Mining Future Skills

MINING QUALIFICATIONS AUTHORITY

FINAL REPORT

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FOR

STUDY ON SKILLS DEVELOPMENT AND RELATED MATTERS WITHIN THE SUBSECTORS OF THE MINING AND MINERAL SECTOR (MMS): A CASE STUDY OF KWAZULU-NATAL PROVINCE

Prepared by: Wits Mining Institute

EXECUTIVE SUMMARY

Introduction and Background

The Mining Qualifications Authority (MQA), as a Sector Education and Training Authority (SETA) for the mining and minerals sector (MMS), plays a crucial role in skills development and training. It ensures that both the workforce and communities are equipped with the necessary skills and competencies to meet the current and future needs of the sector. This is achieved through the implementation of various programmes underpinned by the skills demands of the MMS. Central to this is skills planning that integrates local community needs, to ensure that training programmes are tailored to the socioeconomic contexts as well as opportunities found in specific geographical areas. It is in line with these imperatives that the MQA initiated a study to provide insights into the specific mining and mineral sector related skills development needs in mining communities. By identifying the skills needed by communities, the study will help inform strategies that will lead to the implementation of targeted training programmes needed to address the skills gaps in communities.

Study Aim and Objectives

The aim of the study is to provide insights into the specific MMS-related skills development needs in mining communities in KwaZulu-Natal province considering its unique economic landscape, minerals resources endowments, and their sectoral challenges. This aim is supported by several objectives, including an assessment of policies, legislation, and strategies that support skills development, as well as an analysis of the socioeconomic landscape of the province. Additionally, the objectives encompass establishing the status of the MMS in the province, highlighting its performance and contribution to the provincial economy. Identifying mining-related skills shortages and assessing skills development and training programs are also key objectives of the study.

Approach to the Study

The study employed a mixed-methods approach that involved collection both primary and secondary data. Primary data was collected through surveys and key informant interviews. A total of 869 surveys were conducted with community members across nine district municipalities in the province. Additionally, interviews were conducted with representatives

from mining companies and post-school education and training institutions. Secondary data was gathered through literature review and document analysis. To understand skills demand in the province, study made use of the MQA's Workplace Skills Plans (WSPs) and Annual Training Reports (ATRs) data. The information collected was synthesised to provide understanding of the skills development needs of the province considering both the skills supply and demand.

Key Findings and Insights

The key findings from the study are outlined below.

The community surveys and key informant interviews revealed key insights that have a bearing on skills development and training intervention in KwaZulu-Natal province. These are highlighted below.

- Women represented the largest share of participants, which aligns with the provincial gender profile where females constitute the majority of the population. While skills development initiatives must remain inclusive, programmes must intentionally target women, given their significant presence in the province. Notably, districts such as Amajuba, eThekwini, uMgungundlovu, uMkhanyakude, and uMzinyathi recorded particularly high levels of female participation. This trend suggests that female-focused programmes would be impactful within these district municipalities.
- The study sample was predominantly youth-centred, reflecting the age profile of the province, where young people constitute the largest proportion of the population with the median age of 28 years. Across district municipalities, the highest representation of participants in the 18–25 age group was observed in Ugu, Zululand, and iLembe. In municipalities such as Harry Gwala, uMgungundlovu, and uMkhanyakude showed a notable presence of older youth (25–35 years) who remain in transition toward stable employment. This strong concentration of young people highlights the need for interventions that would strengthen school-to-work pathways, support early career development, and address the barriers that hinder youth entry into the labour market.
- From literature, it was established that about 40% of the population (i.e., aged 120 years and older) completed secondary education, which is above the national average of 37%. This is the second-highest secondary school completion percentage in South

Africa. In line with this, 47% of study participants reported having a matric qualification, which corresponds closely with the provincial pattern. However, concerns remain regarding the relatively low proportion of participants who hold post-school qualifications. Additionally, a notable share of participants in districts such as Amajuba, uMzinyathi, and Zululand reported not having completed matric, highlighting the need for targeted interventions to improve foundational and post-secondary educational outcomes in these areas.

- The participants reported completing a diverse set of school subjects, with Life Sciences, Mathematics, Mathematical Literacy, Geography, and Physical Sciences being the most common. Several of these subjects fall within the domain, which is important in accessing technical, scientific, and industry-aligned training opportunities. There are concerns about learners moving away from Maths and the reasons cited were difficulty, weak teaching quality, unclear links between Mathematics and future careers, and anxiety about failing.
- Among those who have progressed beyond matric, participants have pursued a wide range of fields. Mining related disciplines, education, business administration, mechanical and electrical engineering, finance, IT, environmental science, health sciences, and law are all represented. While the overall number of people holding post school qualifications is relatively small, there is representation across both technical and professional fields, including disciplines aligned with STEM and industrial development priorities.
- The labour market situation across the province remains challenging, with most study participants reporting that they are unemployed. In Q1 2024, KwaZulu-Natal recorded an official unemployment rate of 31.5%, which is higher than the national average. Employment patterns vary significantly across district municipalities: districts such as Amajuba and uMzinyathi face high unemployment pressures, while areas with stronger economic activity, such eThekwini and uMgungundlovu demonstrate comparatively better employment absorption capacity.
- Employment is concentrated in few economic sectors such as government services, finance and business services, construction, and agriculture. Mining employment is notable but localised, with only a few districts showing participation in mining.

- Self-employment activity varies across the province spans finance and business services, transport, construction, agriculture, and a small presence in mining. However, business ownership remains small, and many households relying on social grants, with salaries supplementing income where formal employment is available. The relatively small contribution of business income highlights the challenges faced by emerging entrepreneurs.
- Communities identified a mix of engineering, safety, and operations related skills as being important for accessing opportunities in the MMS. Electrical engineering, mining engineering, occupational health and safety, and mechanical engineering stand out as priority areas.
- Young people emphasised a dual need for technical skills and soft skills. The latter including communication, teamwork, leadership, and mentorship support. The common view is that without strong soft skills, youth will continue to struggle to access opportunities even with technical qualifications. Entrepreneurship also comes out, but the results suggest that many young people regard it as a second step after becoming more employable.
- It was established that awareness of new and emerging skills particularly those associated with the Fourth Industrial Revolution, automation in mining, and renewable energy is limited. Although renewable energy is slightly better understood, knowledge of digital and automated systems remains low.
- In addition to mining, several economic sectors were noted as providing economic opportunities in the province, and these are agriculture, construction, and manufacturing. Tourism and renewable energy were also mentioned by a considerable percentage of community members. According to the literature, manufacturing and construction together contribute approximately 20% to provincial GVA, while agriculture accounts for about 5%. The largest share of GVA, however, is generated by the tertiary sector, which includes trade, transport, finance, and community services.
- Most respondents believe that opportunities exist for small businesses, especially in agriculture, retail, and services. Manufacturing and renewable energy also hold potential, though at a smaller scale. However, several barriers limit entrepreneurial

success, including access to capital, limited business knowledge, weak market linkages, and insufficient mentorship. These constraints are consistent across both startups and existing businesses.

- The most widely valued transferable skills are project management, health and safety, and digital literacy. These foundational capabilities cut across multiple industries and are seen as essential for improving employability, supporting enterprise development, and enabling workers to adapt to changing labour market conditions. The top skills needed to support entrepreneurship in the province are financial management, business skills and marketing.
- In terms of training programmes, the study identified visibility and access challenges. Only a small percentage of participants were aware of mining-related training programmes, and most find existing training difficult to access. Familiarity with MQA was found to be extremely low. In view of this, participants called for for clearer communication, broader programme offerings, and simpler application processes.
- It was noted that while mining companies prefer local recruitment, many community members lack the foundational education and technical knowledge to access opportunities in the MMS. Gaps in Mathematics and Physical Science at Matric level, limited understanding of mining standards, and inadequate safety awareness contribute to this mismatch. The ongoing demand for semi-skilled and skilled labour, local hiring remains constrained.
- Young people find it hard to move from school into training, then into workplace experience, and finally into a job because the process is not well-connected. There are not enough opportunities for practical, on-the-job learning, and companies often require experience that young people do not yet have. This makes it difficult for them to gain the skills and experience needed for entry-level jobs, trapping many in a cycle where they cannot progress.
- The mining sector in KwaZulu-Natal is characterised by diverse operations, including extraction, processing, smelting, and downstream manufacturing. These activities require specialised skills. To meet these needs, some companies have developed internal training facilities to support skills development of their workforce.

- Automation, and digitalisation are transforming roles such as machine operators and TMM drivers. This shift requires workers to develop digital literacy, computer-based competencies, and the ability to interact with automated systems.
- Safety training continues to be a cross-cutting priority, with particular emphasis on “invisible hazards” like electrical risks and occupational health concerns. Respondents noted that effective safety learning often requires practical, context-specific approaches such as storytelling and relatable examples. Leadership at foreman and supervisory levels are important in maintaining a safe work culture.
- To address future mine closures and reduce community dependency on mining, several companies are investing in wider skills programmes. These include training in agriculture, food production, and entrepreneurship, which help broaden job prospects beyond the mining sector.
- Mining companies rely on partnerships with training providers, universities, SETA-aligned entities, and development trusts to address specific skills gaps. These partnerships support training in areas such as mineral processing, laboratory work, engineering, and adult education. However, their sustainability depends heavily on funding availability, accreditation processes, and regulatory clarity, which can limit long-term impact.
- Participants generally view the MQA as a credible and increasingly responsive partner, but some challenges persist. Concerns were raised about low MQA visibility within KZN communities, delays in discretionary grant approvals, and uncertainties associated with the ongoing QCTO transition. These issues can affect planning, training implementation, and community-level engagement.
- Across interviews, stakeholders expressed a strong desire for skills reviews and engagements to translate into targeted action plans. They emphasised the need for feedback, coordinated implementation, and measurable results at community level.

Priority areas for skills development and training

Against these findings, the following have been identified as priority areas for skills development and training in KwaZulu-Natal province.

- Priority areas for skills development and training in the province

- Against these findings, the following have been identified as priority areas for skills development and training in KwaZulu-Natal province.
- Strengthening Foundational Education and Technical Readiness - Many community members struggle to access technical or mining-related opportunities because they lack strong foundations in subjects like Mathematics and Physical Science. Targeted interventions are needed to support both learners and educators addressing both the uptake of STEM subjects as well as the quality of teaching.
- Expanding Work-Integrated Learning and Entry-Level Work Experience – There is a need to support young people with transitions from school to training, training to workplace exposure, and finally into employment. Programmes such as learnerships, apprenticeships, internships, and workplace placements would help youth gain the real-world experience they need to secure entry-level jobs.
- Technical and Occupational Skills for mining and manufacturing - Communities highlighted the importance of engineering, safety, and operations-related skills for accessing jobs in mining and manufacturing. Training programmes should focus on technical and operation skills that are in demand in these sectors.
- Digital Skills and Emerging Technologies – There is need for training that will build digital literacy skills so that working-age population can adapt to changing technologies and benefit from new opportunities in the green and digital economy.
- Soft Skills and Workplace Readiness – Youth continue to struggle in the workplace because they lack soft skills such as communication, teamwork, and leadership. These skills are essential for career progression and should be integrated into training programmes to help young people navigate the workplace more confidently and effectively.
- Strengthening Occupational Health and Safety (OHS) Capacities - Safety remains a top priority in the MMS, especially when it comes to risks that are not easily visible, such as psychological hazards. Training should include leadership skills for practitioners at supervisory levels to support safe working environments.
- Entrepreneurship and Enterprise Development Skills – Opportunities for entrepreneurship have been identified in the province, but many people lack basic business skills and support. There is need for training that focuses on financial

management, marketing, and business planning, combined with mentorship and access to markets to help small businesses grow and remain sustainable.

- Portable and Transferable Skills for Economic Diversification - Communities need skills that can be used beyond mining to improve long-term livelihood options. Training in agriculture, construction, manufacturing, tourism, and renewable energy can help people adapt to different sectors and reduce dependence on mining.
- Improving Access to and Awareness of Training Opportunities - Awareness of training opportunities, especially those offered by the MQA, is very low. Improving communication and increasing visibility of programmes in communities would ensure more people can benefit from available training.

Recommendations

The following recommendations are based on the key findings of the study:

Recommendation 1: Strengthen school-to-work skills pipelines

It is recommended that the MQA strengthen and expand targeted school-to-work and bridging initiatives across the province. This should be done in close collaboration with the Department of Basic Education, TVET colleges, mining companies, and local training centres to ensure alignment between schooling outcomes and industry requirements. The MQA should support structured bridging programmes in Mathematics, Physical Science, and technical literacy by funding preparatory courses, Saturday classes, and focused learner support. These interventions will help learners meet entry requirements for mining- and engineering-related qualifications and improve their readiness for technical career pathways.

Recommendation 2: Expand work-integrated learning and experiential training

To address the lack of practical exposure, the MQA should incentivise mining companies to offer more learnerships, apprenticeships, internships, and workplace-based learning. This could include conditional grants for companies that host learners, structured partnerships with TVET colleges, and community-level placement hubs. Strengthening these pathways will help young people gain the work experience required to enter semi-skilled and artisan roles.

Recommendation 3: Increase accredited artisan training and trade test capacity

The review highlights ongoing constraints in access to accredited artisan training and assessment facilities, contributing to hard-to-fill technical and artisanal vacancies. Strengthening local training and trade test capacity aligns with national priorities to expand occupationally directed training in under-served regions. It is recommended that MQA Provide capacity-building support to training providers and explore the expansion of trade test facilities within KwaZulu-Natal.

Recommendation 4: Improve Digital and Emerging Technology Training

Given low awareness of digital and automation-related skills, the MQA should support the development of short courses focused on digital literacy, automated mining systems, analytics, remote operations, and renewable energy fundamentals. Once developed, these courses should be delivered through accessible platforms to ensure wide community reach in the province.

Recommendation 5: Strengthen occupational health and safety training approaches

The MQA should support the development of innovative OHS training methods that use practical demonstrations, simulation, and real-life case studies. Training should target both entry-level workers and supervisors, with special emphasis on addressing “invisible hazards” that are often overlooked in risk assessments.

Recommendation 6: Integrate Soft Skills into All Training Programmes

Soft skills such as communication, teamwork, problem-solving, and leadership should be built into all MQA-funded programmes. Many young people struggle to succeed in the workplace even when they have technical skills, so the MQA should ensure that employability training and mentorship support are mandatory components of learnerships and apprenticeships.

Recommendation 6: Promote portable and transferable skills development

In response to mine closure risks and long-term community sustainability concerns, skills development initiatives should include portable and transferable skills applicable beyond mining. This approach aligns with policy emphasis on economic diversification and resilience in mining-affected communities.

Recommendation 7: Strengthen support for local enterprise development

While local procurement and enterprise development are prioritised, community-based SMMEs continue to face barriers related to technical capacity, equipment, and business readiness. Targeted skills development can support progression into higher-value segments of mining supply chains, consistent with SLP objectives.

Recommendation 9: Establish a provincial pool of experienced industry practitioners

The study highlights the value of experienced practitioners in shaping practical, behavioural, and supervisory training, particularly in occupational health and safety. Formalising access to such expertise can strengthen training quality and relevance. It is recommended that MQA establish a provincial pool of experienced industry practitioners to support curriculum development, mentoring, and training delivery.

Recommendation 10: Strengthen visibility, communication, and dissemination of skills development information in KwaZulu-Natal

The study findings indicate that while stakeholders recognise the role of the MQA in skills development, its visibility and perceived impact at community and provincial level in KwaZulu-Natal remain limited. Respondents noted that skills research findings and training opportunities are not consistently communicated back to communities, training providers, and local stakeholders, reducing awareness and limiting uptake. This challenge is also reflected in skills planning literature, which emphasises the importance of transparent communication and feedback in strengthening stakeholder participation and trust. It is therefore recommended that the MQA strengthen its visibility and communication presence in KwaZulu-Natal through structured dissemination of skills review findings and training opportunities, including district-level outreach, regular feedback engagements, and accessible communication channels such as community radio and digital platforms. Improved dissemination will support greater awareness, clearer participation pathways, and stronger translation of research into implementation.

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LIST OF ABBREVIATIONS AND ACRONYMS

Abbreviation/acronym	Description
4IR	Fourth Industrial Revolution
BEE	Black Economic Empowerment
CALS	Centre for Applied Legal Studies
AgriSETA	Agricultural Sector Education and Training Authority
CET	Community Education and Training
CETA	Construction Education and Training Authority
DMRE	Department of Mineral Resources and Energy
DUT	Durban University of Technology
EDTEA	Economic Development, Tourism and Environmental Affairs (KwaZulu-Natal Department)
ETDP SETA	Education, Training and Development Practices Sector Education and Training Authority
GDP-R	Real Gross Domestic Product
GVA	Gross Value Added
GVA-R	Real Gross Value Added
HDSAs	Historically Disadvantaged South Africans
HRD	Human Resource Development
IDP	Integrated Development Plan
KZN	KwaZulu-Natal
KZN DOE	KwaZulu-Natal Department of Education
KZN EDTEA	KwaZulu-Natal Department of Economic Development, Tourism and Environmental Affairs
LED	Local Economic Development
LFPR	Labour Force Participation Rate
LGSETA	Local Government Sector Education and Training Authority
MUT	Mangosuthu University of Technology
MMS	Mining and Minerals Sector
MQA	Mining Qualifications Authority
MPRDA	Mineral and Petroleum Resources Development Act

MST	Mathematics, Science and Technology (education context)
MUT	Mangosuthu University of Technology
NCV	National Certificate Vocational
NSDS	National Skills Development Strategy
PEGDS	Provincial Economic Growth and Development Strategy
PGDS	Provincial Growth and Development Strategy
QLFS	Quarterly Labour Force Survey
RBM	Richards Bay Minerals
REE	Rare Earth Elements
SAHRC	South African Human Rights Commission
SAQA	South African Qualifications Authority
SETA	Sector Education and Training Authority
SLP	Social and Labour Plan
SMME	Small, Medium and Micro Enterprises
STEM	Science, Technology, Engineering and Mathematics
TIPS	Trade and Industrial Policy Strategies
TVET	Technical and Vocational Education and Training
UKZN	University of KwaZulu-Natal
WIL	Work-Integrated Learning

1. INTRODUCTION AND BACKGROUND TO THE STUDY

1.1. Introduction

The Mining Qualification Authority (MQA) has partnered with the Wits Mining Institute (WMI) to conduct a study that provides insights into skills development and related matters within the mining and minerals sectors (MMS) in KwaZulu-Natal Province. By identifying the skills needed by communities in the province, the study will help inform strategies that will lead to the implementation of targeted training programmes needed to address the skills gaps in communities.

1.2. Background and Context

Skills development is important in fostering socioeconomic development. To this end, South Africa's National Development Plan (NDP) which aims to eliminate poverty and inequality by 2030 has marked the need to improve education, training and innovation as a strategic intervention area to achieve the country's development goals (National Planning Commission, 2012). This is because the country continues to struggle with high rates of unemployment which are closely linked to inadequate education and skill levels.

Education plays an important role in equipping working-age population with the skills and competencies required in the labour force. According to Department of Higher Education and Training (2022), it is concerning that 3.7 million adults in South Africa are still illiterate, despite improvements in education and training landscape. Adult illiteracy continues to hinder economic and social progress in the country. The direct consequence of low educational attainment in the country is skills shortages which impacts employability and the ability of working-age population to participate fully in the economy. The shortage of skills is a cross-cutting issue that affects key sectors of the economy, particularly those where technical skills are required such as Information and Communication Technology (ICT) and software development, engineering, construction and others (Tshwane University of Technology, 2023).

Addressing these challenges is important for South Africa to achieve its developmental objectives and improve overall socioeconomic landscape. The need for skills is urgent given

the demands of future work necessitated by Fourth Industrial Revolution (4IR), automation, and digitalisation. More so, the transition to the 'green economy' is transforming economic sectors, and subsequently the labour market increasing the demand for specialised skills.

The mining and minerals sector (MMS), in particular, is experiencing significant changes. According to the MQA (2023), the key change factors affecting the sector's performance and skills development include 4IR, geopolitics and market performance, mineral beneficiation, the impact of load-shedding, the integration of Environment Social Governance (ESG), and illegal mining. These change drivers have various implications, including employment creation, upskilling of certain occupational levels, promotion of entrepreneurship skills, and potential job losses (MQA, 2023).

4IR comes with requirements of new skill sets to support the adoption and application of technologies in the MMS. On the other hand, global market demands necessitate high efficiency and productivity, and this translates into the need for a skilled workforce to leverage the opportunities across the global mining value chain. More so, the mining sector is expected to play a considerable role in the just energy transition (JET), and this will have implication on skills where the adoption of green technologies will require reskilling, upskilling and side skilling of the current workforce and communities to ensure that they leverage the opportunities presented by JET both within the MMS and other economic sectors.

In view of the country's imperatives, and labour market demands, there is a need to turn the attention to skills development within communities. In its Sector Skills Plan (SSP) Update 2024/25 Report, the MQA reiterated the Mining Charter's focus on skills development and capacity building in the mining sector which *"requires mining companies to develop and implement meaningful programmes that address skills gaps, provide training opportunities for employees, and support the education and training of individuals in mining communities*" (MQA, 2023: 22). It is against this background that the study to understand skills development In KwaZulu-Natal province was initiated.

The MMS in the province is relatively small compared to other provinces, contributing about 1% to the provincial Gross Domestic Product (GDP) (Trade and Industrial Policy Strategies,

2024). Despite this, there is potential to increase this contribution, as there are untapped mineral resources. Therefore, examining the skills needs in the province is essential to unlocking this potential and driving economic growth by ensuring that there are skills that support not only the MMS but other sectors of the economy.

1.3. Problem Statement

KwaZulu-Natal is the second most populated province in South Africa, with a population of 12.4 million (Statistics South Africa, 2022). Of this, 66.4% is working-age population providing a substantial labour base to support economic activities (Statistics South Africa, 2022). Despite this favourable demographic profile, it continues to grapple with high levels of unemployment. According to Statistics South Africa (2025), the province recorded an employment rate of 32.3% in the first quarter of the year. This compares to 28.6% in the last quarter of the 2024 recording an increase of 3.7% which is concerning.

The high unemployment rate is attributed to several factors including educational attainment and skills levels in the province. While the province has made significant progress in education, about 8.3% of its population aged 20 years and older have no schooling and only 10.4% have higher education qualifications (Statistics South Africa, 2022). The latter increased from 9% reported in 2011 (Statistics South Africa, 2022). These education levels continue to hinder broader participation in the economy.

