positions. Positions advertised between 24 hours and two months were given greater weighting in the analysis. In some cases, the occupation was advertised as late as two months ago and yet with no applicants. If the position was not advertised at all it received a lesser weighting.
5. **Consideration of National Development Plans and National List of Occupations in High Demand enables the alignment with National Priorities:** Integrating skills needs related to national development plans and initiatives ensures the SPOI aligns with the broader economic and social development goals of the country. This strengthens the overall impact of the SPOI by fostering a skilled workforce that contributes not just to sectoral success but also to national progress.

By incorporating the above methodology, the SPOI development process benefits from:

- ✓ **Triangulation of Data:** Multiple data sources (interviews, research, industry analysis) provide a more comprehensive overview of skills needs, reducing the risk of bias or relying solely on anecdotal evidence.
- ✓ **Enhanced Credibility:** Stakeholder involvement fosters a sense of ownership and buy-in, making the SPOI more credible and reliable for both industry and educational institutions.
- ✓ **Proactive Skills Development:** The inclusion of national development priorities and consideration of future trends helps ensure the SPOI remains relevant and addresses the evolving skill needs of the mining and minerals sector.

3.6.2 Internal MQA Processes for the Approval of the SPOI List

In conjunction with the development of the SPOI list, an iterative process to get buy-in from the MQA’s internal structures on the SPOI list was followed. This approach ensured that organisational processes were adhered to and that the development of the list speaks to the strategic objectives of the organisation. The process is summarised in table 3.14. below.

Table 3.14: Internal Processes for the Approval of the SPOI List

Activities	Document Medium/Type (control mechanism)	Responsibility
Data verification (MMS employee profile) meeting with the DMR	Weighted WSP-ATR data and DMR Public labour statistics	MQA Skills Development and Research Unit (SDRU) and DMR
Presentation of Draft SSP to MQA Staff inclusive of Chapter 1: Labour Market profile and Chapter 3: Occupational shortages (Hard-to-fill vacancies and SPOI list)	Draft 1 SSP AND SPOI LIST	SDRU
Submission of Draft SSP to GSC	Draft 1 SSP AND SPOI LIST	SDRU

Activities	Document Medium/Type (control mechanism)	Responsibility
inclusive of Chapter 1: Labour Market profile and Chapter 3: Occupational shortages (Hard-to-fill vacancies and SPOI list) via round robin		
Feedback of Chapter 1: Labour Market profile and Chapter 3: Occupational shortages (Hard-to-fill vacancies and SPOI list) from the submission of the Draft SSP	Draft 1 SSP AND SPOI LIST	GSC
Present Draft 1 SSP including SPOI List to EXCO	Draft 1 SSP AND SPOI LIST	SDRU
Present Draft 1 SSP to MQA Board with emphasis on the SPOI list	Draft 1 SSP	SDRU
Incorporate final inputs from Board	Draft 1 SSP AND SPOI LIST	SDRU
Board signs-off Draft 1 SSP	Draft 1 SSP AND SPOI LIST	MQA Board
Submit draft 1 SSP and SPOI List with relevant signatures to the DHET	Draft 1 SSP AND SPOI LIST	SDRU
Data Collection, cleaning, analysis (31 May WSP-ATR submissions) and qualitative data (for final submission)	Finalise SSP AND SPOI LIST	SDRU
Write up of Final SSP and review of SPOI list with reference to complete WSP-ATR data sets	Finalise SSP AND SPOI LIST	SDRU
MMS Stakeholder SSP Validation Webinar, which served the role of: <ul style="list-style-type: none"> •Providing input: Sharing insights and experiences on matters related to skills needs and supply, with the relevance of the SPOI list in hindsight. •Validating data: Reviewing the SPOI for accuracy and relevance. •Identifying skills priorities: Determining focus areas for skills development and strategies with reference to the interventions that are tabled in the SPOI. •Building consensus: Collaborating to align efforts and address skills challenges. 	Finalise Final SSP AND SPOI LIST	SDRU
DHET Evaluates draft SSP and SPOI list and provides feedback to MQA.	Draft 1 SSP AND SPOI LIST	DHET
Review SSP and SPOI based on DHET feedback	Final SSP AND SPOI LIST	SDRU

Activities	Document Medium/Type (control mechanism)	Responsibility
Present Final SSP and SPOI to MQA Internal Staff	Final SSP AND SPOI LIST	SDRU
Present Final SSP and SPOI to GSC	Final SSP AND SPOI LIST	SDRU
Present Final SSP and SPOI to EXCO	Final SSP AND SPOI LIST	SDRU
Present Final SSP and SPOI to MQA Board for Approval	Final SSP AND SPOI LIST	SDRU
Submit Final SSP and Final SPOI list to DHET	Final SSP AND SPOI LIST	SDRU

The tables below present the top 10 SPOI list taking into account the above-mentioned methodology. The list is presented by order of Major OFO and not vacancies.

Table 3.15: MQA's OFO Code Based Sectoral Priority Occupations and Interventions List

Occupation name	OFO code	No. of HTFV
Engineering Manager	2021-132104	100
Mining Manager	2021-132201	224
Mining Engineer	2021-214601	89
Electrical Engineer (Mines)	2021-215101	226
Mining Production Supervisor	2021-312101	245
Diesel Mechanic	2021-653306	157
Millwright	2021-671202	61
Electrician	2021-671101	49
Auto Electrician	2021-671208	50
Drill Rig Operator	2021-711301	63

Source: Source: MQA WSP and ATR (May 2024), stakeholder interviews, FGDs, validation workshops and webinar (2024)

Below is a list of emerging occupations that will be supported by the MQA.

3.7 Emerging Occupations List

In addition to the SPOI list, the MQA recognises the existence of emerging occupations in the MMS that may require prioritisation. Building upon previous MQA research, stakeholder interviews, surveys, and the 2024 labour market intelligence project report on skills needs for the economy, particularly the critical report on the hydrogen economy, this list outlines the emerging occupations that the MQA will prioritise to further strengthen the future workforce of the MMS.

Table 3.16: List of Emerging Occupations in the MMS due to Technology and the Hydrogen Economy

Occupation name	OFO code
Application Development Manager	2021-133104
Cloud Computing Developer	–
Alternative Energy Specialist	–
Modelling Practitioner	–
Metallurgical Engineer	2021-214603
Laser Machine Technician	–
Hydrogen Cell Expert	–
Nanomaterial Specialist	–
Gas Engineer	–
Electrolysis Engineer	–
Electrochemical Engineer	–
Electrolyser Technician	–

* Note: As these are emerging occupations, OFO codes may not yet be available for all of them.

Source: MQA 4IR Impact on Skills Demand and Supply Research (2024), Interviews and Identification of the Skills Needed for the Hydrogen Economy, DHET (2024)

3.8 Conclusion

The analysis of the MQA’s WSP and ATR submissions over a five-year period (2020-2024) and discussions with stakeholders indicated that the perennially hard-to-fill occupations are as follows: Mine Manager, Mechanical Engineer, Mining Engineer, Engineering Manager, Diesel Mechanic. The reasons for these hard to fill vacancies varied across individual, organisational, and supply-side levels. At the individual level, factors included a lack of relevant qualifications and experience. Organisational reasons are linked to equity considerations and inadequate remuneration.

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

- **Basic education:** While performance in MMS gateway subjects has improved over the past four years, this does not seem to translate to more enrolments and graduations at tertiary levels.
- **Higher Education:** There is less uptake and throughput of MMS related qualifications across the past five-year horizon.
- **Industry:** The bursary programmes supported by the sector prioritise disciplines crucial to the MMS, with a consistent focus on Mining Engineering and Electrical Engineering. However, although this is the case, there is still a consistent reporting of Mining Engineering as hard-to-fill and an occupation experiencing skills gaps. This discrepancy suggests potential issues such as high graduate starting salaries leading to talent being poached by other industries, or a mismatch between the specific skillsets graduates possess and the actual needs of employers within the MMS.

The new planning cycle necessitates a paradigm shift in MQA’s approach to collaboration and intervention strategies. The SETA must move beyond a siloed model and embrace a more targeted and interlinked approach. By fostering deeper synergies between stakeholders across the skills development ecosystem, the MQA can develop and implement interventions that directly address the negative trends identified. Leveraging the positive achievements and lessons learned from the last cycle, a collaborative framework that fosters innovation and maximises the impact of interventions can be created. The next chapter will delve into these partnership efforts in greater detail, outlining specific strategies and partnerships designed to address the evolving skills needs of the sector.

Chapter 4 : MQA Partnerships

4.1 Introduction

The chapter provides an assessment of the effectiveness of the MQA's existing partnerships, their objectives, value-add, and successes. The proposed partnerships are also presented. The sources of information utilised were the Draft 2024 -2029 Medium-Term Development Plan, the MQA's APR, insights from the MQA Mining Skills Lekgotla and previous research studies conducted by the MQA. Additional insights were also drawn from MQA Project Leaders overseeing these partnerships.

4.2 MQA Partnerships: Alignment with the MTDP

This chapter outlines the Mining Qualifications Authority's (MQA) strategic partnerships and initiatives aligned with the MTDP's priorities of inclusive growth, job creation, poverty reduction, and improved governance. Through collaborations with universities, TVET colleges, CETs, and professional bodies, the MQA enhances educational quality, facilitates staff training, secures funding for bursaries and internships, and addresses sector-specific skills needs, such as those within the jewellery subsector. These efforts support job creation, skills development, and career pathways within the Mining and Minerals Sector (MMS). Partnerships with entities like the Mine Health and Safety Council, CSIR, and the Department of Basic Education promote technological innovation, safety, and early skills education, addressing evolving economic demands and reducing poverty in mining communities. Additionally, the MQA's planned collaborations with the Council for Geoscience and IDC aim to enhance geospatial intelligence and support small-scale mining, contributing to a capable, ethical, and developmental state while aligning with the MTDP's goals of improved governance and professional public service.