The high unemployment rate in KwaZulu-Natal is further exacerbated by significant skills gaps across various economic sectors. Specifically, there is a shortage of technical and specialised skills in key areas, including ICT, construction, engineering, and financial management (Pillay and Kikasu, 2024; Department of Economic Development, Tourism and Environmental Affairs, n.d). More so, there is a mismatch between skills demand and supply in province resulting in high graduate unemployment levels (Provincial Planning Commission, 2016). These deficiencies hinder the province's ability to achieve sustained economic growth and development. Addressing these skills challenges is therefore crucial to ensuring the province can fully leverage its labour force to drive its economic performance.

1.4. Aim and Objectives

The aim of the study is to identify and analyse the specific MMS-related skills development needs in the KwaZulu Natal province, considering its unique economic landscape, mineral resource endowments, and sectoral priorities, socio-economic advancements, and its broader development goals. This aim is supported by the following objectives:

1) Analysing the effectiveness of current legislation, policies, and strategies driving skills development in the province.
2) Assessing the alignment of provincial frameworks with national strategies (including: DDMs).
3) Analysing the population demographics of the province (including age distribution, gender, and racial representation, educational attainment levels and skillsets of working-age population).
4) Establishing a detailed profile of the MMS in the province (including main mining commodities extracted and processed; size and composition of the existing workforce; types of companies operating in the sector including national, multinationals and small-scale miners).
5) Analysing the economic performance of the MMS compared to other sectors in the provincial economy.
6) Assessing its contribution to Gross Domestic Product (GDP), job creation, and revenue generation.
7) Identifying the existing mining-related occupational shortages (hard-to-fill vacancies) and skills gaps within the province and reasons thereof.
8) Identify the mismatches between the skills required by mining companies and the skills available in the community.
9) Assessing the adequacy and effectiveness of existing skills development programmes in addressing provincial needs.
10) Analysing the capacity offerings of technical colleges, universities, and industry-specific training providers in addressing the skills development in the province.
11) Identifying the common skills development needs of community members living near mining operations and beyond mining-specific jobs.

12) Analysing the demand for skills in related sectors such as agriculture, manufacturing, tourism, and service industries.
13) Assessing the need for entrepreneurial and business development skills for local economic empowerment.
14) Gathering insights on the community and companies' experiences in accessing skills development offerings from the MQA.
15) Exploring the potential synergies between skills development needs of the MMS for upskilling and reskilling existing workforce for diversification into other sectors.
16) Identifying potential partners and stakeholders relevant to addressing skills development needs in the province.

1.5. Significance of the Study

KwaZulu-Natal is the second largest economy in South Africa, contributing 16% to the country's Gross Domestic Product (GDP) (Trade and Industrial Policy and Strategy (TIPS), 2024. Its economy is supported by several sectors with the manufacturing and agricultural sectors accounting the largest share both in terms of provincial GDP and employment. According to the Department of Economic Development, Tourism and Environmental Affairs (2024), the provincial economy recorded an average growth rate of 0.4% from 2019 to 2023.

Despite this economic performance, the province faces several challenges, including unfavourable climatic conditions such as flooding, which have had significant economic costs. It has been reported that the 2022 floods in parts of the province resulted in loss of worth more than R500 million (Ntombela, 2024). These challenges, coupled with the high unemployment rate are priority areas in KwaZulu-Natal's Provincial Growth and Development Strategy. As a cross-cutting issue, the province recognises the importance of skills development in addressing these to foster sustainable economic growth (Provincial Planning Commission, 2016). To this end, a study on skills development in the province is important because it can support the implementation of provincial strategies.

By identifying skills needs in KwaZulu-Natal, the study can help stakeholders develop targeted interventions that respond to the province's priority areas. Additionally, the study can benefit various allied MMS economic sectors, particularly manufacturing and agriculture, by

informing their skills development programmes, which are key to supporting their economic performance.

2. LITERATURE AND POLICY REVIEW

2.1. Introduction

The chapter presents the literature and policy review covering the theoretical framework underpinning the study. The chapter also discusses the socioeconomic landscape of the KwaZulu-Natal province and provides an overview of the current state of the mining and minerals sector (MMS) in the province. This discussion is followed by a skills analysis which provides insights on the province workforce composition and skills profiles, skills shortages and gaps and highlights key factors contributing to skills gaps in the province. The chapter also provides a landscape of education and training in the province and discusses skills development policies and initiatives seen in the province aimed at skills development and training.

2.2. Socioeconomic landscape of the province

2.2.1. Locality

The KwaZulu-Natal province is located on the south-eastern part of the country. It is bordered to the north by the countries Eswatini and Mozambique, to the east by the Indian Ocean, to the south by South Africa's Eastern Cape province, to the west by Lesotho and Free State province, and to the northwest by Mpumalanga province. It is the third smallest province by area extent (i.e., which is about 94 391km^2) (Britannica, nd). The province has one metropolitan municipality, namely, eThekwini Metropolitan Municipality. It also has ten district municipalities and 43 local municipalities. The ten district municipalities are Amajuba, Harry Gwala, Ilembe, King Cetshwayo, Ugu, Umgungundlovu, Umkhanyakude, Umzinyathi, Uthukela and Zululand (Municipalities, nd). These are depicted on figure 1 alongside the local municipalities that fall under them.

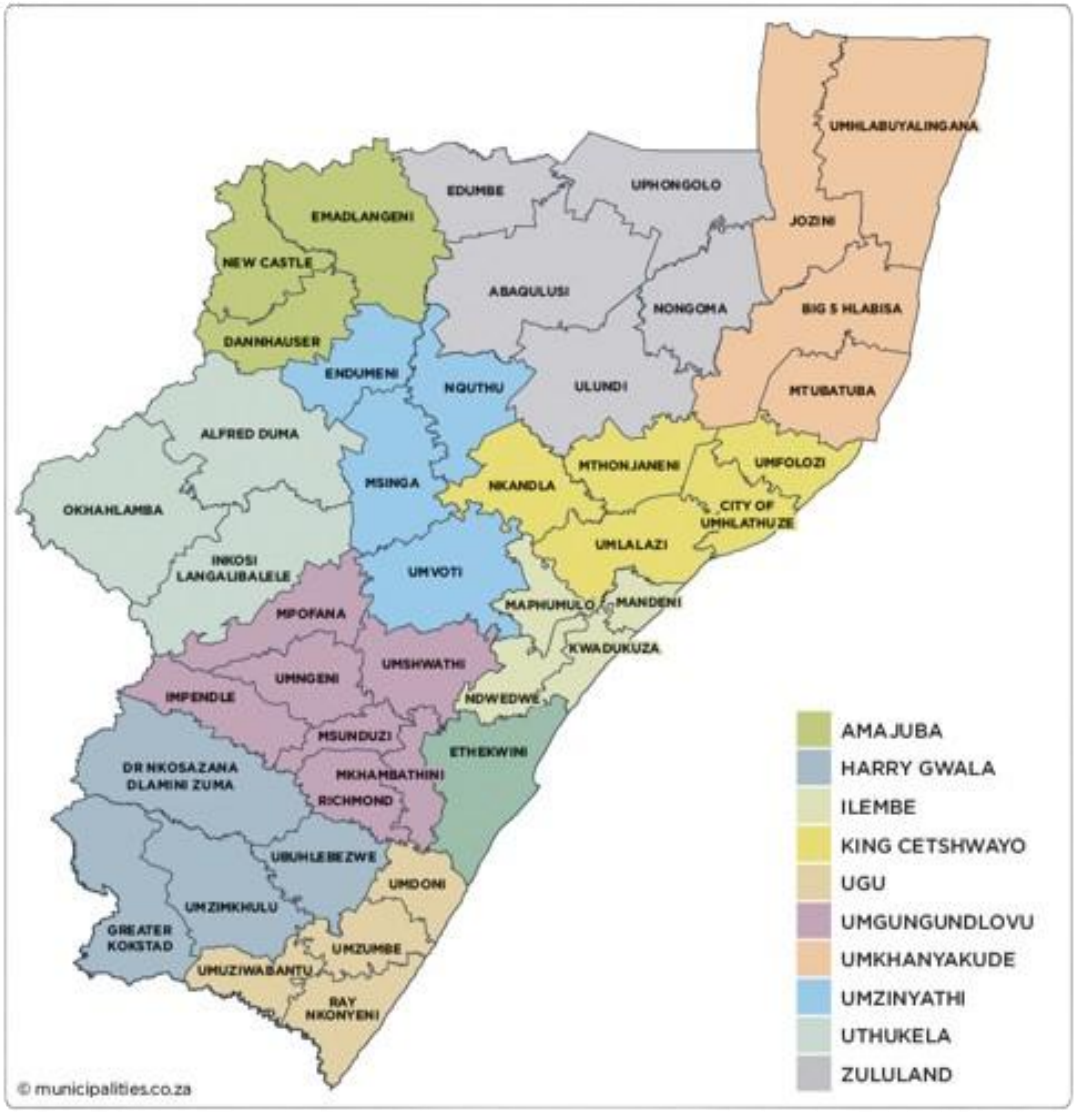

Figure 1: District and local municipalities in the KwaZulu-Natal province

(Source: Municipalities, n.d)

2.2.2. Demographic profile of the province

The KwaZulu-Natal Province is the second most populated province in South Africa. It has a total population of approximately 12.4 million people (Statistics South Africa, 2024). This increased by about 21% from 10.3 million people in 2011. Table 1 shows the growth in population from 1996 to 2022, and this is represented across gender. Female account for the largest share of the population. Their share equated to about 52.4% in 2022. Most of the population is reside in eThekwini district municipality with approximately 4.2 million people followed by Umgungundlovu with 1.2 million people. According to Statistics South

Africa (2024), more than 84% of the population in the province is Black, followed by Indians which account for 9.3% of the population. The other population groups, namely White and Coloureds constitute 4.1% and about 1.5% of the population respectively.

Table 1: Demographic profile of the Eastern Cape province, 1996 to 2022

Census year	Male	Female	Total
1996	4 018 349	4 553 953	8 572 302
2001	4 478 083	5 106 046	9 584 129
2011	4 878 676	5 388 625	10 267 300
2022	5 919 217	6 504 690	12 423 907

(Source: Statistics South Africa, 2023)

Figure 2 shows the population distribution by age and gender. As can be seen in the figure, the province has a young population with the highest distribution seen amongst the young cohorts (i.e., from 0 - 4 years to 35 - 39 years). The population median age is 28 years. A relatively higher number of males is seen in the age group 0 - 39 years, while more females are recorded in advanced ages.

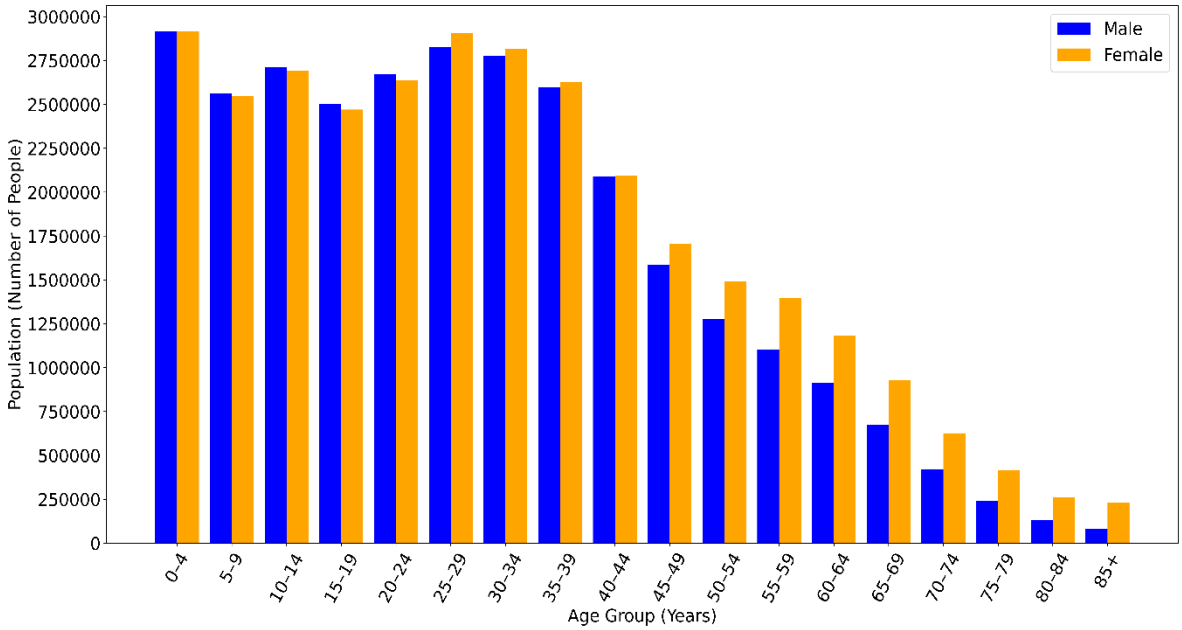

Figure 2: Population groups by gender and age

(Source: Statistics South Africa, 2024)

From the figure, it is seen that the percentage of males generally declines as age increases amongst the population, except for the age groups 5-9, 10-14, 15-19 and 20-24. The total youth population (i.e., aged 15 to 34 years) was 4.4 million in 2022. This increased from 3.9 million in 2011. According to Statistics South Africa (2024), an overall increase of 29.5% in the youth population is recorded between 1996 and 2022.

2.2.3. Education profile

KwaZulu-Natal province has a diverse education landscape, with institutions that cater for pre-primary, primary, secondary and tertiary education. Figure 3 shows the education levels in the province. 74,2% individuals in the age group 5 to 24 years were attending an educational institution in 2022 (Statistics SA, 2024). The majority of the population aged 20 years and older (i.e., 41.2%) have completed secondary education, which is above the national average of 37.3%, and shows the second-highest secondary school completion percentage in South Africa (Statistics SA, 2023). About 10.4% of the population have a tertiary education qualification and 8.3% of the population aged 20 and above have no formal education. From those with post-secondary education, the most popular fields of study are Humanities, Social Sciences and Applied Humanities, studied by 29,6% of the population, followed by Business management (26,4%) and Engineering and other Applied Sciences (13,9%). Conversely, the fields of Law and Mathematical and Natural Sciences are the least popular, with uptake of 2.8% and 3.4% respectively (Statistics SA, 2024)

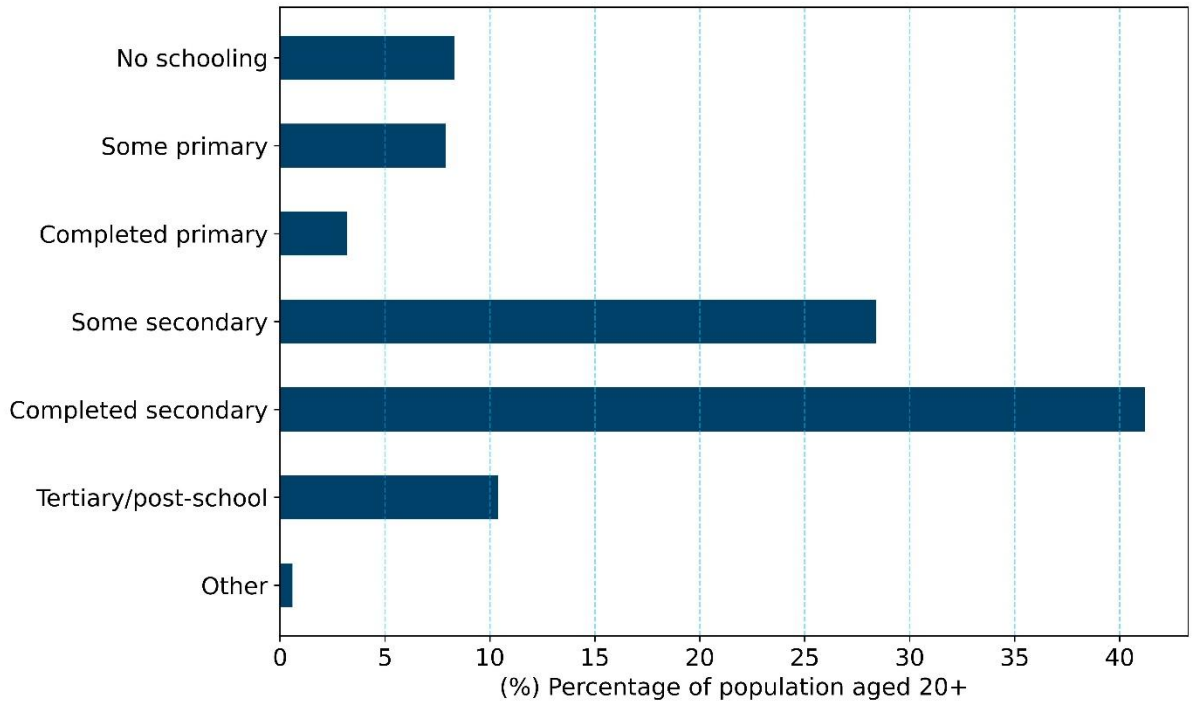

Figure 3: Education levels in KwaZulu-Natal province

(Source: Statistics South Africa, 2024)

2.2.4. Type of households

KwaZulu-Natal's population is made up of 2,9 million households with an average household size of 4.4 people. South Africa's national average household size is 3.5 (Statistics SA, 2023). Most households in Kwazulu-Natal (53.1%) are headed by females (Statistics SA, 2024). The majority (86,8%) of households in KwaZulu-Natal are formal dwellings, followed by traditional (8%) and informal dwellings (5%) (Statistics S, 2024The percentage of the population living in informal dwellings has decreased from 8.3% of the population in 2011 to 5.0% in 2022 (Statistics SA, 2023). In both 2011 and 2022, the proportion of informal dwellings in KwaZulu-Natal was below the national average of 13.6% in 2011 and 8.1% in 2022 respectively. Compared to South Africa's other provinces, Kwazulu-Natal is one of the three provinces with the lowest proportion of informal dwellings, after Limpopo (2.7%) and Eastern Cape (4.4%).

Table 2 shows the numbers of child-headed (i.e. household head below 18 years of age) households in KwaZulu-Natal in 2011 and 2022.

Table 2: Distribution of child-headed households in 2011 and 2022

	Household-head age (years)		
Year	**<17**	**18+**	**% child-headed households**
2011	21 839	2 517 483	0.9
2022	12 674	2 841 067	0.4

(Source: Statistics South Africa, 2024)

As shown in Table 2, the proportion of child-headed households has decreased from 0.9% in 2011 to 0.4% in 2022 (Statistics SA, 2024). Ages of child household heads in 2011 ranged from 10 to 17 years old in 2011, whereas they ranged from 12 to 17 in 2022.While the proportion of child-headed households has decreased, it is seen that there is still a notable number of child-headed households in the province It is not clear whether these child-headed households are predominantly in formal, informal or traditional dwellings, as this information is not provided. According to Statistics South Africa (2022a), child-headed households face several socio-economic challenges including financial hardships, emotional and psychological issues affecting performance in schools. These households are at risk of falling in severe poverty because of limited access to income needed to support families (Molemane, 2021).

2.2.5. Economic landscape

KwaZulu-Natal has South Affrica's second-largest economy, accounting for 16.3% of the national GDP in 2023 (TIPS, 2024), after Gauteng (33.9%) and ahead of the Western Cape (14.2%) (Statistics South Africa, 2024). The economy of the KwaZulu-Natal province is supported by several economic sectors, and the province's real economy is dominated by the manufacturing sector, particularly the food and beverage, petroleum and metals industries. The province also has a significant agricultural sector and a smaller construction industry. The real economy refers to the sectors that produce tangible goods and services - such as agriculture, mining, manufacturing, and construction - as opposed to the financial or speculative sectors. In other words, the real economy includes primary and secondary sectors of production that are directly involved in creating physical value (TIPS, 2024). The

COVID-19 pandemic had a significant impact on KwaZulu-Natal's economy, with employment in the real economy declining but recovering from 2022 (Tips, 2024). Intense flooding in April 2022 also impacted negatively on KwaZulu-Natal's economic performance (KZN Treasury, 2023).

Figure 4 provides a summary of KwaZulu-Natal's real economic sectors as a percentage of KwaZulu-Natal GDP compared national average from 2010 to 2023. As shown in the figure, KwaZulu-Natal's real economy accounted for 26% of the national Gross Domestic Product (GDP) in 2023, compared to 27% nationally. Also shown in Figure 4, manufacturing is the largest real sector in the province, accounting for 17% in 2023. Agriculture accounted for 5%, construction 3% and mining 1%. Manufacturing and construction declined by 1% from 2010 to 2023, while agriculture grew from 4% to 5% from 2010 to 2023.

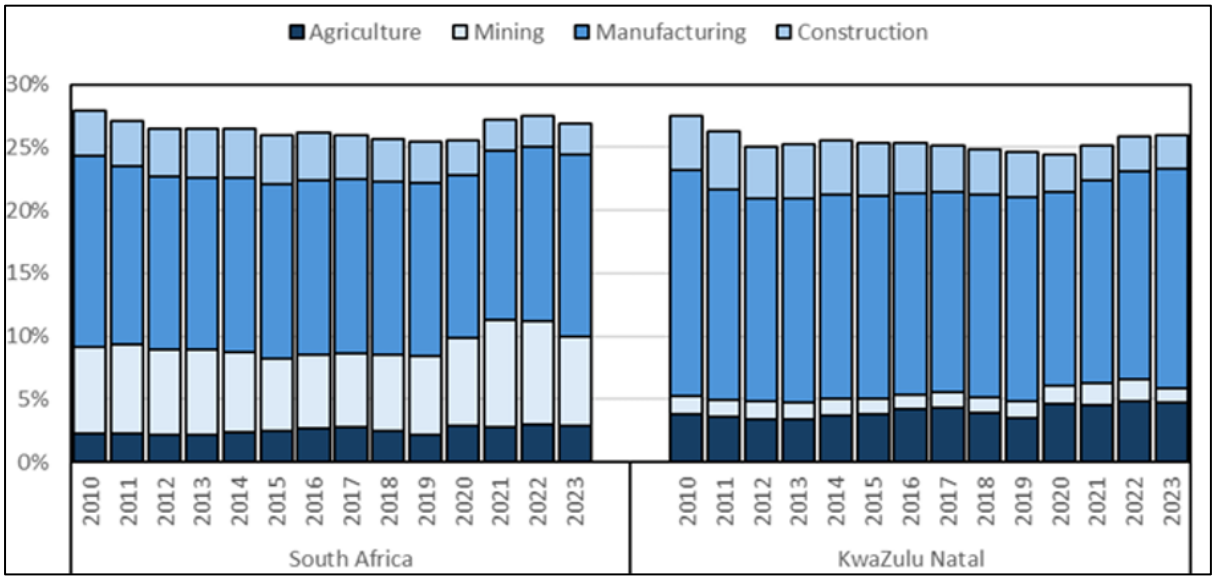

Figure 4: KwaZulu-Natal's real economy sectors

(Source: TIPS, 2024)

The manufacturing sector in KwaZulu-Natal is dominated by food and beverages, petroleum, and metals, with these industries accounting for a 22%, 20%, and 19% share of provincial manufacturing output in 2023. The food and beverages industry has grown rapidly, growing by 10% from 2005 to 2023. In contrast, transport equipment and textiles and clothing steadily declined over the same period (TIPS, 2024).