4.3 Analysis of MQA Partnerships

The MQA champions a collaborative approach to skills development within the MMS. Partnerships are intended to foster linkages between the labour market, employers, and sectors to ensure a better supply of the relevant skills (DHET, 2019). Partnerships refers to “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” (DHET, 2019). Recognising the importance of existing sectoral needs, the MQA has established strategic partnerships with educational institutions, professional bodies, and research institutions. Notably, collaborations with research institutions equip the SETA with up-to-date labour market insights regarding critical skills supply and demand issues in the sector. These partnerships are not merely strategic; but are essential to fulfilling the MQA's mandate of fostering skills development. This aligns with Outcome 2 of the National Skills Development Plan (NSDP) 2030, which emphasises bridging the gap between education and workplaces. The MQA's partnership model goes beyond replicating these efforts. By fostering collaboration and innovation, this framework ensures high performance and supports the development, research, and implementation of effective skills development initiatives for the MMS.

4.3.1 MQA's Approach to Partnerships

To achieve its skills development mandate, the MQA leverages a **partnership framework** approved by its Board. This framework aligns with government directives such as the Mining Charter, NDP, MTDP, and NSDP, ensuring all efforts contribute to national priorities. Additionally, the framework outlines key partnership areas, types of collaborations, and potential partners. The MQA's partnership framework prioritises collaboration for effective skills development within the MMS. This framework outlines four types of partnerships – resource sharing,

knowledge exchange, policy and governance collaboration, and joint advocacy. Partners encompass a wide range of stakeholders: educational institutions, government entities, industry employers, and civil society organisations. By fostering collaboration across these diverse groups, the MQA aims to achieve several key benefits. Partnerships expand the MQA's reach and expertise, equip the organisation with up-to-date labour market insights, and facilitate fulfilling its skills development mandate. In line with outcome 2 of the MTDP (Increased employment opportunities which includes strengthening the partnership with the private sector to unlock the deployment of artisans and TVET graduates through workplace-based placements and work integrated learning opportunities) these partnerships ultimately enable the MQA to work directly with industry beyond traditional boundaries. This fosters enhanced alignment between training programmes and industry needs, solidifying collaboration as a cornerstone of the MQA's skills development strategy. Figure 4.1 provides a breakdown of this framework.

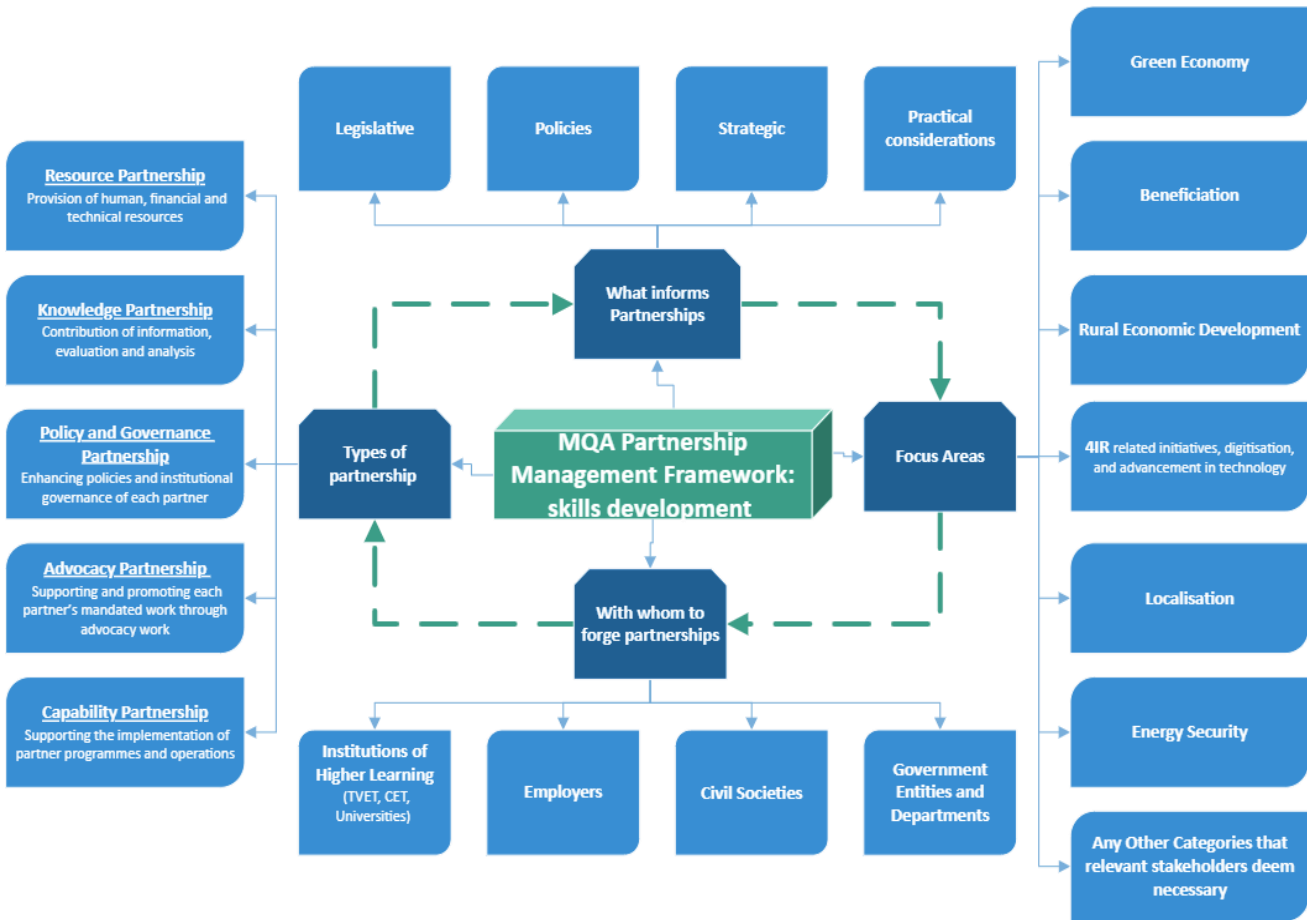


Figure 4.1: MQA Partnership Framework

4.4 Strategic and Special Projects Partnerships

Strategic and special projects are integral to addressing critical issues plaguing the MMS. These initiatives leverage collaborative efforts with a diverse range of stakeholders to develop effective solutions. While the MQA does not currently have any special project partnerships, a dedicated focus on identifying and prioritizing these critical areas remains paramount. The MQA is committed to ongoing exploration of impactful collaborations that will demonstrably improve the MMS. The existing strategic partnerships are listed in table 4.1 below.

Table 4.1: Strategic and Special Partnerships

Partner Organisation	Nature of Partnership (Start & End Dates)	Objective(s)	Value-add
Mpumalanga Department of Economic Development and Trade (DEDT)	Skills development (11th March 2023 - 24 January 2028)	Cooperate in the Implementation of skills development initiatives in the Mpumalanga Province	<ul style="list-style-type: none"> *Tailored skills development programmes to meet provincial needs. *Access to provincial resources and funding for initiatives. *Improved alignment between national and provincial skills development strategies.
Artisan Training Institute (ATI)	Learner support (11th March 2023 - 18th June 2025)	Cooperate in the Implementation of the Career Guidance programme	<ul style="list-style-type: none"> *Enhanced career guidance and mentorship for learners entering the MMS. *Access to ATI's expertise and resources in career development. *Improved learner retention and progression rates.
Mine and Health Safety Council (MHSC)	Capacity building (31 March 2030)	Collaborate in resources, knowledge on safety issues, policy, and governance	<ul style="list-style-type: none"> *Improved safety standards and practices within the MMS. *Joint development of safety training programmes and resources allocation. *Credibility and legitimacy for MQA's safety-related initiatives.
Centre for Scientific Industrial Research (CSIR)	Skills development (11th March 2023 - 31 March 2030)	To collaborate and support national strategies and national career development initiatives	<ul style="list-style-type: none"> *Access to CSIR's research expertise to inform skills development strategies. *Development of data-driven approaches to skills development planning. *Improved alignment between skills development initiatives and national needs.
Chemical Industries Education & Training Authority (CHIETA)	Research skills transfer (11th March 2023 - 31 March 2030)	To collaborate in interventions targeted at the hydrogen economy and in advancing the just transition into the green hydrogen economy	<ul style="list-style-type: none"> *Sharing of knowledge and expertise relevant to the hydrogen economy. *Joint development of training programmes for the green mining skills needs. *Fostering innovation and technological advancement in the sector.
National Youth Development Agency (NYDA)	Skills development (11th March 2023 - 31 March 2030)	To collaborate in activities and/or interventions supporting Small, Medium and Micro Enterprises (SMMEs), Placement, Coaching, Mentorship and Training in the mining and mineral sector	<ul style="list-style-type: none"> *Improved access to skills development and career opportunities for youth in the MMS. *Support for SMMEs in the MMS through skills development initiatives. *Enhanced youth entrepreneurship and participation in the mining economy.

Overall, the partnerships identified above position the MQA to address the evolving skills landscape of the MMS more effectively. They provide access to specialised expertise, regional knowledge and expertise, and research capabilities, enabling the MQA to create targeted programmes and interventions that equip future generations with the skills needed to thrive in a changing mining environment.

4.5 Education And Training Delivery Partnerships

The MQA prioritises collaboration with universities, TVETs, and CETs to address skill needs in the sector. These partnerships focus on multiple areas. This is in keeping with the MTDP’s outcome 3, Skills for the economy, which focuses on increasing access, improving the quality and efficiency of the PSET system. First, they aim to enhance the learning experience for students through dedicated learner support programmes and resources. Second, the MQA works with these institutions to improve the overall quality of teaching and learning within their programmes. Furthermore, the partnerships provide training opportunities for staff at CETs and TVETs, specifically focusing on areas such as corporate management, governance, assessment, and moderation skills. Finally, the MQA collaborates with these educational institutions to secure funding for various initiatives such as learnerships, work-based learning programmes, internships, and bursaries. By increasing the number of graduates equipped with relevant skills and encouraging them to pursue careers in the MMS, these partnerships ultimately aim to address skill gaps and imbalances within mining communities. Table 4.2 below presents the partnerships that the MQA has with PSET institutions.