Construction grew the most between 2011 and 2014, growing by 3%, followed by agriculture at 2% (see Figure 5). Mining and manufacturing declined by 0.5% and 0.4% during this period. Between 2015 and 2019, there was minimal growth among these sectors, with construction declining by 3%. The pandemic mostly negatively affected construction and manufacturing in 2020. Between 2020 and 2022, the province's agriculture grew by 12%, mining by 9%, and manufacturing by 1%, while construction declined by 8%. In 2023, mining experienced a high 29% decline while agriculture declined by 2% and construction by 0.14%. manufacturing grew by 7% during this period (TIPS, 2024).

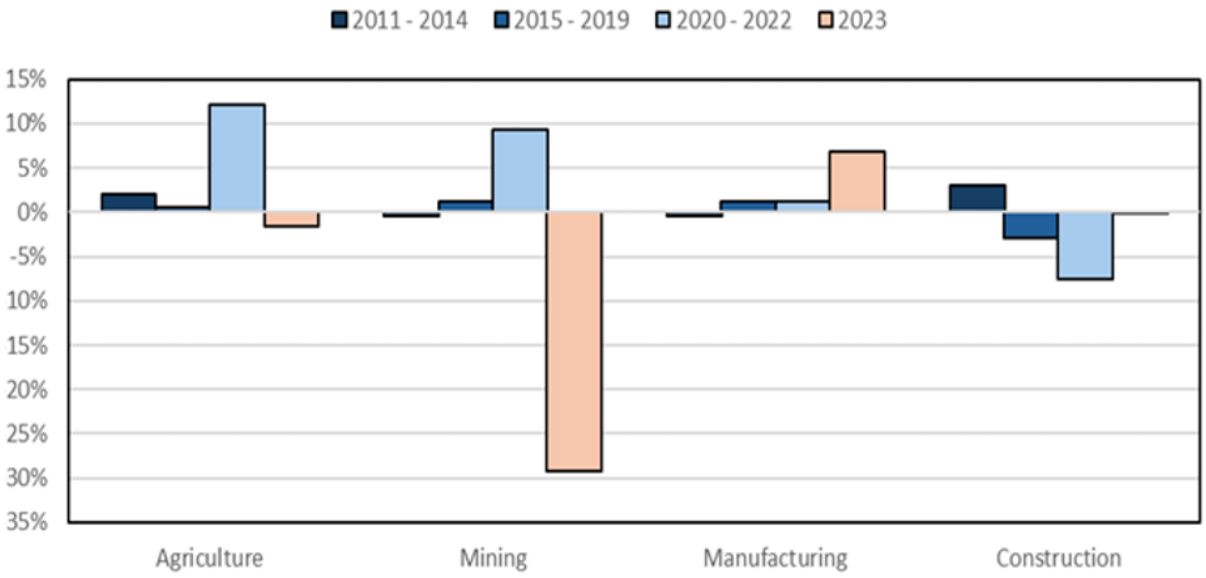

Figure 5: Average growth rates in KwaZulu-Natal's real economy sectors between 2011 and 2023

(Source: TIPS, 2024)

KwaZulu-Natal's economy is also supported by tertiary (i.e., service) industries, which all contribute to the province's Gross Added Value (GVA). The GVA is an economic metric used to measure the contribution of each sector to the economy (Office of National Statistics, 2021). Table 3 provides a summary of the main economic sectors and their contribution to KwaZulu-Natal's Gross Value Added (GVA) in 2023. GVA is an economic metric used to measure the contribution of each sector to the overall economy (Office of National Statistics, 2021). As shown in the table, the manufacturing sector is the largest real sector in the province, accounting for 17% of the provincial GVA. This is followed by the tertiary

sector, with strong performance from trade, finance, and personal services. The primary sector remains small in absolute terms but has seen growth in agriculture in recent years.

Table 3: KwaZulu-Natal GVA by economic sector, 2023

Economic Sector	% Share of KZN GVA	Notes
Primary Sector	6.0%	Agriculture (5%), Mining (1%)
Secondary Sector	20.0%	Manufacturing (17%), Construction (3%)
Tertiary Sector	74.0%	Dominated by Trade, Finance, Personal & Government Services

(Source: TIPS, 2024; KZN Treasury, 2023)

According to the KwaZulu-Natal Treasury (2023), the province's economic performance slowed notably in 2022. Out of all sectors, six experienced a decline in their contribution to the economy, while only four sectors recorded growth. The agricultural sector, for example, saw its real gross value added (GVA-R) decrease slightly by 0.9% in 2022, after a strong rebound of 9.4% growth in 2021 (see Figure 6). GVA-R means real-GVA, which is GVA adjusted for inflation (Investopedia, 2025). This slight downturn reflects reduced agricultural activity over three quarters of the year.

Despite this recent slowdown, the agricultural sector in KwaZulu-Natal has exhibited solid long-term growth, with an average annual increase in real GVA-R of 5.6% between 2012 and 2022. This indicates that agriculture remains an important driver of economic growth over the decade even though it faced short-term challenges in 2022. Figure 6 illustrates these trends, showing the varying growth rates of sectors including agriculture, manufacturing, construction, trade, transport, community services, and others, highlighting the mixed performance across the provincial economy during this period. The figure also illustrates the volatility in the mining sector's economic contribution to KwaZulu-Natal over recent years. While mining is a key part of the provincial economy, its real Gross Value Added (GVA-R) has experienced significant fluctuations, demonstrating periods of sharp growth interspersed with notable contractions. These variations reflect the mining

industry's sensitivity to external factors such as commodity price changes, market demand, and operational challenges within the sector.

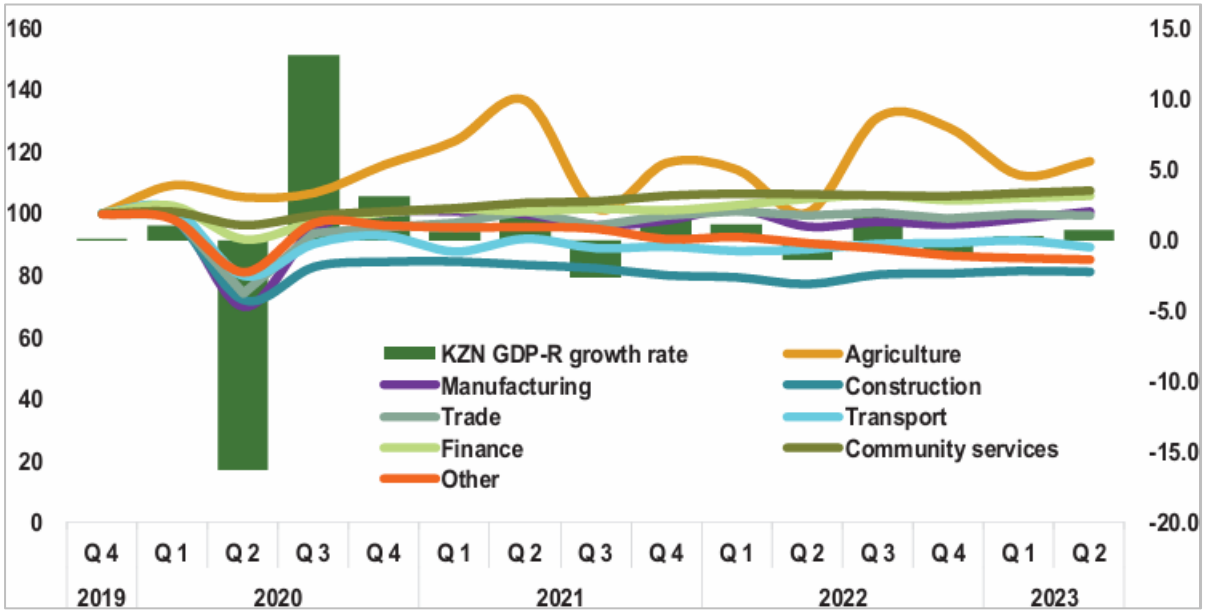

Figure 6: KwaZulu-Natal Gross Value Added (GVA) growth rates Q2 2019 to Q2 2023 (Source: KZN Treasury, 2023)

KwaZulu-Natal's labour market continues to face significant challenges, including a persistently high unemployment rate and comparatively low economic absorption. In 2023, the province's absorption rate – that is, the proportion of working-age people employed - stood at approximately 36%, which is below the national average of 40% (TIPS, 2024). Unemployment in the province has risen steadily over the past decade, increasing from 19.7% in 2010 to around 30% in 2023. This trend reflects ongoing structural issues in job creation and economic participation across sectors (TIPS, 2024).

Of the total provincial population, roughly 2.66 million people were employed in the first quarter of 2024. Employment is distributed unevenly across sectors, with the tertiary sector dominating the labour market, accounting for approximately 71.6% of total employment. This sector encompasses key areas such as government services, trade, and community services, which are among the largest employers (Stats SA, 2024; KZN Treasury, 2023). The secondary sector contributed about 20.5% of total employment, mainly driven by construction and manufacturing industries. This sector's share reflects the province's moderate industrial base and infrastructure development initiatives (Stats SA, 2024).

The primary sector accounted for 7.9% of total employment, with agriculture remaining the primary employer within this sector. Although mining is included here, it remains a very small employer, reflecting KwaZulu-Natal's limited mining footprint relative to other provinces (Statistics SA, 2024).

Notably, the mining sector experienced a significant contraction in employment during Q1 2024, shedding approximately 29% of jobs compared to 2023 levels. This decline was largely due to weak performance in the non-metallic minerals subsector, exacerbating the sector's already marginal role in provincial employment (TIPS, 2024). Figure 7 shows the number of people (in thousands) employed in South Africa's mining industry in 2022 and 2023. Notably, KwaZulu-Natal offers the second-smallest employment in mining, only ahead of the Eastern Cape Province (Statista, 2025).

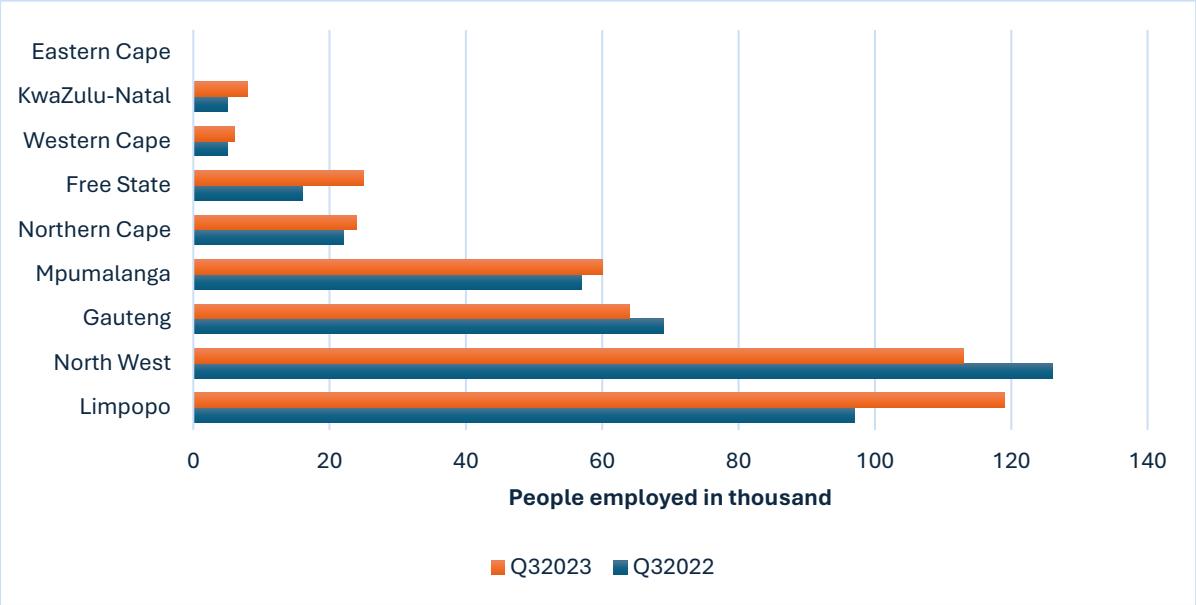

Figure 7: Number of people employed in South Africa's mining sector in Quarter 3 of 2022 and Quater 3 of 2023

(Source: Statista, 2025)

In the first quarter of 2024, KwaZulu-Natal's working-age population (individuals aged 15 to 64) stood at approximately 7.34 million. Of this population, about 2.66 million were employed, 1.22 million were unemployed, and 3.47 million were not economically active. Notably, the number of discouraged work seekers increased by 10% between the fourth

quarter of 2023 and the first quarter of 2024, rising to approximately 384,000 individuals. These figures are summarised in Table 4.

The official unemployment rate for KwaZulu-Natal in Q1 2024 was estimated at 31.5%, which is significantly higher than the national average but lower than the Eastern Cape's unemployment rate of around 49%. The province's labour force participation rate (LFPR) was measured at 52.9%, slightly below the national level of about 60%.

Youth unemployment remains a critical challenge for the province, with 47.8% of people aged 15 to 34 unemployed during this quarter. Gender disparities continue to persist, as female unemployment stood at 35.6%, compared to 27.8% for males. Educational attainment strongly influences unemployment outcomes. Those with only primary education face the highest rates of unemployment - above 45% - whereas graduates experience a considerably lower unemployment rate, at around 14%.

Table 4: Key Labour Force Characteristics, KwaZulu-Natal, Q1 2024

Characteristic	**Value (Q1 2024)**
Working-age population	7,343,000
Employed	2,662,000
Unemployed	1,224,000
Not economically active	3,470,000
Discouraged work seekers	384,000
Unemployment rate	31.5%
Labour force participation	52.9%

(Source: Stats SA, Quarterly Labour Force Survey (QLFS), Q1 2024)

2.3. State of the mining and minerals sector in the province

As noted in the previous section, the mining sector in KwaZulu-Natal contributes the least to the province's total economic output. Despite this low contribution, there is significant potential to expand mining activities in KZN and translate these into meaningful socio-economic benefits, including job creation and community development. The province hosts a diverse range of mineral deposits, some actively being mined, others under prospecting or exploration. Key minerals mined or present in KZN include dimension stone, clay, building

sand, limestone, heavy mineral sands, coal, and limited quantities of uranium, nickel, copper, lithium, and rare-earth elements (REE).

Most of the mining activities in KwaZulu-Natal are conducted using open pit mining methods. The key minerals being mined include sand, stone and aggregate, clay (i.e., brick clay and kaolin), and dimension stone. From the Department of Mineral Resources List of Operating Mines, mining is taking place in the following areas – Richards Bay, Newcastle, Ladysmith, Pongola, Dundee, Hlobane, Vryheid, Stanger, and other locations within the province. Table 5 outlines KwaZulu-Natal's various mineral commodities and their associated properties and geographic locations.

Table 5: KwaZulu-Natal Mineral Commodities and Geology

Mineral	**Description and Key Details**
Dimension Stone	This term is used to describe naturally occurring rock that may be cut, shaped or selected for use in blocks, slabs, sheets or other construction units of specific shapes or sizes (Department of Mineral Resources, 2006). Dimension stone are used in cladding, curbing, paving and in memorials, for example as tombstones. They are mainly used for their architectural and engineering properties (Department of Mineral Resources, 2006) and also have decorative use. There are different types of dimension stone including granite, sandstones, slate, travertine, marble and others. Principal quarries are located in the Natal Metamorphic Province, with significant sites near Oribi Gorge, Sezela Suite (south of Scottburgh), and Mucklebraes near Port Shepstone. These stones are used in cladding, paving, memorials, and architectural features. Rehabilitation efforts at quarries are enforced to protect adjacent high biodiversity zones such as Oribi Gorge Nature Reserve.
Clay	Clays are naturally occurring, fine-grained, soil material with plastic properties containing clay minerals with (Department of

	Mineral Resources, 2008). There are different types of clays owing to the differences in origin, particle size distribution, mineralogical association and chemical constitution. Brick clay and kaolin deposits sustain brick and tile manufacturing industries, predominantly near Durban, Empangeni, and Newcastle. Clay types vary by particle size, mineral composition, and plasticity. The brick clay supports local construction, while kaolin serves ceramics, fillers, paper, and rubber sectors. Kaolin is a soft, white, plastic clay, comprising several minerals. Kaolin is an essential ingredient in the manufacturing of ceramics and is also used as filler in paper, plastics, paint, rubber, soap and adhesives.
Sand	Different types of sands are found in various parts of the province. These include building sand, silica sand and foundry sand. Building sand is pit sand that is used in construction. Silica sand is also called quartz sand - is composed primarily of silicon dioxide (SiO2) in the form of quartz. Silica sand finds use in many applications including glass manufacturing, ceramics and construction. Foundry sand is a specialized silica sand used to make moulds for metal castings. KwaZulu-Natal is home to various sand types include building sand, silica sand (quartz-based, vital for glass and ceramics), and foundry sand. Major legal production occurs along the North and South Coastlines, especially near Richards Bay and Empangeni. Illegal sand mining hotspots include the Umgeni and Tugela Rivers, threatening aquatic biodiversity and water quality. Efforts are underway for formalisation and environmental regulation.
Limestone	Limestone is a calcareous material or rock with limestone content of at least 70%. Limestone forms part of carbonate minerals which are primarily used for cement manufacturing, steel refining and agricultural purposes. Other uses are in construction

	(cement, mortar, building stone), manufacturing (glass, papermaking, water purification, adhesives and others). Limestone and calcitic marble are mined at Idwala Carbonates (Port Shepstone), Simuma Quarry, and Marble Delta. Limestone is crucial for cement, steel manufacturing, agriculture, and construction materials. Large carbonate reserves exist but smaller deposits remain untapped. Environmental controls require quarry rehabilitation.
Heavy Mineral Sands	KwaZulu-Natal is renowned globally for its heavy mineral sands containing ilmenite, rutile, zircon, and leucoxene. Mineral sands are deposits of sand that contain high concentrations of heavy minerals, and these may include key minerals such as These heavy minerals are economically important and titanium, zirconium, and rare-earth elements (REE). Major operations include Richards Bay Minerals (RBM) and Tronox KZN Sands, with mining focused on coastal dune fields (e.g., Zululand Dune Field). These minerals contribute to pigments, welding consumables, ceramics, and refractory production. Port Durnford mine's phased expansion (2025 to 2036) will transition to a higher throughput operation utilizing advanced dozer trap mining units. Tailings management and reclamation strategies are integral for environmental compliance.
Coal	Most of the coal in South Africa is used for electricity generation. The Karoo basin which contains the largest coal deposits in the country extends to Mpumalanga, KwaZulu-Natal, Limpopo, Free State and the Eastern Cape Province. KwaZulu-Natal's coalfields lie mainly in the northern interior around Vryheid, Newcastle, Nongoma, and Ulundi; reserves are primarily anthracite - high-quality coal used in metallurgical processes and export. Coal mining in these areas involves complex geology and faces

	environmental scrutiny, especially regarding water use and community impacts, exemplified by controversy around Somkhele mine. Railway links and the Richards Bay Coal Terminal are major export infrastructure.
Uranium	This is radioactive, silvery-white metal that is key source of nuclear power generation. Limited known deposits, mainly from prospecting stages, with historical focus near northern parts of the province. Uranium's use is primarily nuclear power generation, but no large-scale mining presently exists in KwaZulu-Natal.
Nickel, Copper, Lithium, Rare-Earth Elements (REEs)	Nickel finds use in many applications including the manufacture of industrial and consumer products such as stainless steel, magnets, and alloys (Department of Mineral Resources, 2009). Copper is a soft, malleable and ductile metal with very high thermal and electrical conductivity. Copper has many uses in jewellery making, electrical and electronics, and construction. It also has industrial applications that include use in equipment and transportation. Lithium is a soft, silvery-white alkali metal. It is used in used in the manufacture of lubricants, alloys, glass and ceramics. Its use in the manufacture of batteries is promoted globally as part of the Just Energy Transition. Geochemical surveys have identified promising zones in the northern and central interior, particularly Tugela Rand, Melmoth, and Ugu District. Lithium exploration is of interest due to its role in batteries for clean energy technologies. Nickel and copper deposits are associated with mafic-ultramafic complexes but are presently undeveloped or small scale. REEs exploration is emerging for future strategic importance.

(Source: Statistics South Africa, 2024; Department of Mineral Resources and Energy, 2024; Council for Geoscience, 2024)

Ferroalloys, aluminium, iron and steel, and phosphorus industries leverage KwaZulu-Natal's strategic port and rail infrastructure to support their operations. While raw mining of aluminium ore does not occur in KwaZulu-Natal, the province hosts South Africa's primary aluminium production facilities, notably the Hillside Aluminium smelter in Richards Bay. Hillside Aluminium is the largest aluminium smelter in the southern hemisphere, producing approximately 720,000 tonnes of primary aluminium annually as of 2024/2025. This positions Richards Bay as the country's aluminium industry hub, with well-established secondary aluminium processing industries benefiting from the efficient logistics infrastructure. (Mining Weekly, 2025; South32, 2025).

Mining activity in KwaZulu-Natal takes place both legally and illegally, with illegal sand mining emerging as a significant environmental and social concern, particularly along coastal and riverine areas. These unauthorised operations cause land degradation, erosion, habitat destruction, and water contamination, threatening biodiversity and community livelihoods (Mo et al., 2024; Maphanga et al., 2023). The surge in illegal sand mining is mainly driven by increased construction industry demand and limited economic opportunities in marginalized communities, where mining has become a critical source of income. Despite the regulatory framework established under the Mineral and Petroleum Resources Development Act (2002), enforcement gaps and the absence of formalized small-scale mining structures have allowed these activities to proliferate unchecked (IIEAI, 2024).

Beyond illegal mining, the formal mining sector in KwaZulu-Natal is constrained by multiple challenges including poor transportation infrastructure - especially in rural areas - ongoing disputes over land rights with local communities, and environmental sensitivities in fragile ecosystems such as the iSimangaliso Wetland Park and the Tugela River region (KwaZulu-Natal Treasury, 2023). Furthermore, persistent skills shortages, linked to broader educational shortcomings in the province, hamper mining sector development. Recognizing these issues, KwaZulu-Natal has prioritized skills development initiatives to foster socio-economic growth and support sustainable mining. Stakeholders have called for the formalization of illegal mining activities to mitigate adverse environmental impacts while unlocking economic

opportunities that could benefit impoverished communities reliant on small-scale mining for survival (Mo et al., 2024; Maphanga et al., 2023).

2.4. Skills analysis in the province

The labour force in KwaZulu-Natal (KZN) is characterised by a diverse range of skill levels, reflecting national employment trends across South Africa. This workforce can be broadly classified into skilled, semi-skilled, and unskilled categories. Skilled labour encompasses occupations that require specialised knowledge, formal education, vocational training, and substantial work experience. Semi-skilled workers typically possess vocational training, apprenticeships, or have acquired skills through on-the-job experience, often occupying roles in clerical, sales, and craft-related positions. Unskilled labour generally involves manual, repetitive tasks requiring minimal formal training (Trade and Industrial Policy Strategies, 2008).

According to Statistics South Africa's Quarterly Labour Force Survey (QLFS) data from 2024, approximately 18.7% of employed individuals in KZN hold skilled or professional positions such as managers, professionals, and technicians. Most of the workforce, about 43.8%, are semi-skilled, while unskilled or elementary occupations, including manual labour and domestic work, constitute roughly 37.6% of employment. This distribution indicates that semi-skilled workers form the largest segment of the province's employed labour force, followed by unskilled workers, with skilled workers representing the smallest share (Statistics South Africa, 2024).

Labour migration patterns in KZN have also evolved, with less pronounced outward migration compared to traditional mining provinces. The contraction of mining employment nationally has contributed to a decline in labour flows from KwaZulu-Natal to other mining hubs, as the province's economy increasingly shifts towards manufacturing, services, and agriculture (KwaZulu-Natal Treasury, 2023).

Regarding post-school qualifications, KZN's working-age population - including employed, unemployed, and discouraged work seekers - is predominantly qualified in education, training, health sciences, and various engineering disciplines, notably those classified under "Engineering" and "Engineering or Engineering Technology." Provincial surveys from 2019 estimate approximately 11,000 individuals hold qualifications in "Engineering or

Engineering Technology," with about 3,000 having qualifications exclusively within "Engineering." Employment rates among these groups are relatively robust, with about 62% of those holding Engineering qualifications and approximately 82% of those with Engineering or Engineering Technology qualifications being employed. Nevertheless, a significant minority remains unemployed or discouraged, highlighting the ongoing need for targeted skills development programs to improve employability within these fields (KwaZulu-Natal Provincial Skills Surveys, 2019; KwaZulu-Natal Treasury, 2023).

Some noted skills gaps in KwaZulu-Natal's workforce are detailed in Table 6. These were highlighted by the Local Government Sector Education and Training Authority (LGSETA) 2020 report and echoed in KZN Treasury and TIPS provincial analyses.

Table 6: Skills gaps in KwaZulu-Natal

Skills gaps (critical/top up skills)	Description of the skills gap
Productivity tools	This includes proficiency in programmes such as Microsoft Excel, PowerPoint, Word and project management.
Occupational health, safety and environment	This encompasses knowledge of safety, health and environmental management.
Communication and interpersonal skills	These include active listening, emotional intelligence, speaking skills, communication, presentation skills, social perceptiveness and sign language.
Writing skills	These include technical report writing/editing skills, business writing skills.

(Source: LGSETA, 2020)

2.5. Education and training landscape

KwaZulu-Natal boasts a well-established network of universities, Technical and Vocational Education and Training (TVET) colleges, and Community Education and Training (CET) colleges, all of which offer a wide array of skills development and training programs across various educational levels. The province is home to several major universities alongside a comprehensive TVET system, which collectively provide critical pathways into sectors such as mining, engineering, manufacturing, and related industries (KwaZulu-Natal Treasury, 2023; Trade and Industrial Policy Strategies, 2008).

Among the province's primary universities is the University of KwaZulu-Natal (UKZN), which operates campuses in Durban (Howard College, Westville, Edgewood) and Pietermaritzburg. UKZN offers an extensive selection of undergraduate and postgraduate programs spanning disciplines including chemical, civil, electrical, electronic, mechanical, and computer engineering, as well as geology, science, agriculture, commerce, law, humanities, health sciences, and education. Admission to university-level studies typically

requires a National Senior Certificate (Grade 12) with specific subject and performance prerequisites (University of KwaZulu-Natal, 2025; Mazibuko, n.d.).

Other notable higher education institutions in KwaZulu-Natal include the Durban University of Technology (DUT), which maintains campuses in Durban and Pietermaritzburg and provides nationally recognized diplomas and degrees in engineering, applied sciences, the built environment, and management sciences. Additionally, the Mangosuthu University of Technology (MUT), located in Umlazi, offers qualifications in engineering, natural sciences, and management fields, including programs related to mining (Durban University of Technology, 2025; Department of Higher Education and Training, 2025).

The province also features an extensive network of TVET and CET colleges that cater to vocational training and foundational education. Key public TVET colleges include Coastal KZN TVET College - which incorporates former Durban Technical College and other campuses around Durban South - Umgungundlovu TVET College based in Pietermaritzburg with satellite campuses in surrounding Midlands towns, Esayidi TVET College serving the South Coast region, Thekwini TVET College within the Durban metro, Elangeni TVET College covering Durban and surrounding areas, Majuba TVET College in Newcastle and northern KwaZulu-Natal, Mthashana TVET College in northern locales near Vryheid and Nongoma, and Mnambithi TVET College in the Ladysmith area.

Entry requirements for TVET programs generally include completion of Grade 9 for vocational courses, while National Diploma courses require a matric (Grade 12). These colleges provide focused studies in engineering disciplines such as electrical, civil, mechanical, mining, and chemical engineering, alongside business studies, mining-related short courses, information technology, hospitality, agriculture, and health care. CET colleges, most notably CET College KwaZulu-Natal, offer foundational numeracy, adult education, and community-oriented vocational skills programs requiring only basic literacy for entry (KwaZulu-Natal Department of Education, 2025; Department of Higher Education and Training, 2025).

Curricula at TVET and CET colleges are developed in collaboration with industry stakeholders, the provincial government, and sector partners to ensure the delivery of practical, relevant skills tailored to current economic needs. Several colleges, including

Majuba, Umgungundlovu, and Esayidi, work closely with the local mining and minerals industry to align their programs with critical sector requirements, offering specialized training in areas such as electrical engineering for mining operations, fitting and turning, instrumentation, and safety protocols (KwaZulu-Natal Treasury, 2023; Trade and Industrial Policy Strategies, 2008).

Skills development is further bolstered by numerous Sector Education and Training Authorities (SETAs), which implement targeted programs focusing on youth, women, and diverse communities across KwaZulu-Natal. The Mining Qualifications Authority (MQA) collaborates with multiple TVET colleges in the province, such as Umgungundlovu, Esayidi, and Majuba, to provide qualifications and learnerships vital for mining sectors, covering competencies like rock breaking, mineral processing, mine surveying, and health and safety standards (Mining Qualifications Authority, 2024; KwaZulu-Natal Treasury, 2023).

Other prominent SETAs with strong provincial engagements include the Manufacturing, Engineering and Related Services SETA (MerSETA), Local Government SETA (LGSETA), Agricultural SETA (AgriSETA), Education, Training and Development Practices SETA (ETDP SETA), Construction Education and Training Authority (CETA), and Services SETA. These organizations offer bursaries, artisan training, workplace learning, technical upskilling, and support initiatives for entrepreneurial and leadership development. Their training programs are conducted in partnership with TVET and CET colleges, universities, private training providers, and sector employers. The content and delivery of these programs are frequently updated in response to sectoral shifts, including the energy transition, expanded infrastructure projects, and emerging technologies in mining and manufacturing (KwaZulu-Natal Treasury, 2023; Trade and Industrial Policy Strategies, 2008).

Recent initiatives in KwaZulu-Natal have emphasized workplace-based learning in close partnership with mining companies and industrial hubs such as the Dube TradePort. These initiatives include artisan and apprentice programs targeting electricians and fitters, upskilling efforts aligned with emerging energy and techno-economic sectors, and targeted support aimed at fostering small business creation within the mining and beneficiation supply chains. Through strategic coordination among universities, Technical and Vocational Education and Training (TVET) colleges, Community Education and Training (CET) colleges,

and Sector Education and Training Authorities (SETAs), KwaZulu-Natal has positioned itself as a regional leader in cultivating a skilled workforce tailored to the needs of mining, industrial, and technological sectors. This integrated approach supports the province's broader economic development goals and enhances its capacity to respond to evolving industry demands (KwaZulu-Natal Economic Development, Tourism and Environmental Affairs, 2024; KwaZulu-Natal Economic Development, Tourism and Environmental Affairs, 2023).

Table 7 shows a break-down of KwaZulu-Natal's universities offering formal degrees in mining engineering, geology, and related engineering disciplines, alongside TVET colleges focused on practical vocational skills strongly aligned with mining and its supply chain.

Table 7: Post-school education and training institutions and mining related programmes

Academic Institutions	**Names**	**Programme offerings (related to mining)**
Universities	University of KwaZulu-Natal (UKZN)	Bachelor of Engineering (Mining Engineering)
		Bachelor of Science in Geology
		Bachelor of Engineering (Civil, Mechanical, Electrical, Chemical)
	Durban University of Technology (DUT)	National Diploma in Engineering (Electrical, Mechanical, Civil)
		Applied Science diplomas relevant to mining industry
	Mangosuthu University of Technology (MUT)	Diplomas in Engineering and Applied Sciences
Technical Vocational Colleges and other colleges	Esayidi TVET College	National Certificate Vocational (NCV) Engineering Studies (Levels 2-4)

Academic Institutions	Names	Programme offerings (related to mining)
		Electrical Engineering N4-N6
		Mechanical Engineering N4-N6
	Umgungundlovu TVET College	Engineering and Related Design (N1-N6)
		Fitting and Turning
	Majuba TVET College (Northern KwaZulu-Natal)	National Certificate Vocational (NCV) Engineering
		Learnerships in Mining-related artisan trades (boilermaker, fitter, etc.)
	Coastal KZN TVET College	Electrical Infrastructure Construction
		Mechanical Engineering Studies
	Thekwini TVET College	Electrical Engineering, Fitting and Turning
	Elangeni TVET College	Electrical Infrastructure Construction
	Berea Technical College	Welding, Plumbing, Carpentry, Mechanical Fitting

2.6. Skills development policies and initiatives

This section discusses policies, laws and strategies that support skills development and training. These are presented at three levels considering national frameworks, sectoral legislation and strategies and provincial development strategies.

2.6.1. National policy and strategy frameworks

The ***Constitution of the Republic of South Africa*** sets out the foundation for the country's socioeconomic development by placing its citizens at the centre. The Constitution aims to address the past injustices and in doing so, support the country in building a society that is based on democratic values, social justice, and fundamental human. Specifically, the Bill of Right enshrines fundamental rights and freedoms for all citizens and ensure that they are enjoyed by various groups within the country. The Bill of Rights promotes equality, human dignity, life, freedom and security, privacy, freedom of expression and others. Section 29 of the Constitution highlights the everyone's right "(a) to a basic education including basic education, and (b) to further education, which the state, through reasonable measures, must make progressively available and accessible" (South African government, 1996:12). This fundamental right has been realised through various legislative frameworks, one of which is the Skills Development Act (No. 97 of 1998).

The overarching goal of the ***Skills Development Act*** is to "provide an institutional framework to devise and implement national, sector and workplace strategies to develop and improve the skills of the South African work force" (South African government, 1998). The Act was enacted to address the skills gaps and enhance the overall skill level of the country's workforce closing the gap between skills supply and demand. Through the Skills Development Act, the National Skills Authority and National Skills Fund were established. More so, sector education and training authorities (SETAs) were formed. There are twenty-one (21) SETAs in the country, and they are mandated to drive skills development in the different economic sectors. The Mining Qualification Authority (MQA) supports skills development in the mining and mineral sector and its mission is to "ensure that the mining and minerals sector has sufficient competent people who will improve health and safety, employment equity and increase productivity standards".

Skills development in the country is also embedded in the country's socioeconomic development frameworks. This is because of the direct relationship between skills development and training and the triple challenges affecting the country (i.e., poverty, inequality and unemployment). The government established the ***National Skills Development Strategy (NSDS) III*** whose aim is to support the realisation of the ***National***

Development Plan – Vision 2030. The National Development Plan (NDP) aims to eradicate poverty and inequality by 2030. Specifically, the NDP is striving to reduce the percentage of households with income below R419 per person from 39% to zero in 2030. The NDP further aims to reduce the Gini Coefficient from 0.69 (i.e., in 2009) to 0.60 (i.e., in 2030) (National Planning Commission, 2012). The attainment of the NDP's targets has been linked to several priority areas and these include the need to: increase economic performance and employment, develop economic infrastructure, build an integrated and inclusive rural economy, improve education, training and innovation, and support the transformation of the country's society. These country's imperatives are to be achieved through several strategies. At the centre of these is the need to facilitate skills development in the country. In particular, the NDP has highlighted the need to provide access to young and unskilled workers into the labour market (National Planning Commission, 2012).

The National Skills Development Strategy III aims to address skills gaps and shortages and promote skills development in the workforce. It also aims to improve the efficiency and effectiveness of the skills development system (Department of Higher Education and Training, 2019). The NSDS III is tied to transformational imperatives in the country considering disparities that are seen across race, class, gender, location, age and HIV/AIDS status. In this regard, the NSDS promotes prioritisation of Blacks South Africans, women, youth, rural areas over urban areas, and people living with disabilities.

2.6.2. Sector policies and strategies

The ***Mineral and Petroleum Resource Development Act (No. 28 of 2002)*** is the primary legislation governing the mining and minerals sector in the country. Its overarching goal is to ensure equitable access and sustainable development of the country's mineral and petroleum resources (Government gazette, 2002). This is in recognition of the history of mining in the country that is characterised by discriminatory practices and the exploitation of mineral resources without consideration of social and environmental objectives that are key to the country's development agenda. To this end, the MPRDA has been instrumental in ensuring that South Africa's mining sector benefits all its citizens, particularly historically disadvantaged communities. Sector 100 of the Act called government to develop a broad-

based socioeconomic empowerment charter (i.e., mining charter) that will facilitate the transformation of the mining sector.

The holders of mining licences are obligated to comply with the ***Mine Health and Safety Act (MHSA)***, which serves as the cornerstone of occupational health and safety regulation within the mining sector. The primary aim of the MHSA is to safeguard the health and safety of employees and other individuals present at mining operations. This overarching goal is supported by several objectives including promoting the culture of health and safety, providing appropriate systems for employee, employer and the state ensuring participation in health and safety, promoting training and human resources development, among others (Republic of South Africa, 1996). Mining licence holders are responsible for ensuring that employees are adequately trained to identify, manage, and respond to the risks inherent in the mining environment. To this end, skills development is a critical pillar to achieving zero harm in the MMS.

Aligned to the objectives of the MPRDA, the ***Mining Charter III*** aims to facilitate sustainable transformation, growth and development of the mining sector (Government gazette, 2018). This objective is supported by several areas of intervention covering ownership, procurement, supplier and enterprise development, human resource development (HRD), employment equity (EE), mine community development, and housing and living conditions. Within human resource development, the charter talks to the need to (1) produce skilled, trained and diverse workforce to meet the needs of the mining sector, (2) develop skills that enhance productivity of workforce increasing the employability of disadvantaged South Africans, and (3) develop entrepreneurial skills to improve livelihood and create opportunities outside of mining (Government gazette, 2018).

To support these, mining companies are required to invest a minimum 5% of leviable amount (excluding the statutory skills development levy) on essential skills development activities such as development of science, technology, engineering and mathematics (STEM) skills, adult basic education and training, artisan training, learnerships, bursaries and other skills training initiatives for people in the community which include portable skills training (Centre for Applied Legal Studies, 2017).

The Mining Charter is implemented through ***Social and Labour Plans*** which SLPs outline the strategies that mining companies intend to use for community development, including their approaches to skills training. This framework aims to extend socio-economic benefits not only to workers but also to the host communities and labour sending areas (Benya, 2017). According to Centre for Applied Legal Studies (CALS) (2017), the rationale behind SLPs is to ensure that mining companies offer opportunities for workers and communities to benefit from local mineral resources. The implementation period of projects contained in SLPs is five years and mining companies are required to submit annual reports to the Department of Mineral Resources. The SLP projects needs to contribute towards mine community development, human resource development (HRD), employment equity, housing and living conditions, and address the impacts of downscaling and retrenchments (Department of Mineral Resources, 2010). The HRD programmes, specifically, need to accommodate both employees and communities equipping them with the skills that are relevant to mining as well as skills that can be used in other sectors of the economy (Centre for Applied Legal Studies, 2017).

Artisanal and Small-Scale Mining Policy

South Africa has seen a proliferation of artisanal and small-scale mining activities. These activities have been mostly driven by socioeconomic landscape in the country characterised by high unemployment and poverty rates. Most of these activities take place outside the requirements of the MPRDA, without appropriate mining licences. This has had negative consequences in the country negatively affecting several stakeholders including communities, government, mining companies and those who are working in ASM sites. To formalise the ASM, government released the ASM Policy in 2022 (Department of Minerals and Energy, 2022).

The primary objective of the policy is to formalise the ASM sector ensuring that they operate optimally and in a sustainable manner while contributing to the country's economy through taxes and job creation. The policy recognises that the ASM sector is beset with challenges and hence makes recommendations towards addressing these. The lack of skills and training within the sector is amongst the challenges and hence the policy highlights the importance of training, skills development and innovation. In particular, the policy alludes

to the need for collaboration with institutions such as MQA to cater for skills needs of the sector (Department of Minerals and Energy, 2022).

Beneficiation Strategy

Mineral beneficiation is defined as the "transformation of a mineral (or a combination of minerals) to a higher value product, which can either be consumed locally or exported" (Department of Mineral Resources, 2011: ii). It is a critical component of the mining value chain as it offers increased benefits in revenue generation and job creation. South Africa's beneficiation strategy was published in 2011 with the aim of "advance development through the optimisation of linkages in the mineral value chain, facilitation of economic diversification, job creation and industrialisation" (Department of Mineral Resources, 2011: v).

This is underscored by the concern that the level of beneficiation in the country remains relatively low. A substantial proportion of mineral products continue to be exported in raw or semi-processed form, limiting the country's ability to fully capture the economic and developmental benefits of its mineral wealth. Several factors have been linked to the low levels of beneficiation, with skills shortages identified as a critical barrier. The strategy has highlighted the need to "align the beneficiation skills pipeline to the National Skills Development Strategy and the Sector Skills Plans and promote skills development and partner with the relevant SETA's and institutions of higher learning for training and labour development" (Department of Mineral Resources, 2011:7).

Critical Minerals and Metals Strategy

In recent years, there has been a surge in global attention on critical minerals, driven by their strategic importance in enabling clean energy transitions, and technological innovation. Recognising its strategic position in the global mineral market, South Africa released its Critical Minerals and Metals Strategy in 2025. The strategy outlines a coordinated national roadmap to leverage the country's rich mineral endowment in a way that promotes inclusive growth, industrial development, and job creation (Department of Minerals and Petroleum Resources, 2025). As a leading global producer of several critical minerals including manganese, platinum group metals, vanadium, and rare earth elements,

South Africa is well-positioned to become a key player in the global value chains of emerging technologies such as electric vehicles, battery storage, renewable energy systems, green hydrogen, among others. While this is the case, the strategy recognises the bottlenecks in South Africa's MMS. To address this, the strategy is built on nine core pillars including skills development. Amongst the key areas of intervention is need to "prioritise skills development and training in high demand skills across the mineral value chain from exploration and mining to advanced processing, manufacturing, and even research" (Department of Minerals and Petroleum Resources, 2025: 30). This encompasses aligning occupational demand with education supply with higher learning institutions and developing accredited training programmes.

2.6.3. Provincial strategies

Alignment between national and provincial development strategies is essential to ensure policy coherence, optimise resource utilisation, and enable effective implementation of development programmes. It also facilitates coordination among government departments, industry stakeholders, communities, and development agencies. While national policy provides the framework, provincial and local strategies must be customised to the socio-economic context and factor endowments of each province. Factor endowments refer to the natural, human, and capital resources available within a region that are the foundation for economic activity – such as minerals, arable land, skilled labour, infrastructure, and investment capital (Ancheta et al. 2023).

KwaZulu-Natal Provincial Growth and Development Strategy (PGDS)

KwaZulu-Natal's development trajectory is guided by the KwaZulu-Natal Provincial Growth and Development Strategy (PGDS) 2016 to 2035, which articulates a long-term vision for the province to become a prosperous, innovative, and inclusive economy leveraging its strategic location as a gateway to Africa and the broader world. This vision emphasises a balanced approach that integrates social development, environmental stewardship, and economic transformation, aiming to uplift the quality of life for all residents while fostering inclusive growth and sustainable development (KwaZulu-Natal Planning Commission, 2016).

The PGDS sets out five strategic thematic goals that directly address KwaZulu-Natal's socio-economic challenges. First, it prioritizes inclusive and sustainable economic growth and job creation, focusing on revitalizing traditional sectors such as manufacturing, agro-processing, energy, and mining, alongside developing emerging sectors like green technologies, the digital economy, logistics, and tourism. Second, the strategy aims to cultivate a skilled, innovative, and empowered population by broadening access to quality education and training, spanning from foundational skills to post-school education, while promoting research and innovation partnerships among universities, TVET colleges, SETAs, and industry.

Third, it seeks to enhance health and well-being through improved healthcare access, disease prevention, and social support mechanisms to strengthen human capital. Fourth, the PGDS aspires to foster vibrant, equitable, and sustainable communities focusing on infrastructure upgrades, urban–rural integration, housing, and environmental management. Finally, the strategy emphasizes building capable, accountable, and developmental institutions that improve governance at provincial and local levels, with an emphasis on transparency, service delivery, and community participation (KwaZulu-Natal Planning Commission, 2016).