Table 4.2: Partnerships with PSET Institutions

Institution / Partner Organization	Nature of Partnership (Start & End Dates)	Objectives	Value-add
8 Universities (UniVen, UL, UCT, UJ, UNISA, NWU, CPUT & UWC)	Funding, Lecturer support, Workplace placement & Capacity building (2023/12/08 - 2030/03/31)	Funding of Bursars, Graduate placement, WUSU student placement, Lecturer Support, Career Guidance, Learner support programmes, Adjunct Professor initiatives, Industry expert membership in academic boards	<ul style="list-style-type: none"> *Increased MQA footprint for wider skills development. *Funding for bursaries to support students pursuing mining qualifications. *Access to industry experts for improved curriculum and programme development. *Enhanced practical learning experiences for students through workplace placements. *Capacity building for universities through professorial initiatives.
30 TVETS (Ekurhuleni East, Southwest Gauteng, King Sabata Dalindyebo, King Hintsa, Lovedale, Vuselela, Orbit, North Link, West Coast, College of Cape Town, False Bay, Tshwane South TVET College, Ingwe, Maluti, Goldfields, Flavius, Mareka, Majuba, Coastal KZN, Umfolozi, Elangeni, Vhembe, Mopani, South East, Sekhukhune, Capricorn, Waterberg, Letaba, Northern Cape Urban, Northern Cape Rural, Nkangala, Gert Sibande)	Lecturer support, Learner bursary & Work-placement experiences (2023/03/21-2033/02/31)	Equip people with knowledge and skills for corporate governance & expose them to real-world work experiences. Capacitate lecturers to improve teaching and learning.	<ul style="list-style-type: none"> *Improved access to education and more support for integrated work-based learning for students. *Upskilling and capacity building for TVET lecturers. *Practical work experience opportunities for TVET students through workplace placements. *Scaling up skills development to meet the industry's growing demand. *Increased coverage across all 9 provinces, contributing to poverty reduction, unemployment, and inequality.

<p>9 CETs (Eastern Cape, Free State, Gauteng, KwaZulu-Natal, Limpopo, Mpumalanga, Northern Cape, North West, Western Cape)</p>	<p>Lecturer support (CET college teaching and learning) (2023/03/27-2024/03/27)</p>	<p>Capacitate lecturers to improve teaching and learning.</p>	<p>*Scaling up skills development to meet the sectoral skills demand. *Improved quality of teaching and learning within CET institutions.</p>
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In an MQA study entitled “the assessment of the effectiveness of partnerships between the MQA and CETs (2024), it was found that the MQA's partnership with CETs has demonstrably benefited individuals and communities within the MMS. Nearly 500 learners gained valuable General Education and Training Certificates, opening doors to employment, further education at TVET colleges, and even started their own businesses. The broader community also experienced a positive impact through a rise in overall education levels and the potential shared use of improved facilities used as Skill Learning Centres (SLCs).

However, the impact on skills development specific to the MMS appears limited. While the partnership funded assessor and moderator training for lecturers, and these programmes were well-received, there's a call for a broader approach. To ensure the MMS has a workforce equipped with the necessary skills, future partnerships should consider incorporating training programmes aligned with industry needs. This could encompass areas such as health and safety, fundamentals of mining, or even specialised programmes in mineral processing, basic jewellery design, or diamond identification. By expanding the scope of the partnership beyond lecturer training and into these targeted skills areas, the MQA and CETs can make a significant contribution to developing a more skilled MMS workforce.

4.6 Industry and Professional Bodies Partnerships

The MQA prioritises evidence-based decision-making for skills development in the MMS. The SETA achieves this through research partnerships. This collaboration allows the MQA to gain critical insights into labour market trends, specifically focusing on the supply and demand of skills within the MMS. This data is then used to inform and guide the MQA's skills planning and intervention strategies. Details regarding existing partnerships with industry and professional bodies are provided in the table 4.3 below.

Table 4.3: Industry and Professional Bodies Partnerships

Institution / Partner Organization	Nature of Partnership (Start & End Dates)	Objectives	Value-add
<p>Underhill Corporate Solutions</p>	<p>Knowledge Partnership (January 2023-September 2023)</p>	<p>Exploring the State And Future of the Adult Education And Training Programmes across the Mining and Mineral Sector Subsectors</p>	<p>*Provided insights into the effectiveness and future direction of AET programmes within the MMS.</p>
	<p>Knowledge Partnership (January 2023-September 2023)</p>	<p>Investigating the State of the MQA Funding Policy with Respect to Grants (Learnerships including RPL for Non-Artisans, Occupational Health and Safety (OHS), Candidacy Work Experience and Coach Programmes)</p>	<p>*Improved understanding of how the MQA's funding policies impact specific grant programmes (learnerships, RPL, OHS, etc.) within the MMS. *Informed adjustments to funding policies to optimise its effectiveness.</p>

Institution / Partner Organization	Nature of Partnership (Start & End Dates)	Objectives	Value-add
Topline	Knowledge Partnership (October 2023- April 2024)	Factors Impeding attainment of equity targets with respect to People with disabilities within the MMS	<p>*Provided data-driven insights into the barriers preventing the achievement of equity targets for people with disabilities in the MMS workforce.</p> <p>* Will contribute to the development of targeted strategies to promote greater inclusion of people with disabilities within the MMS.</p>
Redflank	Knowledge Partnership (January- March 2024)	Exploring Employers' Perceptions about the Technical Vocational and Training (TVET) System in South Africa: A case study of Northern Cape, Mpumalanga, Limpopo, and Gauteng provinces	<p>*Identified areas for improvement within the TVET system based on employer feedback from key MMS provinces.</p> <p>*Informed collaborative efforts between the MQA, TVET institutions, and the MMS industry to enhance the skills pipeline.</p>
Redflank	Knowledge Partnership (January 2023- February 2024)	Investigation of the nature of 4IR and related impact on occupational profiling in the subsectors within the MMS	<p>*Analysed how 4IR technologies are transforming job profiles across different subsectors within the MMS.</p> <p>*Informed the development of a framework to anticipate future skills needs arising from technological advancements.</p>
		Investigating the nature of demand and skills supply required with the changing technology within different subsectors in the MMS	<p>*Identified the specific skills gaps emerging due to technological changes within various MMS subsectors.</p> <p>*Informed the development of targeted skills development programmes to address these gaps and ensure a future-proof workforce.</p>
	Knowledge Partnership (January 2023- February 2024)	Developing a framework for future skills in the MMS (applicable across subsectors)	*Provided a comprehensive framework for anticipating and addressing future skills needs across all subsectors within the MMS.
Urban-Econ Nikela	Knowledge Partnership (January 2024- September 2024)	Assessment of the Effectiveness of the Partnership between the Community Education & Training Centres (CETs)	<p>*Evaluates the effectiveness of the MQA's partnership with CETs in terms of skills development within the MMS.</p> <p>*Provides a basis for strengthening or refining the partnership model for greater impact.</p>

4.7 Most successful SETA partnership

Figure 4.2 below demonstrates MQA’s successful partnerships for the financial year 2023/24.

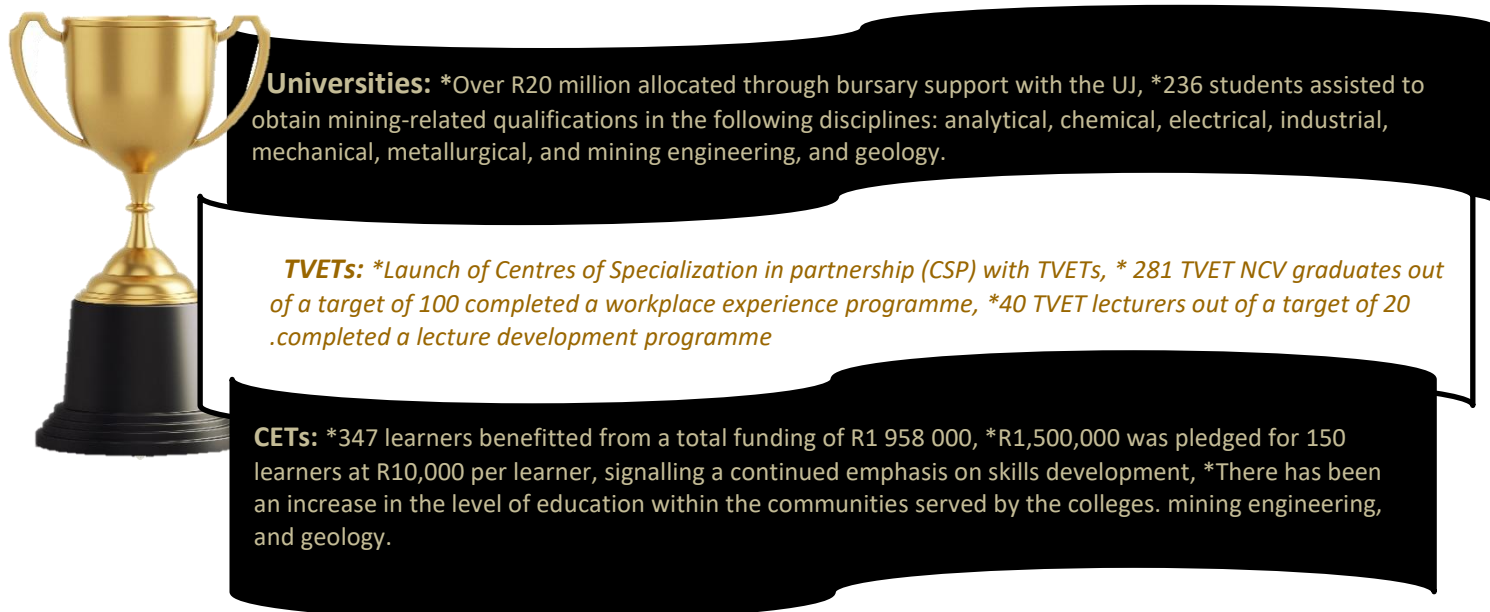


Figure 4.2: MQA's 2023/24 successful partnerships.

4.8 Challenges faced by the SETA partnerships

While the MQA's partnerships have achieved notable successes (as detailed above), challenges have also arisen. These challenges are further explored in Figure 4.3 below.

Table 4.3: MQA Partnership Challenges

Research	TVETs	CETs
*Difficulty in finding industry partners who are open to co-funding research and who share similar research goals. * Time-consuming process of soliciting research partners, traveling to meet with them, and engaging in discussions, which can lead to project delays. *Lack of or poor coordination in research projects. * Failure to meet expected timelines for deliverables on research projects. * Poor research outputs	* Difficulty adapting training programmes to keep pace with changing skills priorities for learners. * Ensuring training programmes remain relevant and meet the evolving expectations of industry for graduates.	* Weak governance and management structures for partnerships. * Ambiguous or poorly defined MOUs that don't adequately outline partnership expectations. * Insufficient communication of the specific needs of the MMS through the partnerships.

4.8.1 What should be done to address the experienced challenges to strengthen partnerships?

Below are some recommendations to address the challenges experienced in MQA's partnerships and foster stronger collaboration:

RESEARCH:

- ✓ **Improved Communication and Coordination:** Establish clear communication channels and project management protocols to ensure timely delivery of research projects.
- ✓ **Collaborative Planning:** Develop research proposals with clear timelines and milestones in collaboration with universities, ensuring all parties understand expectations.
- ✓ **Streamlined Engagement:** Explore streamlining the process of soliciting research partners, potentially through a targeted approach.

TVETs:

- ✓ **Skills Gap Analysis:** Conduct regular skills gap analyses to identify the evolving skill needs of the MMS and update training programmes accordingly.
- ✓ **Industry Engagement:** Increase collaboration with industry partners to ensure training programmes are aligned with current industry needs and expectations for graduates.

CETs:

- ✓ **Strengthen Governance:** Develop clear governance structures and partnership management processes for CET partnerships.
- ✓ **Refine MOUs:** Revise MOUs to clearly define roles, responsibilities, and expectations of each partner.
- ✓ **Needs Assessment:** Conduct needs assessments within the MMS to ensure partnerships effectively address the sector's skills development requirements.
- ✓ **Knowledge Sharing Platforms:** Establish knowledge-sharing platforms to facilitate exchange of best practices and resources among partners.

Performance Monitoring: Implement performance monitoring metrics to track progress towards partnership goals and identify areas for improvement. The MQA's existing M&E Unit is a valuable asset for implementing performance monitoring. As will be seen in Chapter 5, this unit has expertise in data collection, analysis, and reporting, which can be directly applied to monitor partnership performance. The MQA M&E Unit will be crucial to define PIs, collect data, and interpret findings to inform partnership adjustments

4.9 Proposed Partnerships

In light of the change drivers and policy frameworks influencing skills demand and supply discussed in Chapter 2, coupled with the supply and demand challenges detailed in Chapter 3, it is evident that the MQA requires the establishment of new partnerships. While the MQA boasts a robust network of partnerships, expanding collaborations presents a strategic opportunity. By incorporating new partners, the MQA can broaden the talent pool for the MMS and diversify the expertise contributing to skills development initiatives. These partnerships can unlock access to untapped talent pools, introduce fresh perspectives, strengthen industry engagement, and potentially secure additional funding and resources. Ultimately, a wider and more diverse network allows the MQA to significantly enhance its capacity to address the ever-evolving skills needs of the MMS and ensure a future workforce equipped for success. The table below provides for the proposed partnerships for the financial year 2024/25.

Table 4.4: Proposed Partnerships

Institution	Strategic Focus	Rationale
Stats SA	Labour market intelligence sharing	Gain accurate statistical reports (economic performance, labour profiles, retrenchments) for more targeted skills development programmes and research.
Department of Land Reform and Rural Development (DLRRD)	Support for rural mining communities	Collaborate to develop skills programmes for rural community development and small-scale mining and fostering sustainable development.
Department of Science, Technology, and Innovation (DSTI)	Participation in the JET Skills Desk	Receive guidance from the JET Skills Desk to gain relevant information on JET initiatives across the country to identify potential partnerships for JET skills, to avoid the duplication of efforts in the JET and to ensure a skills pipeline appropriate to the MMS in line with outcome 1 (A Just Energy Transition) of the MTDP.
Human Resource Development Council (HRDC)	Guidance from the JET Advisory Forum	The JET advisory forum, which is to be formed through the HRDC will assist the MQA to build partnerships across stakeholders for the implementation of the JET Skills Plan in line with outcome 1 (A Just Energy Transition) of the MTDP.
Department of Labour (DoL)	Employment figures, funding of skills programmes	Access real-time employment data (unemployment, retrenchments) to identify vulnerable groups (NEETs, ex-mineworkers) and leverage DoL's UIF funding for targeted skills development interventions.
Department of Environmental Affairs (DEA)	Support for skills related to EIA, environment management, green skills	Identify and integrate "green skills" into training programmes, ensuring a future workforce equipped for environmentally conscious practices aligned with industry trends.
Industrial Development Corporation (IDC)	Development funding	Identify skills gaps related to IDC's funding requirements and leverage their business development support for small-scale mining enterprises.
Council for Geoscience	Geospatial intelligence	Access information on mining-related activities and skills necessary for exploration, informing curriculum development.
AMMSA	Expert advice, access to active mines	Gain insights on mining activities and related skills needs, ensuring training programmes remain relevant.
Southern African-German Chamber of Commerce and Industry	Mining skills exchange programmes	Access technical expertise on the international front for benchmarking skills development globally.
Minerals Council SA	Trends and developments in the MMS	Collaborate on research, WSP-ATR submissions, and leverage their expertise on MMS-related matters.
Mineworkers Development Agency	Alternative socio-economic livelihoods for ex-mineworkers	Partner to implement skills development interventions that equip ex-mineworkers with new skills for re-entry into the workforce.
Engineering Council of South Africa (ECSA)	Accreditation of engineering programmes	Collaborate to develop and implement effective skills development programmes for engineers within the MMS.
Women in Mining South Africa (WimSA)	Support for women's participation in the MMS	Partner on strategic and skills development programmes to achieve gender equity in the MMS workforce.
South Africa Diamond and Precious Metals Regulator	Mineral policy and regulation	Access information on regulatory guidelines to ensure compliance when developing skills development programmes.
Jewellery Council of South Africa	Skills development and capacity building	Collaborate to identify specific skills needs within the jewellery sector of the MMS.
Department of Basic Education (DBE)	Basic education	Share information on promoting and teaching skills development from an early age, potentially influencing career paths towards the MMS. Collaborate in conducting career awareness drives.

4.10 Planned Partnerships to address SETA Integrated High Impact Programmes (SIHIPs)

In the recent SETA Skills Summit, it was resolved that the effective implementation of SIHIPs would entail fostering impactful partnerships with PSET institutions, promoting interdepartmental and intergovernmental collaboration to equip youth with globally competitive skills through meaningful SETA partnerships, ensuring the SIHIPs are reflected in SETA's strategic plans and annual performance plans. It was also resolved that these imperatives could be resolved by implementing the six SIHIP programmes, namely:

1. Infrastructure Development and Public Sector Institutional Delivery Capacitation
2. Significant reduction in unemployment, including graduates.
3. Sustainable entrepreneurial, SMME, and cooperatives development
4. Comprehensive digitisation and technological infrastructure advancement, research, and development
5. Effective shared ICT services for SETA-wide Learner Information Management System
6. Rural development for community impact

In line with programme four and six, the MQA is consolidating a partnership with the CHIETA, TETA and the CSIR with the purpose of building a centre of specialisation focusing on the green hydrogen economy. Following a recent workshop involving the four organisations, the following decisions were made as part of the next steps in this partnership:

- ✓ Each SETA must identify and develop skill programs and qualifications needed immediately, tailored to their sectors' needs. For the MMS, this includes training trades people to repair and maintain green hydrogen-powered trucks, with MQA's support.
- ✓ Finalize the main skills sets needed in green hydrogen by identifying areas where most jobs can be created.
- ✓ Source additional funding from various sources.
- ✓ The three SETAs will equally contribute to establishing the Centre.
- ✓ Recruit and retain top talent for the Centre of Specialisation.
- ✓ Establish partnerships with industry and academia for the Centre.
- ✓ CSIR to develop a proposal/business plan for initial or seed funding for the Centre, which each SETA will present to their Boards.
- ✓ Finalize a tripartite MoU between MQA, CHIETA, and TETA.

It is envisaged that this partnership will not only meet the imperatives of the SIHIPs, but will also mitigate the challenges identified in Chapter 3, along with meeting the skills needs necessitated by change drivers such the use of alternative energy sources in light of the dwindling energy supply.

4.11 Conclusion

To navigate the complexities of the contemporary skills landscape, a skilled and adaptable workforce is paramount for the MMS. The MQA, utilises partnerships to identify and address evolving skill needs, composing a future-proof MMS workforce. The analysis of the MQA's partnership landscape reveals a multi-layered approach to skills development. Existing collaborations with educational institutions ensure a strong foundation in core technical skills across various mining disciplines. These foundational skills are then enriched through partnerships with research bodies, fostering expertise such as emerging technological advancements and AI for improved efficiency and data-driven decision-making.

Furthermore, successful partnerships with education institutions ensure that training programmes remain aligned with the ever-changing needs of the MMS. This collaborative effort ensures graduates possess practical skills relevant to specific job roles, keeping pace with the latest technologies and best practices within the industry.

However, the MQA's focus extends beyond simply filling existing vacancies. Partnerships with the DoL and proposed collaborations with institutions such as the Mineworkers Development Agency highlight a commitment to addressing existing skill gaps within the workforce. Upskilling and reskilling initiatives can empower NEETs and ex-mineworkers with the necessary skillsets to re-enter the MMS or transition towards "green jobs". The proposed partnerships further illustrate the MQA's commitment to a holistic and dynamic skills development strategy. Collaborations with the Council for Geoscience and IDC suggest a focus on unlocking expertise in geospatial intelligence and business development support for small-scale mining (SSM) operations, fostering entrepreneurship within the MMS. Additionally, international partnerships can provide valuable insights into global best practices and potentially introduce new skill areas relevant to the future of the MMS. This best practise can be realised for instance in the co-constructing centres of specialisation to prepare youth and the skills base at large for alternative energy economies such as green hydrogen to ensure that transitions are just and sustainable. This imperative is expressed in the proposed partnership between the MQA, CHIETA, TETA and the CSIR.