Mining remains a strategic sector in KwaZulu-Natal's economy, underpinned by the province's rich mineral resources and established extraction and processing infrastructure. The province's key mineral assets include coal deposits especially in the northern interior around Newcastle and Vryheid, heavy mineral sands concentrated at Richards Bay Sands, dimension stone, as well as emerging deposits of critical minerals such as lithium and rare-earth elements. The PGDS highlights the importance of promoting mineral beneficiation and value addition locally to maximize economic benefits rather than exporting raw materials. It also stresses the need for environmentally sustainable mining practices aligned with climate resilience and community protection mandates. Furthermore, inclusive growth is promoted through enhanced black economic empowerment (BEE) participation and community development initiatives linked to mining activities (KwaZulu-Natal Planning Commission, 2016).

KwaZulu-Natal Provincial Economic Growth and Development Strategy (PEGDS)

Building on the PGDS, the KwaZulu-Natal Provincial Economic Growth and Development Strategy (PEGDS) 2023 operationalizes these goals with a heightened focus on immediate economic renewal and capacity building to respond to post-COVID-19 recovery and shifting global economic conditions. Its mission commits to acting as a catalyst for sustainable, inclusive economic growth by fostering sound environmental management, attracting investment, and promoting broad-based socio-economic participation (KwaZulu-Natal Department of Economic Development, Tourism and Environmental Affairs, 2023).

The PEGDS delineates six core objectives: improving the province's economic absorption capacity through enhanced skills development, infrastructure upgrades, and digital economy readiness; stabilizing and revitalizing vulnerable sectors such as mining, manufacturing, agriculture, and tourism affected by commodity cycles and local disruptions; protecting existing productive capacity via economic shock mitigation and modernization incentives; diversifying the economy by reducing reliance on volatile sectors and promoting new industries including renewable energy, logistics hubs, and innovation-driven enterprises; expanding productive capacity through public-private partnerships and infrastructure rollouts, especially in mining value chains; and transforming capital and asset ownership by facilitating meaningful black economic empowerment and supporting SMMEs, cooperatives, and entrepreneurship, particularly among youth and women (KwaZulu-Natal Department of Economic Development, Tourism and Environmental Affairs, 2023).

A critical emphasis of the PEGDS is on skills development tailored to the demands of the Fourth Industrial Revolution (4IR). This includes training in digital skills, data analytics, automation, and green technologies as key enablers of industrial modernization. The strategy fosters partnerships among universities, TVET colleges, SETAs, and private sector stakeholders to develop responsive curricula aligned with sector needs. It also expands capacity-building programs that integrate SMMEs and cooperatives into provincial supply chains, notably in mining equipment, services, and beneficiation. Addressing sector-specific skills shortages - in petrochemicals, agro-processing, heavy manufacturing, and mining safety and health - is a priority to ensure the province's economic resilience and innovation capacity

(KwaZulu-Natal Department of Economic Development, Tourism and Environmental Affairs, 2023).

The effective implementation of these strategies relies on strong coordination among a broad spectrum of stakeholders. Provincial government departments such as Economic Development & Tourism, Transport, Human Settlements, and Health work in tandem to align policymaking and program delivery. Local municipalities play a critical role through the design and execution of Local Economic Development (LED) plans consistent with provincial priorities. The private sector, including major mining companies like Richards Bay Minerals and Buffalo Coal, industrial zones such as Dube TradePort, and logistics operators, collaborates to synchronize investment and skills development efforts. Education and training institutions, including the University of KwaZulu-Natal, Durban University of Technology, TVET colleges, and SETAs, provide the technical proficiency, innovation capacity, and workforce development necessary to support these objectives (KwaZulu-Natal Department of Economic Development, Tourism and Environmental Affairs, 2023).

Integrated Development Plans

The Integrated Development Plans (IDPs) are a key component of South Africa's strategy for promoting economic growth, job creation, and sustainable development (de Wet et al., 2020). They integrate economic, social, environmental, and fiscal strategies to allocate resources efficiently, ensuring alignment with community and stakeholder needs over a five-year period, with annual reviews for adaptation. The main objectives of IDPs include fostering economic growth, improving quality of life, promoting environmental sustainability, and managing fiscal resources effectively. In the Northern Cape province, all district municipalities have developed their respective IDPs, which serve as strategic frameworks for guiding development priorities, coordinating service delivery, and aligning local initiatives with provincial and national goals.

District Development Model

The District Development Model (DDM) is a national initiative introduced by the government in 2019. It was developed at the back of this concern: "Lack of coordination between national and provincial governments, between departments and particularly at local government

level, has not served the country. The pattern of operating in silos has led to lack of coherence in planning and implementation and has made monitoring and oversight of government's programme difficult" (Department of Cooperative Governance, n.d). To this end, the DDM was developed to address challenges in governance, planning, and implementation by fostering integrated development at the district level. The DDM is situated within the principle of "One District, One Plan".

According to the South African Local Government Association (SALGA) (2021), the DDM is designed to foster synergy between national, provincial, and local priorities, while enabling the implementation of immediate priority projects. The model introduces a collaborative planning process undertaken at local, district, and metropolitan levels by all three spheres of government. This process culminates in the development of a single, strategically focused "One Plan" for each of the 44 districts and 8 metropolitan municipalities across South Africa. THE DDM approach is critical to skills development as it promotes integrated planning and coordination involving multiple stakeholders at different levels. By aligning local economic development initiatives with national skills strategies, the model helps ensure that training and capacity-building efforts are responsive to the specific needs of each district.

2.6.4. Skills development initiatives in the province

KwaZulu-Natal's approach to mining skills development is strategically targeted across the province's key mining districts. This strategy is driven and coordinated by the Mining Qualifications Authority (MQA) in partnership with provincial government, local authorities, Sector Education and Training Authorities (SETAs), higher education institutions, and industry stakeholders. The MQA provides national sector guidance, skills funding, and ensures skills programmes respond to industry needs and regulatory requirements (Mining Qualifications Authority, 2024). These collaborative initiatives are designed to address critical skills gaps by focusing on youth employability, artisan development, small business support, and increased community participation in the mining economy (KwaZulu-Natal Department of Economic Development, Tourism and Environmental Affairs, 2023; Mining Qualifications Authority, 2024). Some notable district-level development initiatives in KwaZulu-Natal are outlined in the following paragraphs.

In the Amajuba District Municipality, which includes notable coalfields around Newcastle and Utrecht, the Majuba Coal Mining Skills Development Initiative (2024–2026) has been launched. This partnership between the KwaZulu-Natal Department of Economic Development, Tourism and Environmental Affairs, Majuba TVET College, the Mining Qualifications Authority (MQA), Buffalo Coal, and MerSETA, targets 200 unemployed youth, aged 18–35, from nearby rural communities. These learners participate in accredited learnerships at NQF Levels 3 to 5 in plant operation, electrical fitting, mechanical engineering, and mining safety. The programme deliberately integrates 30% classroom theory at Majuba TVET College and 70% workplace experiential learning at partner mines. Mentorship is provided by experienced mining technicians, and each learner receives a stipend, personal protective equipment, and practical toolkits. The initiative adopts a strong gender-equity approach, with at least 35% of places reserved for women. Expected outcomes target a 70% employment rate within mining or related industries within two years of programme completion (Majuba TVET College, 2024; Mining Qualifications Authority, 2024).

In Zululand District Municipality - especially in the mineral sands-intensive regions around Richards Bay and KwaDukuza - the Zululand Heavy Mineral Sands Skills Development Programme (2023–2025) operates as a partnership between Tronox KZN Sands, Esayidi TVET College, the MQA, and LGSETA. This initiative develops technical skills among 150 local youth in mineral processing, plant operations, and environmental management. Training programmes are SETA-accredited at NQF Levels 2 to 4, covering electrical infrastructure construction, mechanical maintenance, and mineral processing. Each cohort completes six months of theoretical training at Esayidi TVET College, followed by 12 months of on-site mentorship at Tronox - with participants also benefitting from transport assistance, work attire, and developmental workshops including communication and health and safety. Notably, the curriculum incorporates entrepreneurship boot camps to inspire and equip graduates to launch mining service businesses (Esayidi TVET College, 2024; Tronox KZN Sands, 2023; LGSETA, 2024).

Umzinyathi District Municipality, featuring mining communities in Dundee and Estcourt, is home to the Skills Development for Small-Scale Mining and Beneficiation programme (2023–2025). A collaboration of Umgungundlovu TVET College, the MQA, MerSETA, and the

provincial Department of Mineral Resources and Energy, this project supports 120 historically disadvantaged and female participants with practical training and business skills for entry into artisanal and small-scale mining and beneficiation. Training takes place at NQF Levels 3 to 5 in fitting and turning, boiler making, welding, and general mining operations, with a mix of 40% theory and 60% mine-site learning. Participants are also guided through business setup, legal compliance, and the governance of mining cooperatives, each receiving ongoing mentorship post-training to ensure sustainable economic participation (Umgungundlovu TVET College, 2024; Mining Qualifications Authority, 2024).

In Uthukela District Municipality, the Uthukela Mining Artisan Skills Empowerment Project (2024–2026) specifically addresses artisan skills shortages for mines and heavy industries in areas such as Ladysmith and Bergville. Implemented by the KwaZulu-Natal Department of Economic Development, Tourism and Environmental Affairs, Thekwini TVET College (extension campuses), the MQA, and MerSETA, the programme enrols 100 beneficiaries each year in full learnerships and ARPL. Specialisations include electrician, millwright, fitter, and turner. The project integrates both traditional artisan skills and contemporary mining-specific modules on safety, technological change, and environmental stewardship. Apprenticeships extend over 12 months, featuring structured workplace exposure at local mines and suppliers. Additionally, life skill sessions addressing financial literacy and health awareness are incorporated to foster holistic professional development (KwaZulu-Natal Department of Economic Development, Tourism and Environmental Affairs, 2023; MerSETA, 2024).

In eThekwini Metropolitan Municipality, particularly within the Dube TradePort industrial precinct, an advanced Mining and Industrial Skills Development Programme (2023–2025) has been implemented. This initiative, in collaboration with Durban University of Technology, Mangosuthu University of Technology, Dube TradePort Corporation, the MQA, and MerSETA, facilitates work-integrated learning (WIL) for up to 200 final-year and postgraduate engineering and applied science students annually. Learners gain placements with leading mining equipment manufacturing and beneficiation companies, tackling advanced manufacturing, process engineering, automation, and green energy modules, as well as digital mining skills and sustainability practices. The academic structure is tightly linked with the real needs of the mining sector, exposing students to research, innovation, and industry best

practice (Durban University of Technology, 2024; Mangosuthu University of Technology, 2024; MQA, 2024).

Across KwaZulu-Natal, these programmes exemplify an integrated strategy that prioritises inclusive access (youth and women), balances theoretical qualifications with practical skills, and strongly supports business, cooperative, and entrepreneurial development. All activities are rooted in the National Skills Development Plan and the Mining Charter and fully support the province's PGDS and PEGDS priority goals of skills transformation, job creation, and economic inclusion through mining-led value chains (KwaZulu-Natal Department of Economic Development, Tourism and Environmental Affairs, 2023; Mining Qualifications Authority, 2024).

2.7. Conclusion

In line with the objectives of the study, the chapter provided insights into the socioeconomic landscape of the province and discussed the state of the Mining and Minerals Sector (MMS) within KwaZulu-Natal. It also included an analysis of skills, the education and training landscape, and the skills development policies and initiatives that have been implemented in the province. The socioeconomic profiling of the population revealed that the province has been experiencing growth and includes a significant youth population, which presents both opportunities and challenges for future development. Females account for the largest share of the population. While the province boasts the highest proportion in South Africa of individuals who have completed secondary education, there remains considerable scope for improvement in KwaZulu-Natal's overall education and skills profile.

Like many other provinces, KwaZulu-Natal continues to grapple with high unemployment and poverty levels, despite having several economic sectors that present potential opportunities for growth and development. The key sectors include government services, private services, trade, finance, agriculture, manufacturing, and construction. Mining is the smallest sector in the province both in terms of its contribution to Gross Value Added (GVA) and employment. However, there are mineral deposits that provide opportunities for small-scale mining initiatives.

For the province to maximise benefits from not only the MMS but also other strategic economic sectors, KwaZulu-Natal must address its existing skills shortages. From the skills analysis, it was established that the working-age population has a substantial proportion of unskilled labour, and several skills gaps exist particularly in emerging economic sectors such as petrochemicals, green technology manufacturing, agro-processing, and auto-manufacturing.

Addressing skills shortages requires a multifaceted approach involving various stakeholders. There are numerous institutions in the province that offer a wide range of post-school programmes capable of supporting skills development aligned with the needs of the MMS and other economic sectors. Additionally, many skills development programmes have been implemented through collaboration between government, training institutions, Sector Education and Training Authorities (SETAs), and other stakeholders. These interventions are underpinned by national and provincial policies and strategies that promote skills development as a key measure to address unemployment in the country.

3. APPROACH TO THE STUDY

3.1. Introduction

This chapter outlines the methodology employed in the study, detailing the research design, data collection and analysis methods, research reliability and validity, ethical considerations, and study limitations. The methodology is underpinned by a conceptual framework which guided the selection of methods, shaped the interpretation of findings. This was important in ensuring alignment between the research objectives and the overall analytical approach.

3.2. Conceptual framework underpinning the study

Figure 19 illustrates the conceptual framework that guided this study in both in terms of data collection and interpretation of the results. The framework was adapted from the Skills Supply and Demand Analysis Framework developed by the Department of Higher Education and Training (DHET) to inform skills policy and planning responses. Within this framework, skills development needs are understood as a factor of skills supply and skills demand. The Department of Higher Education and Training (2022:16) defines skills supply as *"skills possessed by individuals who are either working (the employed) or willing, able and available to work (the unemployed)".* It speaks to the *"what is there"* – both in terms of the availability and quality of the skills. As depicted on the framework, this is established through educational levels, demographics, occupational skills, training programmes and labour market participation.

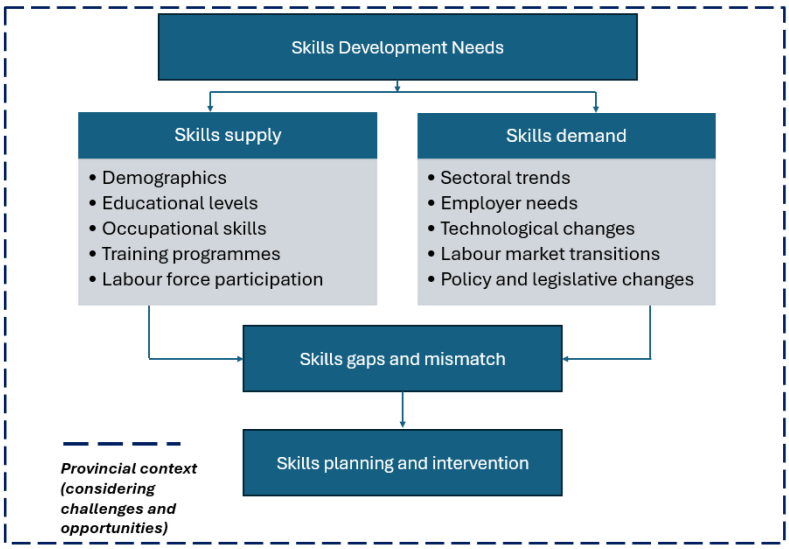

Figure 8: Framework for the analysis of skills supply, demand and mismatches

(Adapted from Department of Higher Education and Training, 2022)

Skills demand, on the other hand, is defined as *"human resources and competencies required by employers at prevailing wages rates to meet their operational needs at a given point in time"* (Department of Higher Education and Training, 2022:16). It reflects the current and future needs of the economy and employers – essentially, *"what is required".* Several factors have a bearing on skills demand, and these include sectoral trends, employer needs, technological changes, labour market transitions, policy ad legislation changes, amongst others.

The interaction between supply and demand may result in skills imbalances, which occur when there is a misalignment between the skills available and those required. These imbalances can manifest as skills shortages where demand exceed supply as well as skills mismatch where available skills are inadequate relative to the job requirements (Department of Higher Education and Training, 2022).

Skills imbalances therefore highlights the need for skills planning and intervention. It is important to note that the analysis of skills supply and demand is embedded within the provincial context recognising that skills needs and labour market dynamics vary across regions. This localisation ensures that interventions are respond to the challenges and opportunities in the province.

3.3. Research design

A mixed method research approach was adopted for the study. This encompasses the use of both qualitative and quantitative research methods to respond to research questions (Kemper et al, 2003). This method is selected because it takes advantage of the strengths of various methods ensuring a well-rounded understanding of the issues being investigated. Its main benefit is that it can study a phenomenon from different perspectives leading to a comprehensive understanding of the subject matter.

Qualitative methods, as used in the study, are designed to gather non-numeric data which is critical in understanding the nuanced aspects of the research topic (Sardana et al, 2023). Quantitative methods, on the other hand, involve the collection of data (i.e., both numeric and categorical) that can be analysed statistically providing insights that are measurable

(Sardana et al, 2023). Practically, this method is deemed suitable to provide understanding of skills development which is a multifaceted issue affecting different stakeholders. The use of a mixed method ensured that both the depth and breadth of the issue are explored, leading to broader understanding of the interventions needed to address the issues in Northern Cape province.

3.4. Data collection methods

Both primary and secondary data was collected in the study. The latter was collected through a systematic literature review. This is a process where relevant literature is identified, assessed and synthesised into different components of the study (Carrera-Rivera *et al,* 2022). The sources of data includes both published and grey literature with the latter encompassing unpublished reports obtained from different stakeholders such as the MQA, mining companies, local municipalities and others.

Primary data was collected through community surveys and key informant interviews. A total of 869 participants. Figure 9 shows the distribution of the responses. Figure 9 presents the distribution of these responses. Data collection was conducted in nine of the eleven district municipalities in the province; uThukela and King Cetshwayo were not included due to challenges in securing fieldworkers in those areas. As shown in the figure, participation rates across the nine municipalities are relatively well distributed ranging from 10% to 12%. Data was collected in several locations including Durban, Pinetown, Ray Nkonyeni, Umdoni, Umziwabantu, Umlazi, Umzumbe, Pongola, Waterfall, uMzimkhulu, Osizweni and other areas in the province.

Key informant interviews were conducted to complement the survey data and generate deeper insights into the province's skills needs. The key informant interviews were held with mining companies, and post-school education and training (PSET) institutions. Mining company representatives provided valuable perspectives on the specific skills required to support mining operations, existing skills gaps including hard-to-fill vacancies, economic opportunities that could be leveraged for skills development, and the range of skills development programmes available to surrounding communities, as well as key stakeholders and potential areas for collaboration.

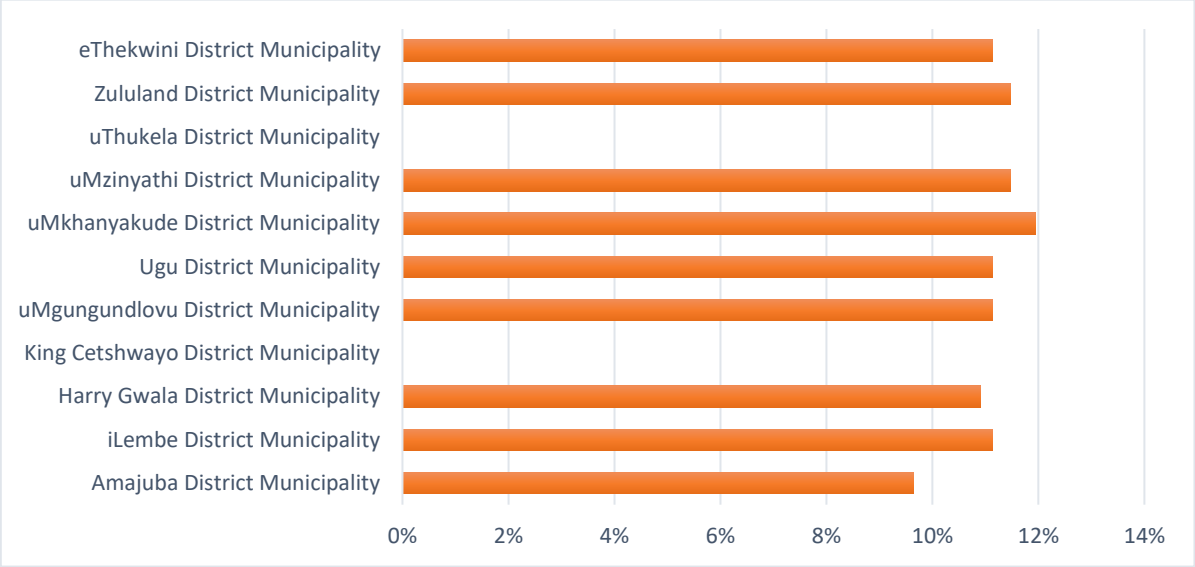

Figure 9: Distribution of survey participation rates across the province

The representatives from PSET institutions offered insights into the courses and training programmes they provide that align with the minerals and mining sector, programmes currently in high demand, the skills development needs required to support the broader provincial economy, and the challenges and opportunities associated with expanding or strengthening skills development initiatives. They also highlighted relevant stakeholders and potential partnerships that could enhance programme delivery and relevance.

3.5. Data analysis methods

The quantitative data was analysed using Microsoft Excel to establish frequencies and percentages, providing insights into the distribution and trends within the data. The qualitative data was analysed content analysis where key themes were extracted as guided by the key questions that were posed.

3.6. Research reliability and validity

Research reliability and validity are important measures in research that ensure the quality and trustworthiness of the research and findings being presented (Kazman and Othman, 2016). Validity is concerned with the accuracy and the truthfulness of the findings whereas reliability is defined as the extent to which the results of the research can be reproduced when repeated under same conditions (Abowitz and Toole, 2010). There are various methods that can be used to establish validity and reliability of quantitative and qualitative research.

In this study, reliability and validity of the qualitative components of the study was established using the triangulation methods. Triangulation is a process where data from a research study is cross-referenced to ensure validity and reliability (Kazman and Othman, 2016). In this study, three triangulation methods were used. Specifically, data triangulation which involves the use of multiple data (i.e., primary and secondary data), investigator triangulation where multiple researchers collect and analyse the data (i.e., see project team in 7.2), and methodological triangulation which encompass the use of different approaches to collect and analyse data (i.e., see data collection methods) (Heale and Forbes, 2013).