In conclusion, the MQA's strategic use of partnerships serves as a powerful tool for understanding and addressing the evolving skill needs of the MMS. By fostering a collaborative ecosystem that unites educational institutions, research bodies, industry leaders, and international partners, the MQA not only addresses skill gaps but also equips the future workforce with the necessary tools to thrive. This collaborative approach ensures the continued competitiveness and sustainability of the South African mining and minerals sector, solidifying its position as a global leader in a resource-driven world. The next chapter discusses the MQA's skills planning reflections.

Chapter 5 Monitoring and Evaluation

5.1 Introduction

The chapter focuses on Monitoring and Evaluation (M&E) in the MQA. **It focuses** on MQA's M&E approach and how it informs skills planning and reporting. The sources of information are from the 2023/24 APP, APR, SP and findings from tracer studies. Additional insight information was obtained from internal personnel within the MQA M&E Unit. This first section of this chapter reflects on sector skills planning reflections.

5.2 SETA Skills Planning Reflections

The MQA is dedicated to continuous improvement in skills development within the sector. This sector skills planning reflection serves as a crucial self-assessment tool. It will delve into the SETA's approach to M&E, examining how the MQA uses information from previous year's Annual Report and Reports from Tracer Studies to inform research and planning. Importantly, the reflection will evaluate progress made in implementing interventions and measures that support national strategies such as the ERRP, NSDP, and relevant master plans. Finally, the reflection will examine the current status of implementation for strategic skills priorities identified in the previous SSP. By addressing these questions, the MQA aims to identify areas of strength, acknowledge challenges, and ultimately chart a more informed and impactful course for future skills development initiatives within the MMS.

5.2.1 M&E: Five-Year Reflections and Projections

Improvements in M&E over the past five years include the fortification of the Risk sub-unit, the conscientisation of MQA staff as practitioners of M&E and the adoption of virtual learner verification methods.

- *Over the past five years, key positions in the Risk Unit have been filled which has vastly accelerated the effect of this function in the monitoring and evaluation of the organisation's programmes, plans and interventions.*
- *Previously, M&E was siloed within the dedicated M&E Unit, limiting its overall reach within the organisation. By empowering staff through capacity building workshops, The MQA has cultivated a broader M&E culture, where all Units, including Research, now actively participate in this critical function.*
- *The shift to virtual learner verification has streamlined the process, especially for learners in remote provinces. Although resource constraints persist, the efficiency gains from virtual platforms have helped alleviate the burden on our verification team.*

Despite notable progress over the past five years, the MQA anticipated the new planning cycle to address key challenges, including the development of a robust M&E management information system, capacity building, increasing the number of tracer studies conducted, and enhanced collaboration with subject-matter experts to support service providers in delivering MQA-funded programs. To build on the successes of the past five years and address challenges, the MQA will prioritise several strategic initiatives in the upcoming planning cycle including:

- *An M&E management information system (MIS) will be developed to streamline learner allocation and prevent fraudulent double-dipping of MQA funds.*
- *The capacity of the M&E Unit will also take priority, to avoid burnout as a result of an under-resourced Team.*
- *To inform evidence-based decision-making, tracer and impact studies will be expanded to evaluate both learner outcomes and program effectiveness. This includes tracking learner placement rates and analysing program performance to identify successful models for future investment.*
- *Benchmarking with other SETAs and aligning with the Department of Planning Monitoring and Evaluation (DPME) will inform best practices for M&E within the MQA. A benchmarking exercise with the Services SETA*

has already been completed.

- *Involving subject matter experts in assisting service providers who are implementing MQA funded programmes to ensure that training programmes can promote cross-organisational mobility of learners since an internship in one mining company will be the same in another mining company and learners can be eligible for absorption in both.*

5.2.2 MQA's Approach to Monitoring and Evaluation

The MQA employs a rigorous project monitoring system to assess the impact of its programmes in the MMS. This is administered through the organisation's Risk, Monitoring, Evaluation and Quality Assurance Unit that serves three primary functions. Firstly, M&E data informs the MQA's decision-making processes during the planning stages of projects. Through the analysis of M&E data, the MQA can make strategic decisions regarding resource allocation and project selection, ensuring its investments are targeted towards initiatives with the greatest potential for positive impact within the sector. Secondly, M&E plays a crucial role in optimising project management practices. M&E data is utilised throughout the entire project lifecycle, from the initial selection and commencement stages to the allocation of resources and oversight of implementation. This continuous monitoring allows the MQA to ensure projects remain on track and effectively deliver the intended outcomes for the MMS workforce. Thirdly, to further gauge the effectiveness of training initiatives, the Unit conducts impact and tracer studies. These studies delve into the impact of MQA's programmes on the beneficiaries, providing a more comprehensive understanding of the programme's success.

The MQA gathers data for its M&E processes through a variety of methods. These methods can include on-site visits to employers or training providers directly involved in the project. Alternatively, the MQA conducts desktop verifications, meticulously analysing project documentation and relevant data to assess projects.

5.3 Utilisation of APR and Tracer Studies to inform Research and Planning?

As previously mentioned, the MQA's M&E Unit plays a critical role in assessing the effectiveness of its interventions through tracer and impact studies. These studies leverage valuable data sources, including information from the prior year's APR. By analysing these reports, the MQA can gauge progress, efficiency, sustainability, and ultimately, the overall impact of its initiatives.

Tracer studies hold particular significance. They extend beyond simply evaluating interventions; they track past learners to gather post-intervention data. This comprehensive approach allows the MQA to assess the long-term impact of its programmes on beneficiary skills and career trajectories. In essence, M&E and tracer studies, as INTRAC (2017) highlights, are primarily concerned with evaluation and impact assessment. They are designed to answer crucial questions about "what changed, when, and why," ensuring the MQA's interventions deliver lasting and measurable results.

Three tracer studies were conducted in 2023/24, namely:

1. Non-Artisan Core Learnership Tracer Study: The primary focus of the study was to understand the impact of non-artisan core learnerships.
2. Tracking and Tracer Research Study Focusing on the Impact Analysis and Assessment of the Effective and Relevance of Jewellery And Diamond Processing For The Past Five Years (2018/19-2022/23): The primary focus of this study was to understand the impact of jewellery and diamond processing programme on beneficiaries.

3. MQA Tracking And Tracer Research Study Focusing on Artisan Development: The study aims to assess the relevance, effectiveness, efficiency, and impact of the following artisan development programmes: Plater Boilermakers, Welder, Fitter and Turner, Fitter including Machining, Rigger, etc

Furthermore, the MQA APR is one of the valuable tools used for skills planning and informing research within the organisation. By analysing trends in employment, qualifications offered, and industry needs, the report help identify areas where there are skills gaps or surpluses. This information is then be used to develop targeted skills development programmes and inform research initiatives that address the specific needs of the sector. For instance, if the report reveals a decline in the number of professionals entering the mining industry, research could be conducted to understand the reasons behind this trend and develop strategies to attract more graduates to these fields.

5.4 Strategic Priorities captured in the 2023/2024 SP & APP

The following reflects on the MQA’s strategic priorities that were captured in its APR and Strategic Plan.

Table 5.1: Strategic priorities in the previous SSP captured in the MQA’s Strategic Plan and APP

Strategic priorities	2020-2025 Strategic Plan	2023-2024 Annual Performance Plan	Impact
Facilitate transformation and SMME development of the sector through skills development	Programme 3: Learning Programmes	Programme 3: Learning Programmes. Promote work-based skills development to support transformation in the mining and mineral sector. Support training initiatives in mine communities	<p>Artisan programme, artisan recognition of prior learning, artisan aides programme and small business scale mining training, are programmes that have been instituted that see to the objective of transformation and SMME development.</p> <p>*Between 2018/19 FY and 2022/23 FY, 4,996 learners registered for the artisan development programme, and 4,110 completed it, reflecting an 82.3% completion rate.</p> <p>*Workplace-based learning of non-artisan core learnerships funded by the MQA between 2018 and 2023 shows that a total of 1,943 learners completed the learnerships.</p> <p>*Despite some fluctuations, the Artisan Aides Programme and ARPL have shown overall positive trends. Employers have expressed highly positive sentiments about the artisan programs, stating that the quality of training is producing skilled artisans who enhance business productivity and reduce costs by performing tasks adequately the first time. This proves the effectiveness of the training programmes issued by the MQA.</p>
Continue to support	Programme 3: Learning Programmes	Programme 3: Learning Programmes. Promote work-based skills development to support transformation in the mining and mineral sector. Support training	* There has been a significant rise in Occupational Health and Safety representative development programmes for periods 2018-2023. From 25

Strategic priorities	2020-2025 Strategic Plan	2023-2024 Annual Performance Plan	Impact
<p>interventions to improve mine health and safety through skills development</p>	<p>AND Programme 4: Quality Assurance, Monitoring and Evaluation</p>	<p>initiatives in mine communities AND Programme 4: Quality Assurance, Monitoring and Evaluation. Ensure the delivery of quality and impactful learning programmes in the MMS</p>	<p>representatives in 2019/2020 to 3972 representatives in 2023/2024 who are registered for training. *Despite the initial sharp increase and subsequent fluctuations, the average increase percentage remains positive and substantial, reflecting strong overall growth in the programme over the five years. *According to tracer studies conducted by the MQA on Small Scale Mining, most participants believe the skills programme significantly enhances career prospects and, despite some challenges, such as limited career discussions and competition for promotions, the training is seen as valuable and impactful, particularly for female participants who feel more assured and are motivated to pursue further studies and higher positions.</p>
<p>Continue to monitor and provide support to interventions responding to technological changes through skills development</p>	<p>Programme 3: Learning Programmes AND Programme 4: Quality Assurance, Monitoring and Evaluation.</p>	<p>Programme 3: Learning Programmes. Promote work-based skills development to support transformation in the mining and mineral sector. Support training initiatives in mine communities AND Programme 4: Quality Assurance, Monitoring and Evaluation. Ensure the delivery of quality and impactful learning programmes in the MMS.</p>	<p>*The MQA entered into MoUs with research partners to conduct several research studies and made recommendations from those studies in relation to the impact of technological changes on occupations and skills in the MMS. *In the 2022/2023 financial year, three studies were conducted with relation to expectation of the impact of 4IR, effects of changing technologies of the skills demand and supply, and a framework for predicting future skills. *The success in implementing 4IR technologies in the MMS hinges on efforts of skilling, reskilling and upskilling the current workforce, building foundational competencies in adaptability to change, and fostering competent leadership/management. This approach aims to balance the pressures of technological advancement with the need for a supportive and proficient work environment and workforce. *These studies provide the MQA with a clear understanding of the technological changes in the MMS, enabling the SETA to respond to the technological needs of the sector.</p>

Strategic priorities	2020-2025 Strategic Plan	2023-2024 Annual Performance Plan	Impact
<p>Monitor and support interventions aimed at developing skills required for Minerals beneficiation</p>	<p>Programme 2: Research AND Programme 3: Learning Programmes</p>	<p>Programme 2: Research. Improve skills development planning and decision-making through research. Support industry collaboration with public college system. AND Programme 3: Learning Programmes. Promote work-based skills development to support transformation in the mining and mineral sector</p>	<p>*The MQA has commissioned research studies, with focus being on mineral beneficiation in South Africa, in support of efforts to monitor and support interventions aimed at mineral beneficiation.</p> <p>*There has also been an increase in the number of programmes that support small scale mining, growing from 60 in 2018/2019 to 237 in 2022/2023, which represents a 295% increase. With small-scale mining playing a role in the value chain of mineral beneficiation, this growth indicates an increase in efforts to support mineral beneficiation.</p> <p>*The overarching opinion from learners in the tracer studies report on small-scale mining training programmes is that these initiatives will not only formalize and enhance the efficacy of the small-scale MMS, but also significantly contribute to rural development. By supporting small-scale mining, the MQA is viewed as playing a vital role in reducing unemployment and poverty in rural areas and addressing historical inequalities, thereby uplifting the living standards of marginalised communities.</p>
<p>Focus on increasing support for core mining-related skills and hard-to-fill occupations in terms of skills development in the MMS</p>	<p>Programme 3: Learning Programmes AND Programme 4: Quality Assurance, Monitoring and Evaluation.</p>	<p>Programme 3: Learning Programmes. Promote work-based skills development to support transformation in the mining and mineral sector. Support training initiatives in mine communities AND Programme 4: Quality Assurance, Monitoring and Evaluation. Ensure the delivery of quality and impactful learning programmes in the MMS</p>	<p>*The Management Development Programme, bursaries, learnerships, and artisan development programmes aim to address hard-to-fill occupations, skills gaps, and occupational shortages in the sector. These programmes have shown a steady increase over the past five years, with some fluctuations.</p> <p>*Collectively, over the five-years, the MQA ran a total of 4,543 programmes for Management Development and Artisan Development combined and 2,370 bursaries were awarded.</p> <p>*According to employers/stakeholders in the study issued by the MQA on the extent of 4IR innovation and the related impact on occupational profiling, it was stated that to address hard-to-fill vacancies, MQA will have to implement comprehensive training programs that integrate both basic skills and advanced technological competencies. Additionally, by promoting internal skilling,</p>

Strategic priorities	2020-2025 Strategic Plan	2023-2024 Annual Performance Plan	Impact
			reskilling and upskilling initiatives, the MQA can help organizations retain employees and ensure a redress of occupational shortage issues. These strategies collectively aim to mitigate skill and occupational shortages.
Develop skills for environmental sustainability	Programme 3: Learning Programmes	Programme 3: Learning Programmes. Promote work-based skills development to support transformation in the mining and mineral sector. Support training initiatives in mine communities	<p>*Mine communities training development programme hosted a total of 8425 over a period of five years.</p> <p>*Artisan development programmes, small-scale mining training programmes, bursaries, learnerships, and career guidance some of the other programmes that are also instituted.</p> <p>*The overall count of programmes in Artisan Development Programs, Small-Scale Mining Training Programs, Bursaries, Learnerships, and Career Guidance over the five-year period is 14,367.</p> <p>*These programmes are the initiatives that the MQA has propagated in efforts to support environmental sustainability. The impact of the programmes, however, has not been limited to environmental sustainability.</p> <p>*The MQA artisan development programme, for example, has significantly impacted learners, showcasing its effectiveness and relevance. With an 82.3% completion rate and 80% of learners passing the trade test, around 3,992 new skilled artisans have been created. Learners expressed positive sentiments, noting increased knowledge, confidence, and competence in their work.</p>

5.5 Status on the Implementation of Interventions and measures in support of National Strategies and Plans

The MQA's diverse range of programmes aligns with multiple national strategies, including the NDP, NSDP, and ERRP. These programmes address critical areas such as artisan skills development, workplace safety, youth employment, community development, and small business growth within the mining and minerals sector. By aligning with these national priorities, the MQA ensures its skills development efforts contribute to broader socio-economic goals in South Africa. A five-year trends analysis (2018/19-2022/23) is presented in table 5.2 below, indicating the MQA's support for national strategies and plans. This analysis is crucial for informing future skills development and programme prioritisation in the sector. By understanding the past trends (2018/19-

2022/23) and aligning them with the new planning cycle (2025-2030), the MQA can anticipate future workforce needs and ensure that the programmes offered are relevant to the industry's requirements.

Table 5.2: Measures to Support National Strategies and Plans (2018-2023)

Programmes supporting national strategies & plans	National Strategy/ Plan	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24
Artisan programme	NDP 2030, NSDP, ERRP	1306	950	652	526	670	1101
Artisan recognition of prior learning (ARPL)	NDP 2030, NSDP & ERRP	-	-	32	127	63	109
Artisan aides programme	NDP 2030, NSDP, & ERRP	-	143	171	327	446	332
Learnerships Employed	NDP 2030, NSDP, ERRP, & HRDSA	783	340	350	351	246	478
Learnerships Unemployed	NDP 2030, NSDP, ERRP, & HRDSA	1152	450	516	903	1620	1406
Employees completing RPL for learnership	NDP 2030, NSDP, ERRP, & HRDSA	25	26	24	33	51	43
OHS Representative Development and Other MQA approved Skills Programmes	NDP 2030, NSDP, & OHSA	25	3334	2877	4318	3972	4267
Completed AET and NATED courses	NDP 2030, & ERRP, SDA	831	1240	1250	1499	1661	1455
FLC	NDP 2030, NSDP, ERRP, SDA	-	-	116	218	289	241
Internship	NDP 2030, NSDP, ERRP, & HRDSA	-	-	103	-	-	588
Work-place experience Undergraduates	NDP 2030, NSDP, ERRP, & HRDSA	139	416	411	471	562	618
Work-place experience TVET NCV	NDP 2030, NSDP, ERRP, & HRDSA	126	192	73	216	281	334
Management development	NDP 2030, NSDP, HRDSA	76	19	77	130	137	197
Lecture development (University lecturers)	NDP 2030, NSDP, HRDSA	-	-	-	20	41	6

Programmes supporting national strategies & plans	National Strategy/ Plan	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24
Lecture development (TVET lecturers)	NDP 2030, NSDP, & HRDSA	–	52	–	–	40	52
Candidacy for HDSAs	NDP 2030, NSDP, ERRP, & HRDSA, Mining Charter 2018	15	–	–	26	52	96
Work-place coaching	NDP 2030, NSDP, ERRP, & HRDSA	–	–	–	100	118	144
Bursaries Unemployed	NDP 2030, NSDP, ERRP, & HRDSA	788	519	242	362	407	601
Bursaries Employed	NDP 2030, NSDP, ERRP, & HRDSA	–	52	38	55	61	111
Mine community training development	NDP 2030, NSDP, HRDSA, & Mining Charter 2018	–	916	1 030	3515	2964	4692
Unemployed youth Development	NDP 2030, NSDP, & ERRP	–	27	1 182	3505	1755	2144
Small business scale mining training	NDP 2030, NSDP, ERRP, & ASM Policy	60	150	100	283	237	223
Career guidance	NDP 2030, NSDP, &ERRP,	–	–	105	128	119	168
Capacity building workshops on career development	NDP, NSDP, & HRDSA	–	–	–	–	–	5
Entrepreneurial skills training	NDP, NSDP, HRDSA, & NGP	–	–	–	–	–	50
Cooperatives funded for skills that enhance enterprise growth and development p	NDP, NSDP, HRDSA, & NGP	–	–	–	–	5	5
Small businesses funded for skills that enhance growth and development	NDP, NSDP,	–	–	–	–	7	7

Programmes supporting national strategies & plans	National Strategy/ Plan	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24
	HRDSA, & NGP						
CBOs/NGOs/ NPOs funded for skills that enhance the development and sustainability of their organization activities	NDP, NSDP, & HRDSA	–	–	–	–	5	5
Federations /Trade Unions supported through the relevant skills training interventions	NDP, NSDP, & HRDSA	–	–	–	–	–	5
Annual International Literacy Day hosted	NDP, NSDP, & HRDSA	1	1	1	1	1	1
Training providers quality assured	NDP 2030, NSDP, & ERRP	229	259	124	212	180	159
Number of reviewed or developed learning programmes / assessment toolkits / learning materials (packs or modules) for the MMS	NDP 2030, NSDP, & ERRP	53	231	79	138	152	171
Number of HDSA supported on primary accreditation as training providers for entry into the MMS	NDP 2030, NSDP, ERRP, HRDSA, & Mining Charter 2018	6	–	8	5	4	5
Total Learners		5614	9316	9560	17468	16146	19819
Year-on-year difference (%)		n/a	40%	3%	45%	-8%	19%

Despite the decrease in 2022/23, overall, the total number of learners participating in MQA programmes has increased significantly, with a peak in 2021/22 (17,468) representing a near threefold increase since 2018/19 (5,614). Programmes such as Learnerships (employed and unemployed), Workplace Experience (undergraduates and TVET NCV), and Mine Community Training have shown consistent growth, indicating a focus on practical skills development and community upliftment. Programmes like FLC, Internship, and Candidacy for HDSAs saw minimal participation, possibly indicating a need for strengthened support for these programmes.