3.7. Ethical considerations

The study was conducted in line with the University's research requirements. During the research, ethical requirements were followed. The key components of the ethics include:

- Risk level – The risk associated with the study is minimal. As defined by the University, minimal risk encompasses research where questions are posed about people's everyday lives, activities and opinions rather than detailed demographic information. In the study, the participants will not be asked to provide personal information.
- Anonymity – This could not be guaranteed during data collection because of the sampling techniques and data collection methods that were used in the study. Anonymity was maintained in the final report. The study findings are presented in a generalised and aggregated format to protect participant identities.
- Confidentiality – The information collected during the data collection was not shared with anyone outside of the research team. Data has been securely stored and was analysed for this study.
- Consent - Informed consent was obtained from all participants prior to their participation in the study. Participants will be provided with information about the study and the nature of their participation. They were given an opportunity to ask questions and seek clarity on the aspects that were not clear. Both verbal and written consent will be sought from the participants.

3.8. Challenges encountered during the study

The main challenge encountered during data collection was a noticeable decline in participants' willingness to take part in the study. Several Participants expressed concerns about whether research outputs would translate into tangible benefits for their communities. In addition, many indicated that they had already participated in similar studies in the past and were therefore reluctant to engage again.

3.9. Conclusion

The purpose of the chapter was to discuss the methodology employed in the study. A mixed methods research design was adopted for the study, incorporating both quantitative and qualitative methods of data collection and analysis. Specifically, data was gathered through literature review, surveys and key informant interviews. The research was conducted in line with ethical requirements ensuring that consent was obtained from the participants prior to taking part in the study. Overall, the research design and supporting methods facilitated data collection and analysis that effectively addressed the study's objectives. The next chapter presents the results an discusses key findings emerging from the study.

4. RESULTS AND KEY FINDINGS

4.1. Introduction

This chapter presents the results of the study, organised into three main sections. The ***first section*** outlines findings related to the skills supply in the province. It includes an overview of Participant demographics, education levels, employment status, occupational skills need, and participation in training programmes. Understanding these aspects is critical for assessing the province's skills supply. In particular, the demographic and educational data help establish the profile of the available labour force. This indicates whether the province has a sufficient pool of skilled, semi-skilled, and unskilled individuals to support economic activities. Information on occupational skills needs reveals where shortages or gaps exist within the labour market.

The ***second section*** turns attention to skills demand, presenting insights on the specific skills required to support mining operations, existing skills gaps including hard-to-fill vacancies, economic opportunities available in the province, and the range of skills development programmes accessible to surrounding communities. Understanding the demand side is essential for determining how well the current skills supply aligns with industry and economic requirements, and for identifying priority areas where targeted interventions.

The ***third section*** brings these insights together by synthesising the supply and demand findings to identify key implications and priority areas for the province. This integrative analysis highlights where the most significant gaps lie, the opportunities that can be leveraged, and the strategic focus areas that should guide future skills development planning and intervention in the Northern Cape province.

4.2. Skills supply in the province

4.2.1. Demographics

The demographic information presented in this subsection includes gender and racial representation, age distribution, and educational attainment, including post-school education profiles. It also covers disability prevalence and the types of disabilities reported in the province.

Gender and racial profile

Figure 10 presents the gender distribution of the community members who participated in the study. Overall, female participants accounted for approximately 51% of the total sample, while male participants made up about 46%. The gender composition, however, varied across district municipalities. Higher levels of female participation were observed in the Amajuba, eThekwini, uMgungundlovu, uMkhanyakude, and uMzinyathi district municipalities. Overall, there is adequate gender representation across the municipalities, which is essential for providing balanced insights on the skills needs of different cohorts.

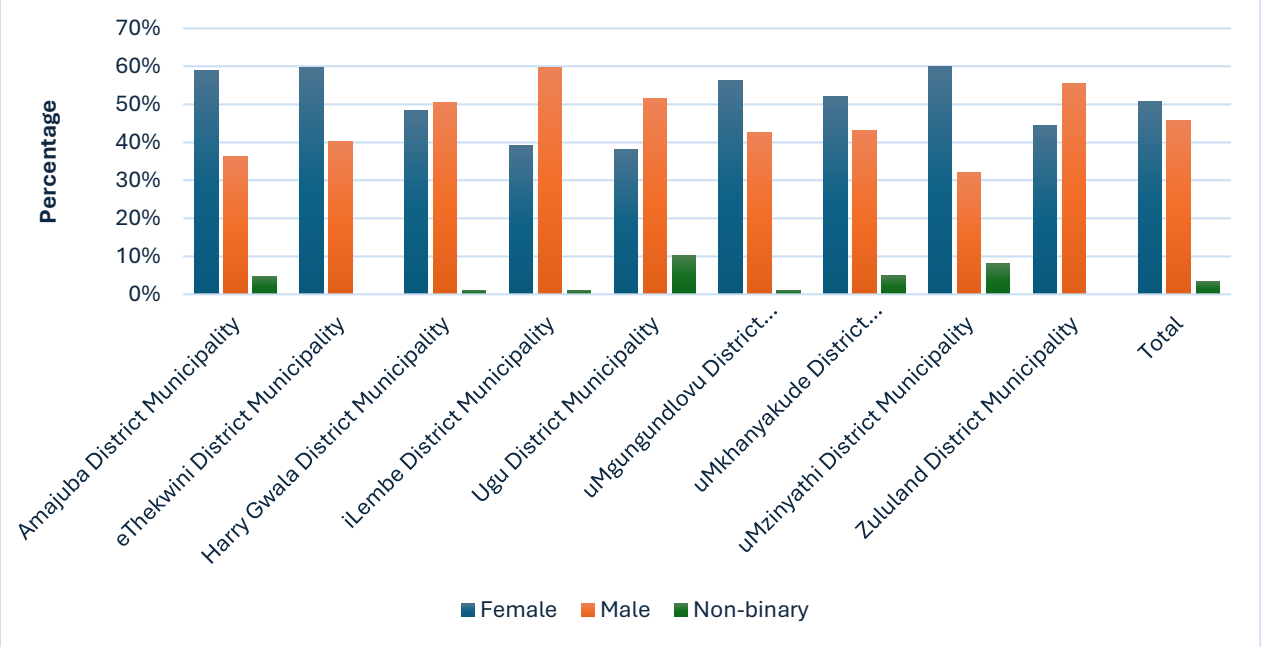

Figure 10: Gender distribution

In terms of racial representation, Black accounted 87%, followed by Coloureds at 6%. The remaining percentage are White and Indian community members.

Age distribution

Figure 11 illustrates the age distribution of participants in the study. The largest share of respondents falls within the 18 to 25 years (i.e., 43%), followed by those aged 26 to 35 years (i.e., 30%). Taken together, individuals aged 18 to 35 years account for approximately 74% of all participants, highlighting the strong representation of youth in the study. This youth concentration is seen in Ugu (i.e., 78% aged 18 to 25), Zululand (i.e., 76% aged 18 to 25), and iLembe (64% aged 18 to 25). The figure also shows concentration of older youth (25 to 25 years) in Harry Gwala (i.e., 44%), uMgungundlovu (i.e., 44%) and uMkhanyakude (i.e., 37%).

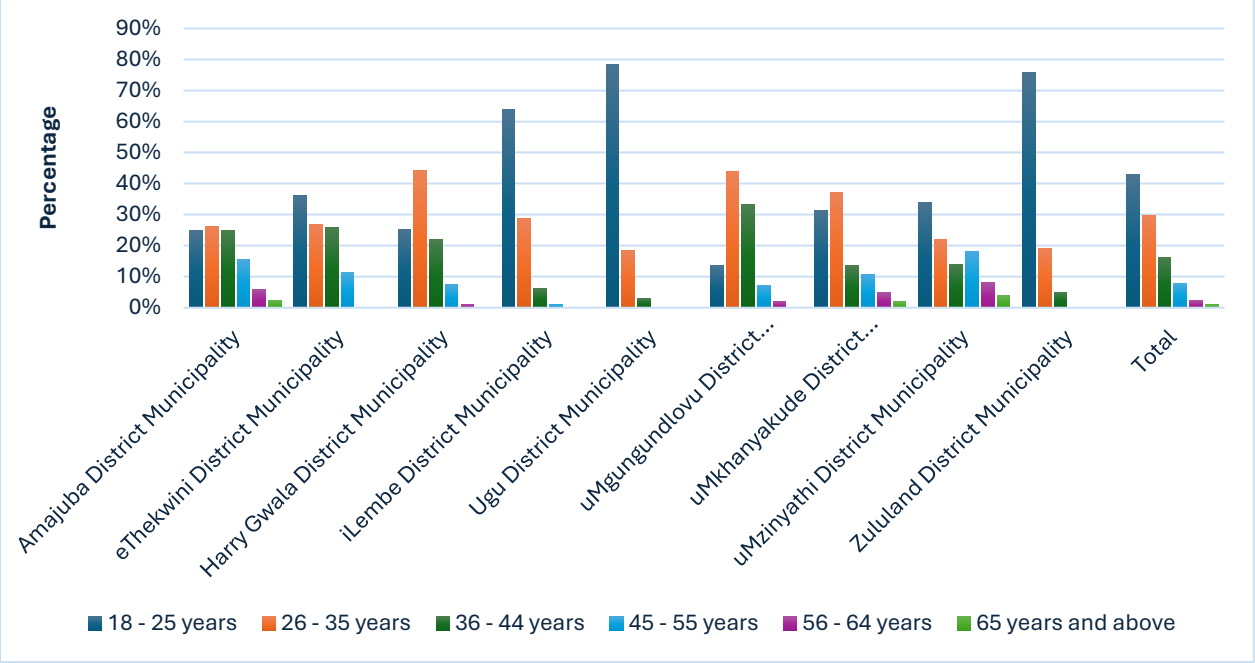

Figure 11: Age distribution

Education levels

Figure 12 presents the educational attainment of participants across the province. As shown, matric is the most common highest level of education, accounting for approximately 47% of the participants. This is followed by those whose highest level of schooling is Grade 11 or its equivalents, making up around 12% of the sample. The remaining participants are distributed across lower schooling levels (Grade 10 and below), and a smaller percentage holding post-school qualifications.

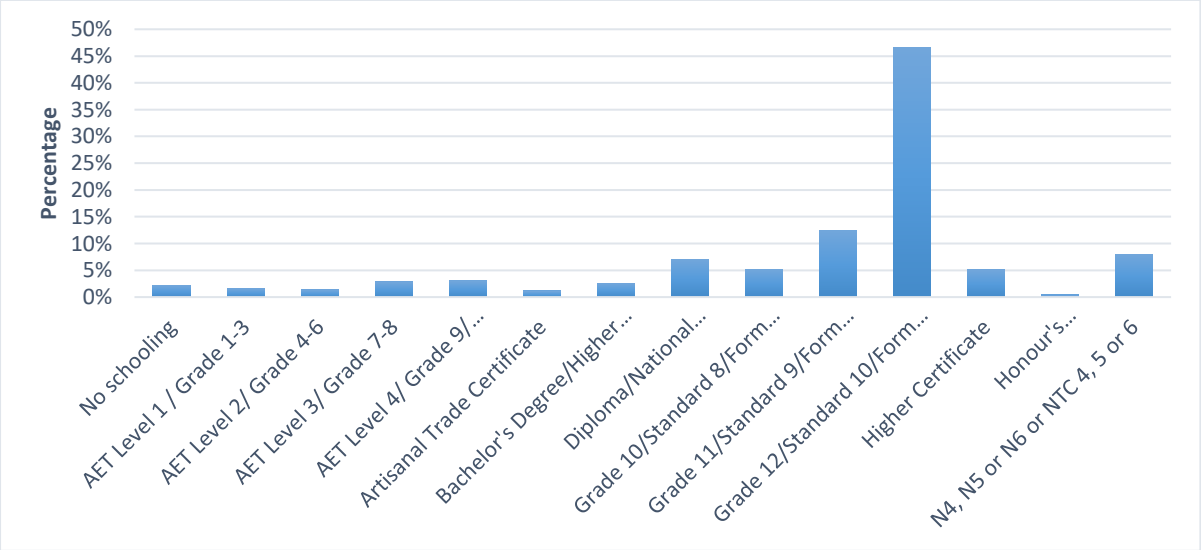

Figure 12: Education levels

When disaggregating education levels across district municipalities, two cohorts emerge, some districts show very high “No Matric” shares while others have strong “further education” pipelines (i.e., See figure 13). The municipalities with a large percentage of participants with “no matric” are Amajuba (i.e., 67%), uMzinyathi (i.e., 50%), and Zululand (i.e., 46%). It is also seen that less than 5% of the participants in Amajuba have matric. By contrast, matric attainment is strongest in Ugu (i.e., 68%), iLembe (i.e., 64%), and Harry Gwala (i.e., 63%). Notably, uMgungundlovu leads on “Further education” (i.e., 40%), followed by uMzinyathi (i.e., 32%) and Amajuba (i.e., 31%), suggesting a sizeable base of post-school qualifications in those areas, even where schooling gaps persist.

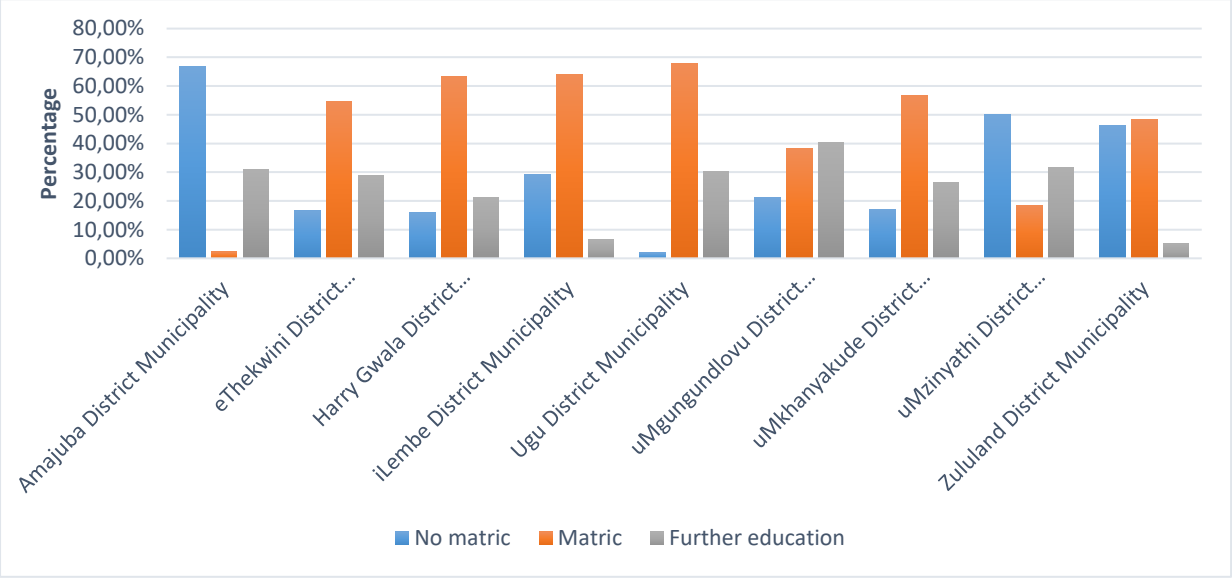

Figure 13: Education levels across district municipalities

Figure 14 illustrates the level of education pressure across district municipalities, based on the proportion of participants who have not completed matric. This indicator is a critical signal of where foundational learning gaps are most pronounced and where skills development and training interventions should be prioritised. The results highlight Amajuba, uMzinyathi, and Zululand as districts with comparatively higher education pressure, underscoring the need for targeted interventions in these district municipalities.

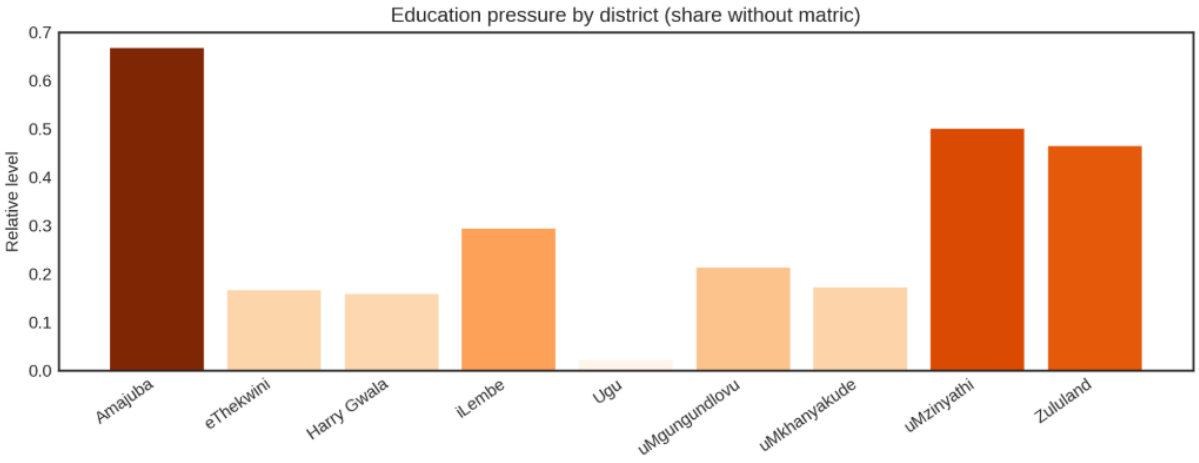

Figure 14: Education pressure by district municipality

When assessing the education levels of community members, participants were also asked to indicate the subjects they completed at school (see Figure 15). The data shows that the top five subjects completed are Life Sciences (Biology), Mathematics, Mathematical Literacy, Geography, and Physical Sciences. Notably, several of these subjects fall within the STEM (Science, Technology, Engineering, and Mathematics) domain, which is important in accessing technical, scientific, and industry-aligned training opportunities.

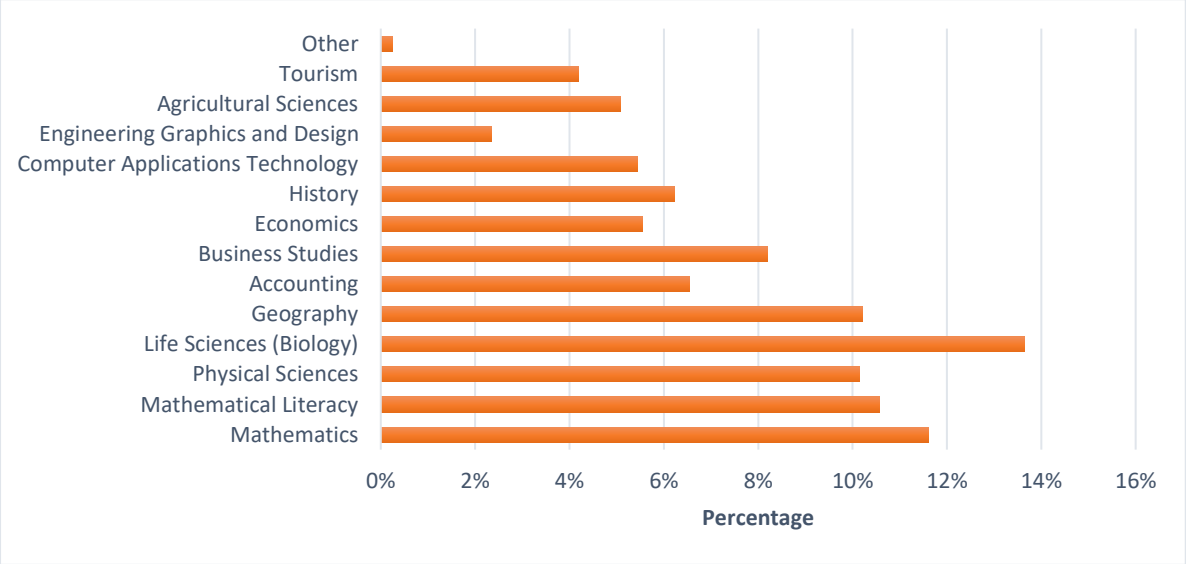

Figure 15: Subjects taken at school by community members

Although the proportion of participants who completed pure Mathematics is higher than those who completed Mathematical Literacy, there are concerns that learners are moving away from Mathematics. When asked why learners are opting out of pure Mathematics, the majority of respondents (approximately 25%) indicated that they find the subject difficult. Other key factors contributing to this shift include a limited understanding of the importance

of Mathematics for future career opportunities, poor teaching methods, and a fear of failing, which learners feel could negatively affect their overall academic performance. Together, these challenges highlight the need for targeted support to improve Mathematics confidence, teaching quality, and career awareness in schools.

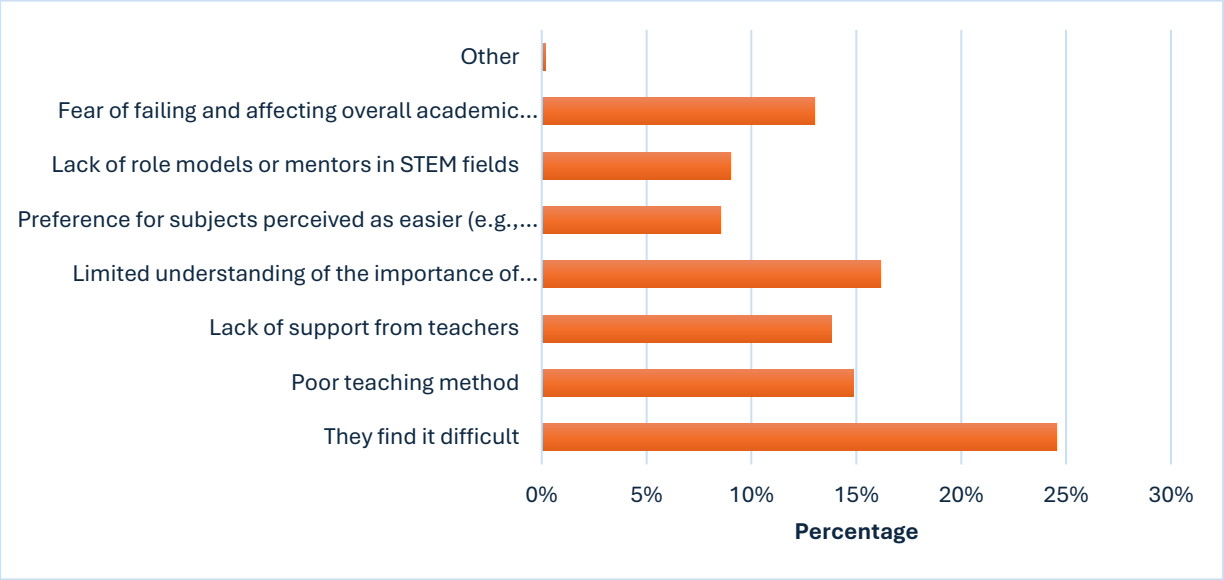

Figure 16: Reasons for not selecting Mathematics at school

As previously highlighted, the proportion of participants with post-matric qualifications is relatively low across the province. To better understand the areas of study pursued by those who do hold such qualifications, participants were asked to indicate the disciplines in which they had completed further education. As shown in Figure 17, these qualifications span a wide range of fields, with notable concentrations in Mining Engineering (12%), Education (10%), and Business Administration (10%). Other areas include Mechanical and Electrical Engineering (each at 9%), Finance (9%), Information Technology (5%), Environmental Science (5%), Health Sciences (4%), and Law (4%). This distribution suggests that although post-school attainment is limited, there is representation across both technical and professional fields, including disciplines aligned with STEM and industrial development priorities.

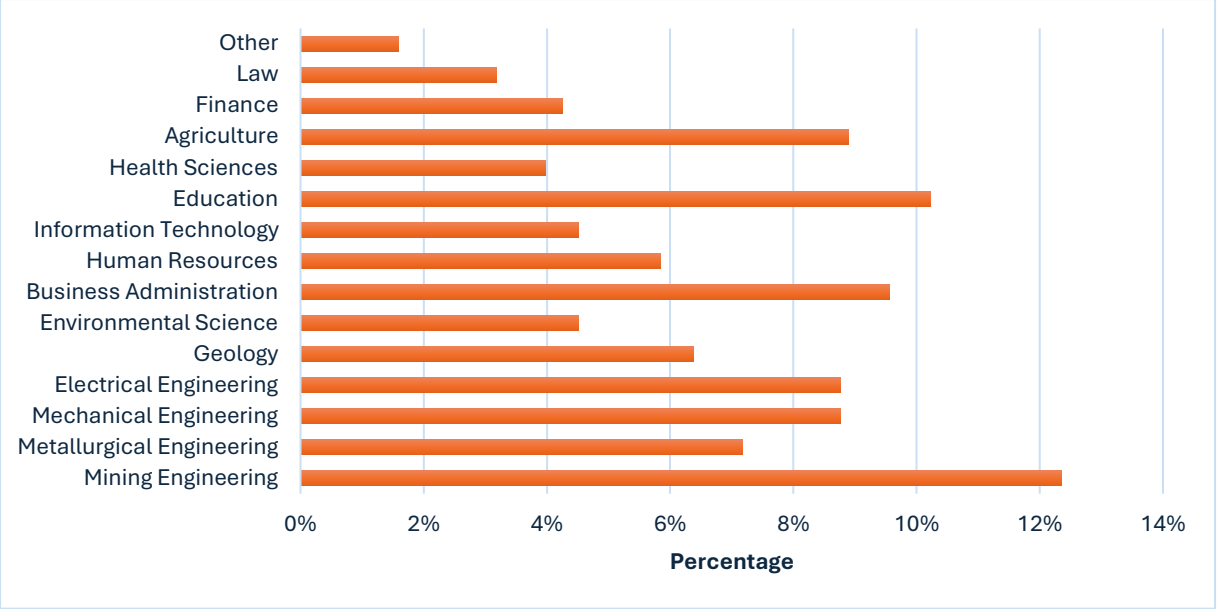

Figure 17: Post-matric qualifications amongst the participants

Key to the data collection was understanding why individuals with a matric qualification choose not to pursue higher education (i.e., See figure 18). The participants cited lack of funding/bursaries (i.e., 30%), limited nearby institutions (i.e., 20%), poor academic performance (i.e., 21%), and the need to work and support family (i.e., 19%). A further group highlighted that higher education does not guarantee employment (i.e., 11%). Several areas of support were highlighted (i.e., see figure 19), and these include bursaries (i.e., 29%), career guidance (i.e., 24%) and mentorship from graduates and/or professionals (i.e., 18%).

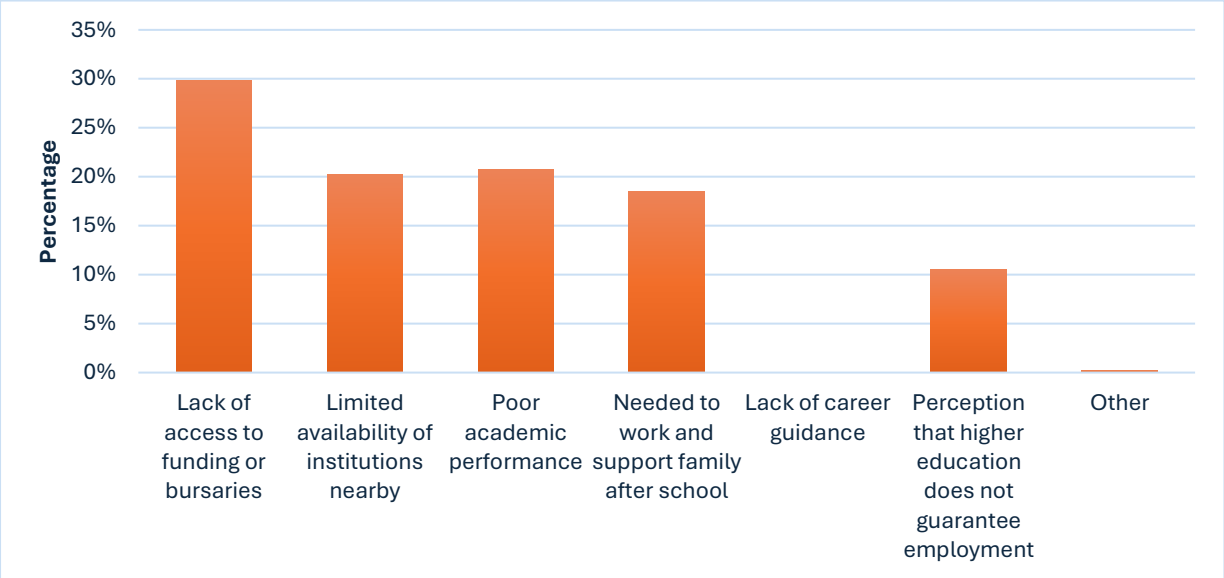

Figure 18: Factors affecting post-school progression

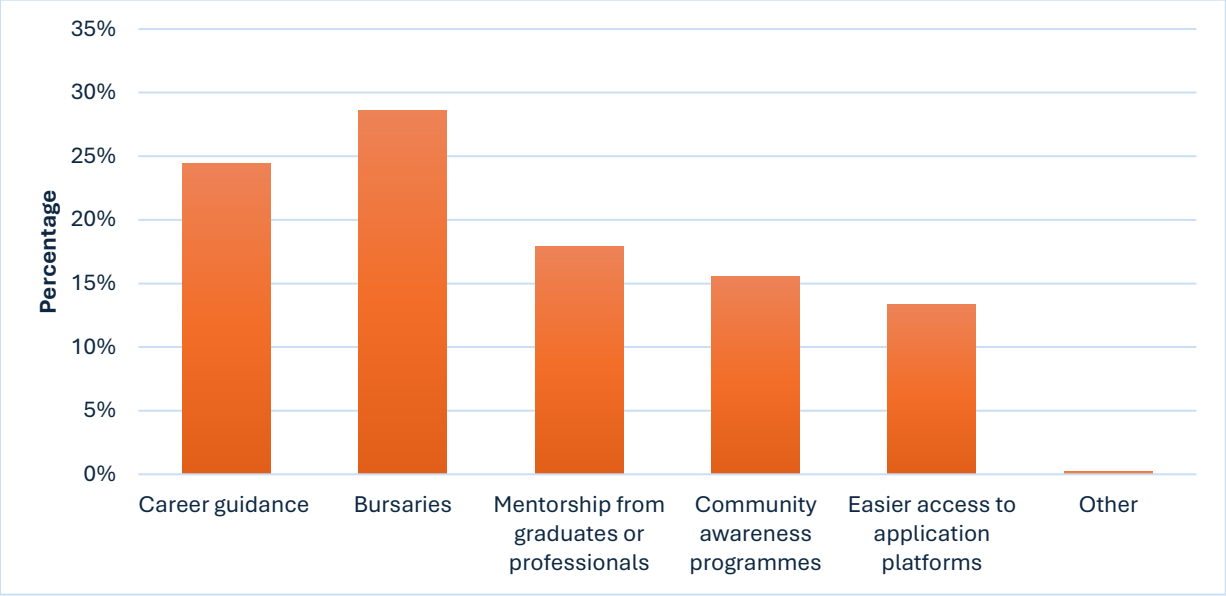

Figure 19: Support needed by matriculants for further education

Disability status

As part of developing the demographic profile of communities in the province, participants were asked whether they were living with a disability. Only 5% of the participants reported having a disability and this was in three municipalities, Amajuba, uMzinyathi and Zululand.

4.2.2. Employment status

Part of the study was to establish employment levels in the province, and these are shown in figure 20. Majority of the participants (i.e., 46%) fall under the "unemployed and looking for work" category. Only 19% indicated that they are employed full time. Across district municipalities, the highest unemployment is found in uMzinyathi (i.e., 76%), Amajuba (i.e., 73%), and iLembe (i.e., 60%), while Ugu is an outlier with a small percentage being unemployed (10%), likely due to its very large student cohort (i.e., 79%) who took part in the study. Full-time employment is strongest in eThekwini (i.e., 46%) and uMgungundlovu (i.e., 41%). These patterns show that different parts of the province have different job situations. Some areas have very high unemployment, while others, especially the bigger towns and places with more education opportunities, can absorb more people into jobs.

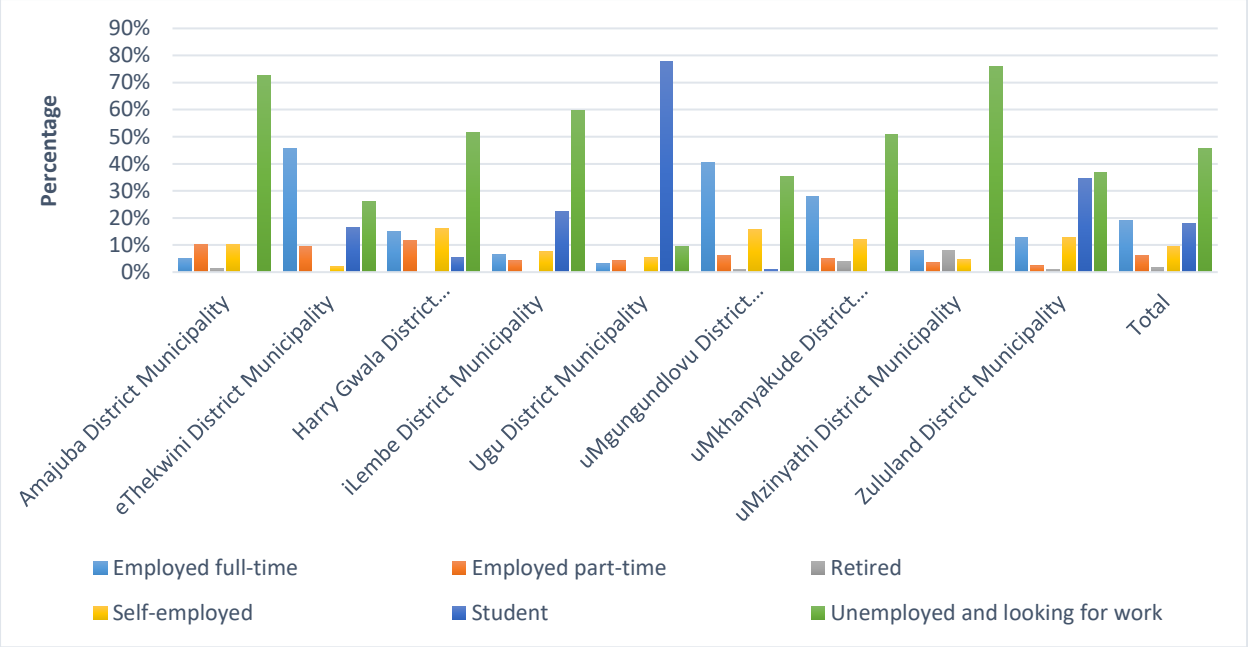

Figure 20: Employment status

Building on the above information, Figure 21 presents unemployment pressure across district municipalities, based on the proportion of participants who are currently not working. This visual is particularly useful for identifying districts where labour market challenges are most acute and where responsive interventions should be prioritised. The findings point to Amajuba, uMzinyathi, and iLembe as exhibiting notably high unemployment pressure, signalling an urgent need for targeted employment-focused initiatives in these districts.

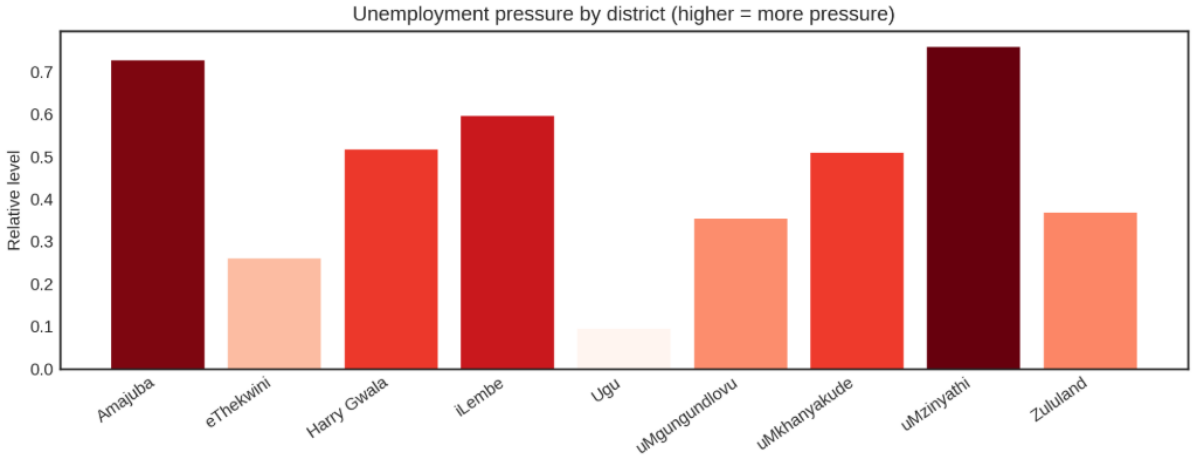

Figure 21: Unemployment pressure by district municipality

Figure 22 shows the economic sectors in which participants are employed. Overall, most employment is concentrated in General Government Services, Finance/Real Estate/Business Services, Construction, and Agriculture, while Mining appears only in a few district municipalities. The leading sector differs from one district to another. Zululand has the highest share of participants working in Mining (i.e., 25%), with Amajuba (i.e., 18%) also showing mining activity. In the case of uMkhanyakude, employment is in Finance and Business Services, while employment in Government Services is dominant in uMgungundlovu and eThekwini. In iLembe, government employment is also considerable supported by Agriculture and Construction. Together, these patterns show that each district has its own economic landscape, shaped by local industries and opportunities.

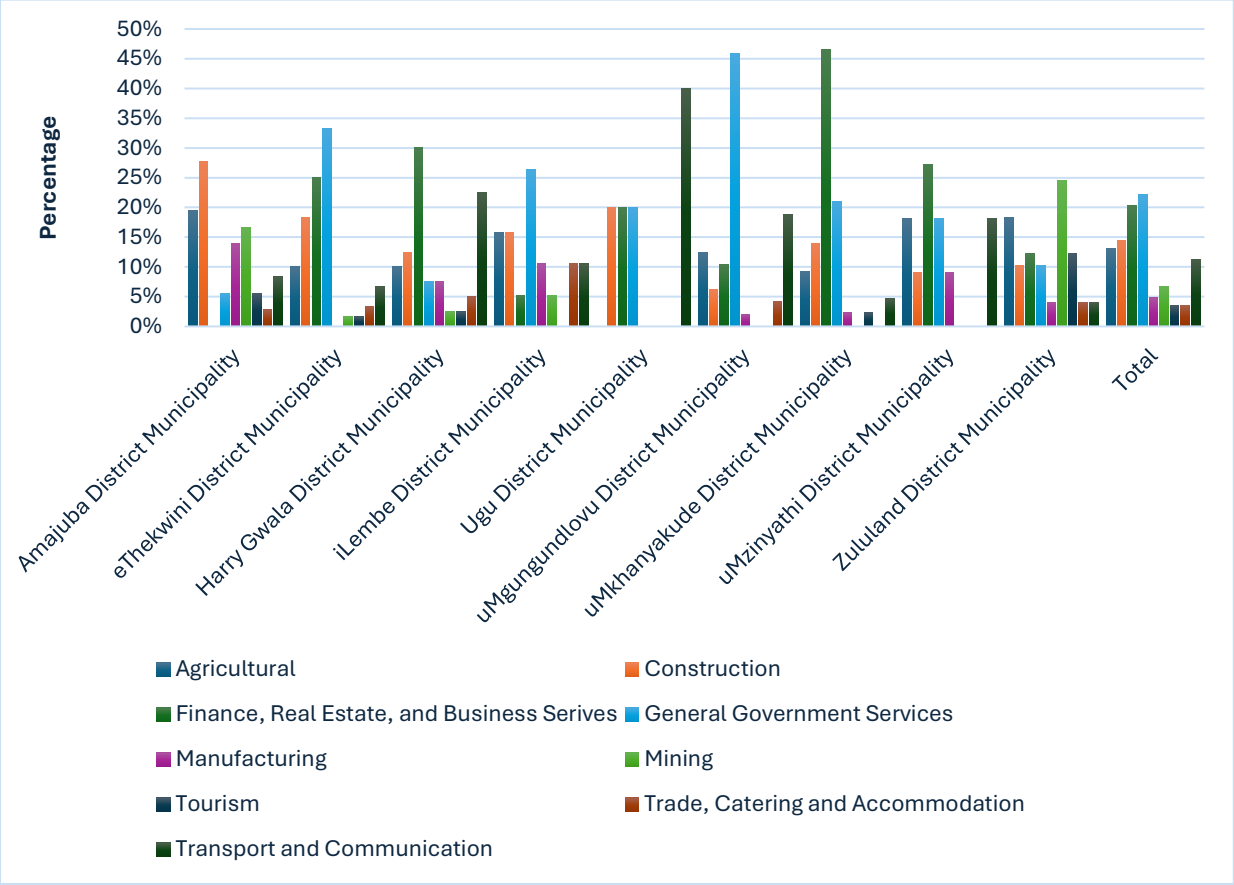

Figure 22: Employment by economic sector

Sectors of self-employment

From figure 23, about 10% of the participants shared that they are self-employed. As seen on figure 21, self-employment activity is most associated with Finance/Business services (~i.e., 6%), followed by Transport/Communication (i.e., 18%), Construction (i.e., 15%), and Agriculture (i.e., 9%). Only 5% of the businesses are in Mining with smaller percentages in

Manufacturing and Government-related services. While the figure is not district-disaggregated, links can be drawn with dominant sectors in the different district municipalities. For example, uMkhanyakude's strong finance/services base may support related micro-enterprise, while Amajuba shows potential in construction-linked self-employment and Zululand offers opportunities in agriculture and mining.

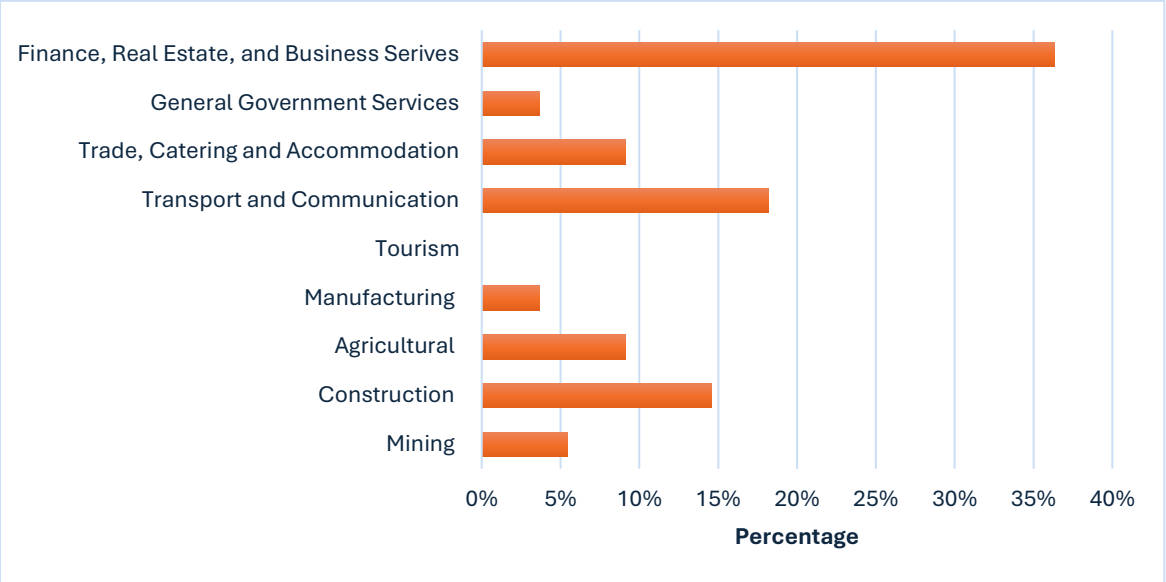

Figure 23: Sectors of self-employment

Sources of income

Figure 24 depicts the sources of income in the province. The main sources of income are social grants (i.e., 54%) and salaries (i.e., 37%), with business income (i.e., 8%) and other (i.e., 0.8%) constituting small shares. The figure presents province-wide totals only (no district split). However, when read together with the employment-by-sector results, districts with higher formal employment (e.g., eThekwini, uMgungundlovu) are likely to contribute more to salary-based income, whereas districts with high are expected to depend on social grants.