5.6 Plan of Action

Strategy for Strengthening M&E	Strategy for Improving SETA Plan Implementation
<p>Standardize Data Collection Methods Implement consistent data collection methods (e.g., online surveys, standardized interview protocols) across all projects and years. This ensures data comparability for better trend analysis and programme evaluation.</p>	<p>Formalize Research-Planning Integration Establish a formal process where research findings directly inform planning efforts. This could involve including researchers in planning meetings and requiring research summaries to be attached to relevant programme proposals.</p>
<p>Expand Tracer Studies Conduct tracer studies for a wider range of programmes to assess long-term impact on beneficiary skills and career trajectories. This provides a more comprehensive picture of programme effectiveness.</p>	<p>Set Clear & Measurable Targets Define clear and measurable targets within the SSP and APP. These targets should be aligned with strategic objectives and allow for progress tracking and resource allocation based on performance.</p>
<p>Develop Performance Indicators Create a set of clear performance indicators directly tied to the MQA's strategic objectives. These indicators should be used to measure programme success and guide decision-making.</p>	<p>Strengthen Communication & Collaboration Foster stronger communication and collaboration between different MQA units (research, planning, implementation). This ensures a unified approach towards achieving strategic goals.</p>
<p>Improve Data Analysis & Reporting Enhance data analysis capabilities to identify trends, patterns, and areas for improvement within MQA programmes. Invest in data visualization tools for clearer reporting of M&E findings.</p>	<p>Develop Risk Management Plan Proactively identify and mitigate potential challenges that could hinder implementation of the SSP and APP. This plan should outline contingencies for addressing resource limitations, stakeholder resistance, or unexpected market shifts.</p>
<p>Increase Transparency & Communication Share M&E findings broadly within the MQA and with external stakeholders. This transparency fosters accountability and allows stakeholders to understand the impact of MQA programmes. Dissemination methods could include reports, workshops, and presentations.</p>	<p>Align SSP & APP Targets with Strategic Objectives Ensure that targets set within the SSP and APP directly contribute to achieving the MQA's broader strategic objectives. This alignment avoids duplication of efforts and ensures efficient resource allocation.</p>

5.7 Measures to Improve Skills Planning

This final section delves into the measures that should be initiated by the MQA in order to improve skills planning in the new 5-year planning cycle. These measures are distilled from key findings articulated in chapters 1-5 of this SSP and are unpacked further in Chapter 6, through the strategic skills priorities. The measures include:

- ✓ Attracting younger talent and promoting diversity by implementing targeted outreach, mentorship, and bursary programmes to address transformational issues in the sector. This also includes the prioritization of skilling and upskilling programs for HDSAs to ensure equitable workforce participation.
- ✓ Promoting digital literacy across all occupational levels. By focusing on data analysis skills for better decision-making in the digitalised MMS.
- ✓ Develop expertise in renewable energy technologies to support the JETF and Green Hydrogen Commercialisation Strategy.
- ✓ Continue focusing on core mining operational skills such as mine management, mining engineering, and mechanical engineering.
- ✓ Support for automation-related skills such as electromechanical engineering and data analysis.
- ✓ Monitor trends suggesting decreased demand for specialized roles like geology and chemistry and adapt accreditation pathways to keep specialized programs relevant.

5.8 Conclusion

The Chapter revealed that the MQA's current M&E system utilises various methods for programme evaluation and verification. The analysis showed that standardisation of data collection and expanding the use of tracer studies would strengthen the comprehensiveness and long-term impact assessment of MQA programmes. Developing clear performance indicators and improving data analysis capabilities would allow for more focused evaluation and data-driven decision making.

Furthermore, ensuring a stronger link between research and planning efforts could lead to the development of programmes that more effectively address identified skill gaps within the MMS. Setting clear and measurable targets within the SETA planning documents, along with a risk management plan, would allow for better progress tracking and proactive mitigation of potential challenges. In addition, fostering enhanced communication and collaboration across different MQA units, combined with increased transparency regarding M&E findings, would promote a more cohesive and accountable approach to achieving the MQA's strategic objectives. By implementing the plan of action outlined above, the MQA can significantly strengthen its M&E function and ensure the effective implementation of its SETA plans. This will ultimately lead to a more impactful and efficient skills development support for the sector.

Chapter 6 Strategic Skills Priority Actions

6.1 Introduction

The purpose of this chapter is to synthesise key findings from the previous chapters, consolidate them to inform key priority actions for skills development and make recommendations that are specific, manageable, achievable and realistic for the MMS.

6.2 Key Findings

Chapter 1: Economic Performance and Workforce Demographics

- **Economic Uncertainty:** Fluctuations in commodity prices and production volumes create an unstable environment for skills development investment. The MMS requires a **versatile and adaptable workforce** capable of navigating these uncertainties.
- **Workforce Imbalances:** The current demographic makeup presents challenges. An **aging workforce** suggests a potential skills gap as experienced workers retire. Strategies to attract younger talent and promote **gender and racial diversity** are crucial. Initiatives such as targeted outreach programmes, mentorship opportunities, and scholarship programmes can address these imbalances.

Chapter 2: Key Change Drivers and Policy Landscape

- **Evolving Skills Landscape:** The MMS faces significant transformations driven by:
 - **Technological Advancements:** Automation and data analytics necessitate a workforce equipped to operate and maintain these new technologies.
 - **Growth of ASM and Beneficiation:** Targeted skills development programmes are needed ASM and mineral beneficiation subsectors.
 - **Energy Landscape:** The limited energy supply and demand for renewables require expertise in renewable energy technologies for mine operations and maintenance.
 - **Youth Migration:** Strategies to attract young people back to rural mining communities and equip NEETs with relevant skills are crucial.
- **Policy Alignment:** The MQA's skills development strategy should **align with national development goals** :such as
 - **Digital Literacy:** Promote digital literacy across all occupational levels to prepare for the increasing digitalization of mining operations.
 - **Data Analysis:** Integrate data analysis skills to equip the workforce with the ability to interpret data for improved decision-making.
 - **Renewable Energy:** Foster expertise in renewable energy technologies to support the Just Energy Transition Framework (JETF) and Green Hydrogen Commercialisation Strategy (GHCS).
 - **Transformation:** Prioritize skilling and upskilling programmes targeting HDSAs for equitable participation within the MMS workforce.
 - **Sustainability:** Integrate environmental management practices and resource efficiency principles into training programmes.

➤ Chapter 3: Skills Needs Forecast

- **Persistent Skills Gaps:** Consistent demand exists for core operational skills like mine management, mining engineering, and mechanical engineering. The strategy should ensure a continued focus on these foundational skills.

➤ Emerging Skills Needs:

- **Automation:** Electromechanical engineering and data analysis skills are crucial for the growing automation of mining operations.
- **Environmental Focus:** Skills in environmental compliance and sustainability are necessary for a more sustainable future in the MMS.

- **Shifting Landscape:** Trends suggest a potential decrease in demand for specialized roles like geology and chemistry. The MQA should monitor these trends and adapt accreditation pathways for specialized programmes to ensure they remain relevant.

➤ Chapter 4: Skills Development Provision

- **Insights from Partnerships:** The MQA prioritizes a multifaceted approach through partnerships with:

- **Educational Institutions:** Develop a strong foundation in core technical skills relevant to various mining disciplines (geology, engineering, surveying, mine safety, mineral processing) and soft skills (communication, teamwork, critical thinking).
- **Research Bodies:** Focus on emerging skills related to technological advancements (automation, robotics, AI) for improved operational efficiency and data-driven decision-making, alongside skills related to resource exploration using advanced technologies and sustainable mining practices.
- **Industry Bodies:** Ensure skills development programmes align with current industry needs, focusing on practical skills relevant to specific job roles and keeping pace with evolving technologies and best practices.

- **Addressing Skill Gaps:** Partnerships can help address existing skill gaps by targeting upskilling or reskilling initiatives for NEETs, ex-mineworkers, and those transitioning towards "green jobs" in the MMS.

Chapter 5: MQA Information and Strategic Priorities

- **Increased Demand for Skills:** Participation in MQA programmes has grown significantly, indicating a rising demand for skills within the MMS.
- **Focus on Practical Skills:** Programmes like Learnerships, Workplace Experience, and Mine Community Training highlight a focus on practical skills development.
- **Skills Gaps Remain:** While participation is increasing, there seems to be a need for strengthened support for programmes like FLC (Functional Learning Competency), Internship, and HDSA (Historically Disadvantaged South Africans) Candidacy programmes.
- **M&E Strengths and Areas for Improvement:** The MQA's multi-pronged approach for M&E allows for a comprehensive assessment. Opportunities exist to improve M&E by standardizing data collection methods and expanding the use of tracer studies for better trend analysis, long-term impact assessment, and data-driven decision making.
- **Strategic Alignment:** The MQA's focus on transformation, health and safety, technological changes

6.3 Strategic Priority Actions

The MQA's strategic priorities have remained steadfast over the last planning cycle (2020-2024), reflecting a deliberate focus on the enduring challenges and opportunities within the sector. The SETA's commitment to facilitating transformation, enhancing health and safety, responding to technological advancements, supporting minerals beneficiation, developing core mining skills, and promoting environmental sustainability has been a priority. To ensure these priorities remain aligned with the sector's evolving needs, the MQA has implemented a robust monitoring and evaluation framework. Through regular assessments, stakeholder consultations, and performance indicators, we have continuously evaluated the effectiveness of our strategies. While the core focus

has remained consistent, we have made deliberate moves, such as supporting historically disadvantaged individuals, health and safety and support for research determining essential green skills and those related to technology in the MMS. In line with the priority to support SMMEs, the SETA introduced the support for small businesses/cooperatives which includes providing targeted skills development programmes, access to finance, and business development support. By empowering these enterprises, the MQA aims to contribute to job creation, economic growth, and increased participation in the MMS. These refinements demonstrate the SETA's ability to adapt to changing circumstances without compromising our core objectives.

Building upon the successes and lessons learned from the previous planning cycle, the MQA has developed a set of strategic priorities for the next planning cycle (2025-2030). These priorities are aligned with the evolving needs of the MMS, informed by two of the three strategic priorities of the MTDP (Inclusive growth & job creation; Reducing poverty and tackling the high cost of living), informed by ongoing industry trends, and designed to drive sustainable development and skills excellence. These include:

Priority Action 1: Constant engagement with the MMS for collaboration in various programmes to bridge the gap between workplace and training institutions for a fit for purpose skills development system in line with outcome 2 of the MTDP Increased employment opportunities which focuses on ensuring a stronger and more cooperative relationship between education and training institutions and the workplace.

- ✓ Collaborate with the Department of Mineral Resources (DRM) to ensure that companies adhere to the Mineral and Petroleum Resources Development Act (MPDRA), which mandates the submission of Social and Labour Plans (SLPs) and compliance with the Mining Health and Safety Act (MHSA), including the submission of WSP-ATRs, as prerequisites for obtaining, renewing, or retaining mining permits.
- ✓ Facilitate roadshows featuring senior leadership and management to emphasise the strategic significance of WSPs-ATRs and the importance of their submission. These roadshows can also serve as a platform for engaging stakeholders on other MQA programmes and fostering collaboration TVETs and CETs, as well as work-integrated learning (WIL) initiatives.
- ✓ Advocacy and lobbying in various platforms such as the Mining Indaba. Secure a slot in the CEO Forum meeting to discuss critical issues such as WSP and ATRs, graduate employment, and WIL, ensuring that skills development remains a central focus in high-level discussions within the sector.

Priority Action 2: Strengthen existing partnerships for effective skills development and develop plans to support the implementation of SIHIPs which articulates with outcome 7 of the MTDP (Improved governance and performance of public entities) which focuses on the review of legislations to address national policy imperatives including rectifying ambiguities, inconsistencies, changing circumstances as well legal complexities to enhance the effectiveness of the legislative framework of the PSET sector.

During the upcoming mid-term planning cycle, all SETAs are expected to execute six impactful programmes in a coordinated manner and the MQA must:

- ✓ Consider mainstreaming its Partnership Management Framework into its operational processes. This include ensuring that the partnership has clearly defined the nature, scope, goals, objectives, and indicators of success and desired outcomes.
- ✓ Engage all partners in collaborative planning processes to develop action plans, timelines, and milestones for implementation. This collaborative approach ensures buy-in, commitment, and ownership of the

implementation process.

- ✓ Allocate sufficient resources, including infrastructure, financial, human, and technical resources, to support the implementation of each partnership.
- ✓ Implement robust monitoring and evaluation mechanisms to track progress, measure outcomes, and identify areas for improvement. This regular monitoring allows partners to assess performance, identify successes and challenges, and make informed decisions to enhance implementation effectiveness.
- ✓ Collaborate with the SETAs to implement the SIHIP programmes to ensure sectoral alignment, resource analysis and resource pooling (sharing), programme harmonisation, join projects and initiatives and advocacy and policy influence to implement programme that address the following areas.
- ✓ Establish arrangements or set up a working model with other SETAs on to how to implement SIHP programme, i.e. to address challenges relative to rural development, infrastructure development and public sector institutional delivery capacitation- enhance institutional capabilities to respond to individual and national imperatives (Hydrogen Centre of Specialisation) , significant of unemployment people including graduates (skills for jobs) , sustainable Entrepreneurial, SMME and Cooperatives Development (Self-Employment Creation). Holistic Digitisation and advancement of technological infrastructure, research and development (Hydrogen Centre)
- ✓ Work with other SETAs to ensure effective and efficient Shared services on Information and Communication Technology (ICT) for SETA- wide Learner Information Management System (centralised WSP-ATR management information system).
- ✓ Set up M&E systems to assess responsive, relevance, sustainability (Impact)- including impact studies.

Priority Action 3: Heighten efforts to facilitate growth and support of ASM through skills development.

The MQA should amend its funding policy to cater for provision of infrastructure funding, broaden its scope for the support to include small business development to include capacity building for access to markets, understanding taxation, royalty, and licensing regimes of ASMs. By amending its funding policy to include infrastructure funding and capacity building for access to markets, taxation, and licensing regimes, the MQA is working to empower small businesses to create economic opportunities and improve the livelihoods of those working in the sector, thus addressing poverty and the high cost of living, the second strategic priority of the MTDP. Engage the development finance institutions such as IDC to ramp up support for mining (small scale, junior, artisanal and cooperatives) with a potential for creation of job opportunities and provision of low-end skills.

Priority Action 4: Continue to support interventions to improve mine health and safety through skills development and increasing the number of safety officers in the MMS.

The mining fatalities occur due to various factors, and understanding these causes is crucial for implementing preventive measures and improving safety standards in the MMS. Among others, there is a need to:

- ✓ Increase the number of safety officers in the MMS. The challenge is that there are more safety reps than safety officers in the MMS. Implement interventions aimed at ensuring progression of Safety Representatives. There is a need to develop specialised training programmes aimed at equipping safety

representatives with additional skills and knowledge to perform tasks traditionally handled by safety officers. This could include courses on risk assessment, incident investigation, regulatory compliance, and emergency response in line with the MSHA.

- ✓ Conduct a vigorous analysis of the causes of the fatalities in the MMS (human, behavioural- due to “planisa”, Fall of Ground Action Plan (FOGAP), heavy equipment and machinery, seismicity, natural disaster such as floods) and then ensure that appropriate interventions to effect transformation.
- ✓ Work with MHSC and Mineral Council Mosh to see how we can contribute towards the FOGAP. To address the challenge of having more safety representatives than safety officers in the MMS, a focus on skills development is crucial. Strategies include developing specialised training programmes aimed at equipping safety representatives with additional skills and knowledge to perform tasks traditionally handled by safety officers. This could include courses on risk assessment, incident investigation, regulatory compliance, and emergency response in line with the MSHA. Upskilling and certification of the current cohort of safety representatives is crucial.
- ✓ This could offer opportunities for them to upskill and obtain relevant certifications recognised in the industry. This could among others, involve partnering with educational institutions or accrediting bodies to design certification programmes tailored to the needs of safety representatives to articulate into the safety officer programme. Establish mentorship programmes to pair safety representatives with safety officers for guidance, support, and acquisition of practical knowledge. These mentoring relationships can facilitate knowledge transfer and professional development, on-the-job training, continuing education, and performance.

Priority Action 5: Align skills development with evolving technologies in the MMS

The level of technological innovation and application differ in the MMS. However, what is there is that technology is part of the change and due to the digitisation and integration of different variants of technologies, there are certain occupations and skills required to keep up with developments.

The MQA will prioritise integrating digital literacy, data analysis, and renewable energy skills across programmes. This also include packaging skills programmes by working with other SETAs that already have programmes that meet the need in the MMS. There is also a need to work with institutions such as Mandela Mining Precinct that work in the space of research, innovation, and development to identify skills and the kind of skills programmes required for this integration and upskilling. This is also in line with the SIHIP programme on the support for a “holistic digitization and advancement of technological infrastructure, research and development”.

Priority Action 6: Implement skills development support for the ex-mine workers and the NEET population directly responding to the MTDP’s priority to reduce poverty and tackle the high cost of living by fostering economic participation and empowerment.

The MQA must develop a cogent plan on how to support:

i. Ex-mineworkers

- ✓ Develop a practical, user-friendly portable skills framework.
- ✓ Provide training in business management, financial literacy, and access to funding opportunities.

- ✓ Assist them with job placement assistance, connect the retrenched workers with potential employers or job opportunities within and outside the MMS. Collaborate with MMS partners and employment agencies to enhance job placement outcomes.

ii. The NEET

MQA can play a pivotal role in supporting NEETs (youthful and rural), enhancing their skills, improving their employability, and ultimately contributing to their socio-economic empowerment and inclusion in the workforce for future sustainability of the country. Increase the access to PSET institutions, enabling the attainment of basic skills , including reskilling and upskilling

- ✓ Provide access to training programmes and certification courses that enhance technical competencies, occupational skills, and employability. These programmes should be tailored to meet the demands of various sectors, including mining-related industries.
- ✓ Expand learnership, internships and apprenticeship opportunities with mining companies, SITM companies, and related up and down stream industries. These programs provide hands-on experience, practical skills development, and potential pathways to permanent employment.

Recommendation 7: Assess the effectiveness (the degree to which an intervention achieves intended goals), efficiency (how well resources-time, money and effort are used i.e. minimising input while maximising output) and efficacy (the ability to produce the desired effect) of all of the MQA's interventions (Bursary , internships, WIL, Candidacy Project, Mine Community Projects, partnerships and start up kits).

This will:

- ✓ Provide data on whether the intended outcomes are being achieved, such as improved skills, employability, or job performance.
- ✓ Help achieve quality improvement to the extent that the MQA can identify strengths and weaknesses in the implemented programmes.
- ✓ Also provides framework for evidence-based decision Making. The empirical data from M&E allows decision-makers to make informed choices about programme design, resource allocation, and future directions. It provides evidence of what works and what doesn't, facilitating better planning and management.

This fosters conditions conducive for organisational learning and adaptation, continual improvement and feedback loop enables necessary adjustments to improve the quality and relevance of the interventions.

Priority Action 8: Develop a Research Recommendations Implementation Framework to maximize the impact of research on sector planning.

To ensure the successful implementation of research recommendations and driving meaningful change for greater impact, the MQA must strive to:

- ✓ Understand and contextualise recommendations within broader goals of the organisation to ensure alignment with vision, mission, and business strategy.
- ✓ Involve project managers with the MQA in the research determination (inputs into the research agenda), delivery (validation) and dissemination (workshop recommendations).
- ✓ Set clear and measurable objectives for implementing the recommendations. These objectives should outline what is aimed to be achieved through the implementation process and provide a roadmap for progress tracking.
- ✓ Establish a dedicated team responsible for overseeing the implementation process. This team should comprise individuals with diverse skills and expertise relevant to the recommendations.
- ✓ Develop an action plan that outlines specific steps, timelines, and responsibilities for each recommendation.
- ✓ Break down the implementation process into manageable tasks to ensure smooth execution.
- ✓ Develop a monitoring and evaluation plan to ensure that research findings improve sector planning.

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