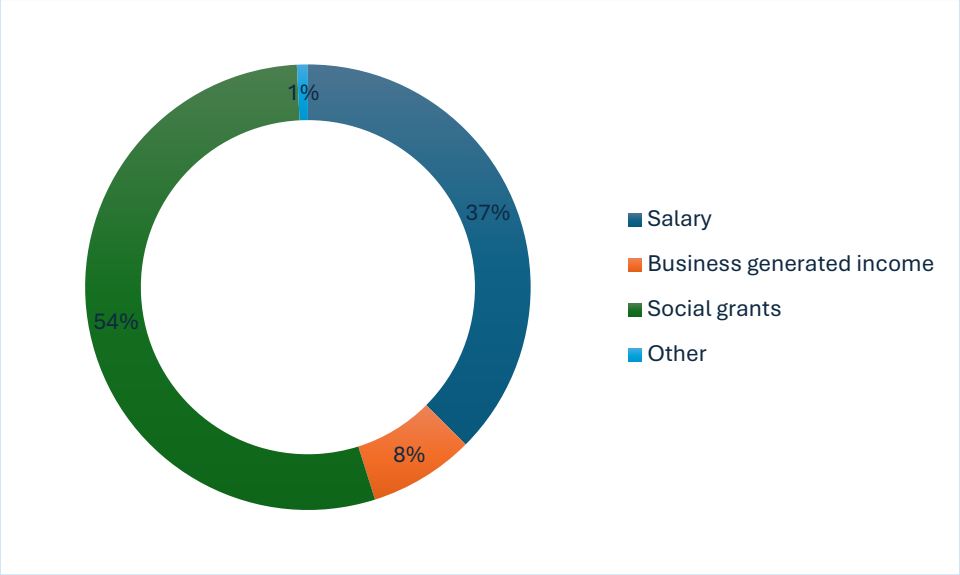

Figure 24: Sources of income in the province

4.2.3. Establishing skills needs of the community members

Skills needed by community members

This section outlines the skills required to support increased participation in the mining and minerals sector. Figure 25 outlines the skills identified the participants. Across the district municipalities, the most cited skills for mining participation are Electrical Engineering, Mining Engineering, and Occupational Health and Safety (OHS), and Mechanical Engineering. Overall, there is interest in a mix of engineering, safety compliance, and production-based occupations.

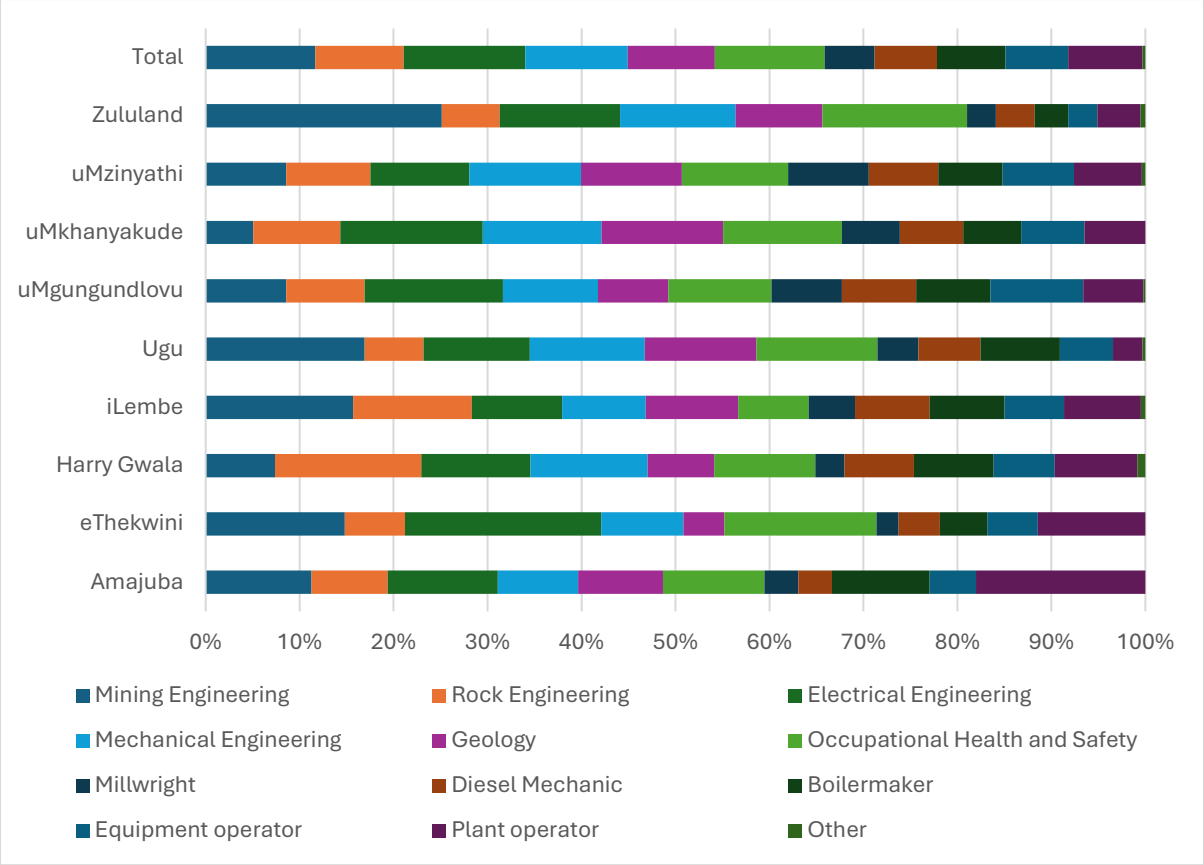

Figure 25: Skills identified by communities to support participation in MMS

With a large percentage of the participants falling under the youth category, they were asked about specific skills needed by young people in the province (i.e., See figure 26). As captured on the figure, young people see technical skills and soft skills (communication, teamwork) as being important for employability, followed by mentorship and leadership training. Entrepreneurship is important but ranks lower overall, suggesting many young people first want to secure job-readiness before starting businesses. Across district municipalities, eThekwini and iLembe weighted technical skills most; Harry Gwala, uMgungundlovu, uMkhanyakude, uMzinyathi and Zululand placed soft skills at the top; Ugu identified mentorship; Amajuba placed leadership training and entrepreneurship slightly ahead of technical and soft skills.

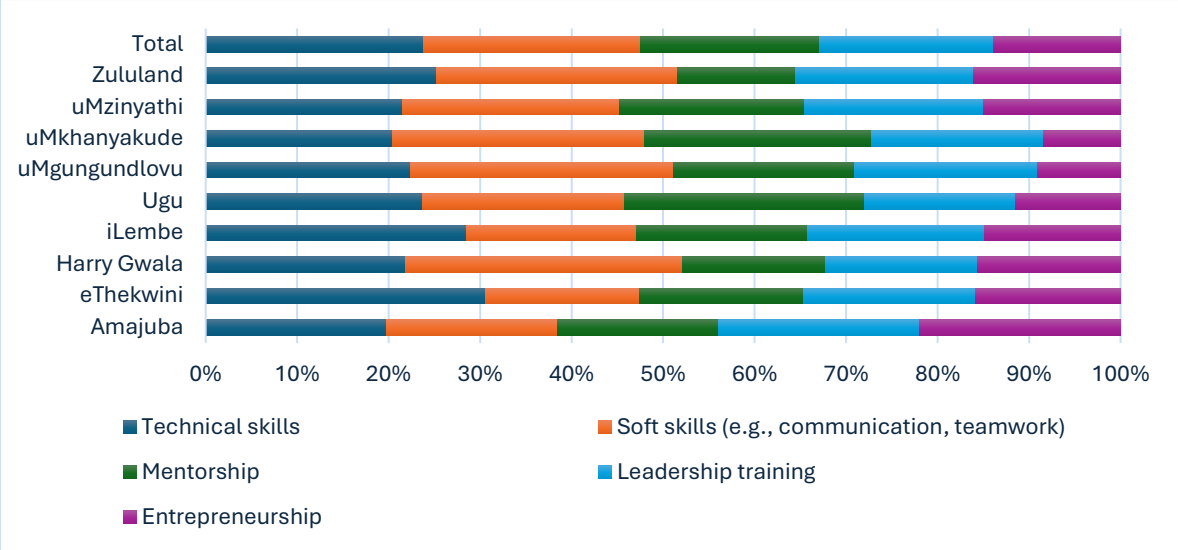

Figure 26: Specific skills needed by young people in the province

Figure 27 is a word cloud capturing direct submissions from the participants. The overall findings highlight that young people in the province recognise the importance of both foundational soft skills and technical capabilities in supporting participation in the labour market. Communication, teamwork, problem-solving, adaptability, emotional intelligence and leadership dominated the responses, highlighting awareness that these transferable skills support employability across industries. The view is that without strong soft skills, youth will continue to struggle to access opportunities even with technical qualifications. They also mentioned mining, engineering, agriculture, welding, carpentry.

In addition, business management, financial literacy, entrepreneurship, and project management were highlighted with them noting the need for skills that will enable them to create their own opportunities amid high unemployment. They also made references to digital literacy, robotics, and artificial intelligence highlighting the importance of 4IR skills in the labour market.

Figure 27: Word cloud capturing direct submissions from the participants

Emerging skills in the province

Part of the study was to establish community awareness of emerging skills, particularly those associated with technological advancements in the MMS. Participants were first asked whether they were familiar with the concepts of Fourth Industrial Revolution (4IR) technologies, automation within the mining sector, and renewable energy. While there was mention of 4IR skills by some participants, overall, familiarity is limited with only about 29% being familiar with 4IR, 19% with automation in MMS), and about 37% with renewable energy.

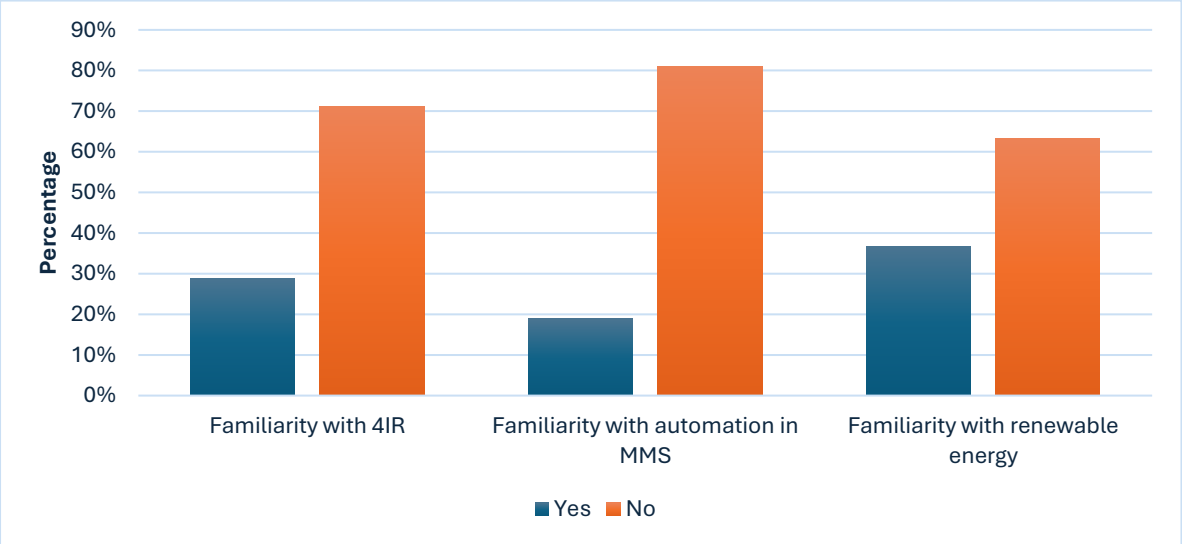

Figure 28: Familiarity with 4IR, automation and renewable energy

Key economic sectors and cross sector skills

In addition to the MMS and emerging industries, the province's economic landscape includes several sectors that present opportunities for community participation (i.e., See figure 29). The major sectors identified by community members that are offering economic opportunities in the province are agriculture (i.e., 23%), construction (i.e., 21%) and manufacturing (i.e.,20%). Tourism (16%) and renewable energy (12%) also have a notable share. At a district level, agriculture was ranked high in Ugu, iLembe, and Zululand; construction leads in Ugu, eThekwini and uMgungundlovu; manufacturing tops Harry Gwala, uMkhanyakude, and uMzinyathi; Amajuba balances agriculture with manufacturing, tourism, construction and renewable energy.

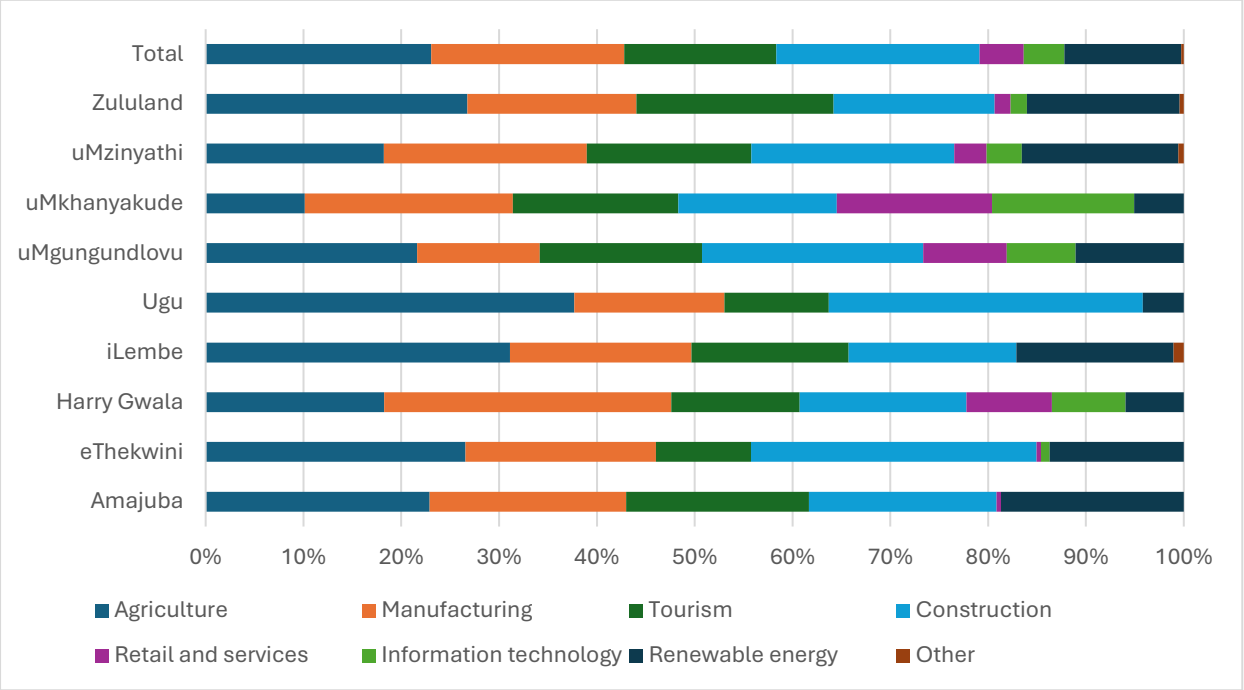

Figure 29: Key economic sectors offering opportunities across the province

Figure 30 presents a heat map showing the perceived key economic sectors in the province. The four main sectors as identified by the participants are agriculture, manufacturing, tourism and construction.

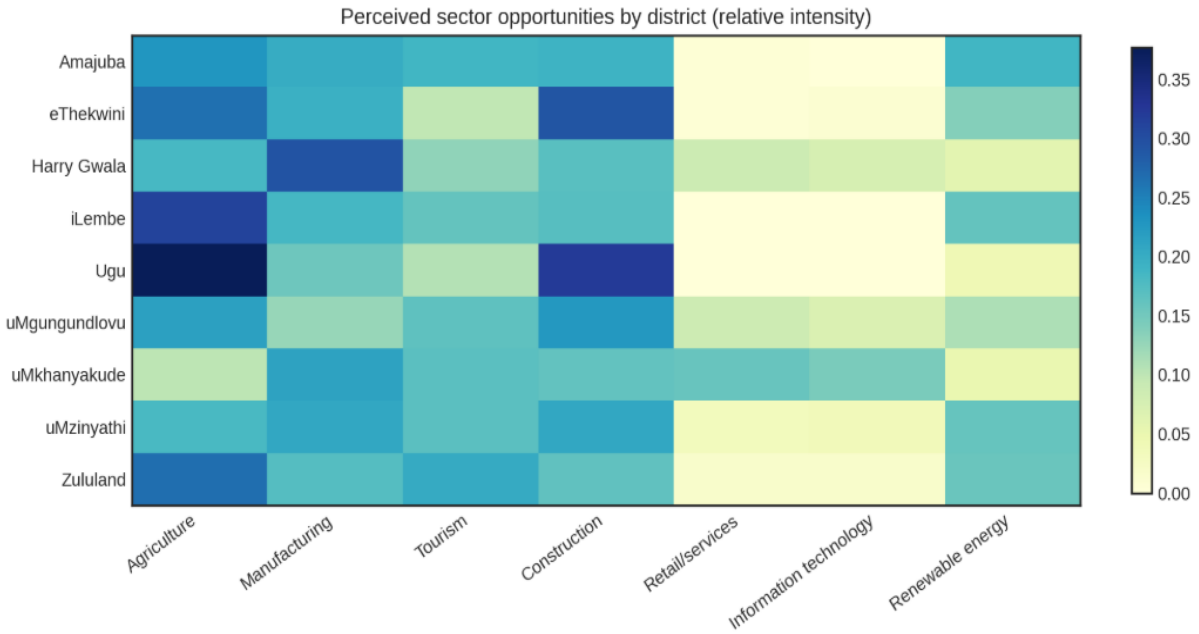

Figure 30: Perceived key sectors in the province

Participation in these sectors requires a set of cross-cutting skills that would enable individuals to engage in diverse economic activities. The study identified several transferable skills, and these are shown in figure 31. The top three skills are project management (i.e., 23%), health and safety (i.e., 23%) and digital literacy (i.e., 18%). Across districts, health and safety is the top cross-sector skill in Ugu, uMgungundlovu, uMkhanyakude, uMzinyathi, Zululand; project management leads in eThekwini, Harry Gwala, iLembe and Amajuba placed digital literacy first followed by project management.

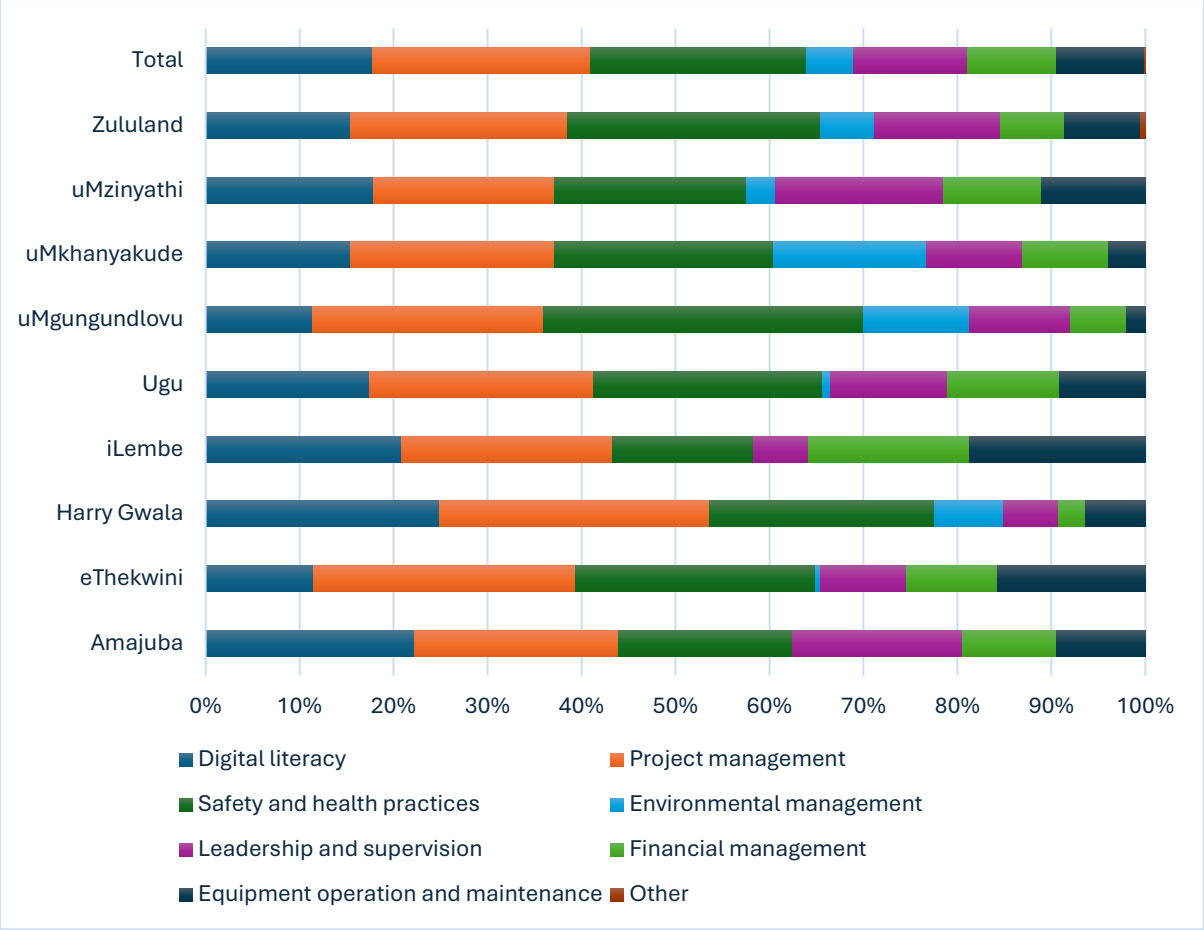

Figure 31: Cross-sector skills needs in the province

Entrepreneurship opportunities in the province

Several questions were posed to participants to assess perceptions of entrepreneurial and small-business opportunities within the province. As illustrated in figure 32, when asked whether opportunities exist to support small businesses, 68% answered “Yes”, while 32% responded “No”. Most of the participants who answered “Yes” are in eThekwini, iLembe, uMkhanyakude, uMgungundlovu, and Zululand. The “No” responses were recorded mostly in Ugu, Amajuba, and uMzinyathi, as seen on the figure.

The perceived opportunities in the province are captured in figure 33, and these cluster around agriculture, retail, and services (hair salons, car washes, etc.). Renewable energy and manufacturing form a secondary band of opportunities, with mining-related services and ICT/digital services present but smaller. Across districts, retail is top in eThekwini and Harry Gwala; services in uMgungundlovu and uMkhanyakude; agriculture leads in Amajuba, iLembe, Ugu, uMzinyathi, Zululand. In Ugu, there are split opportunities in agriculture, retail,

and services. The entrepreneurial opportunities are pulled together on the heat map (i.e., see figure 34).

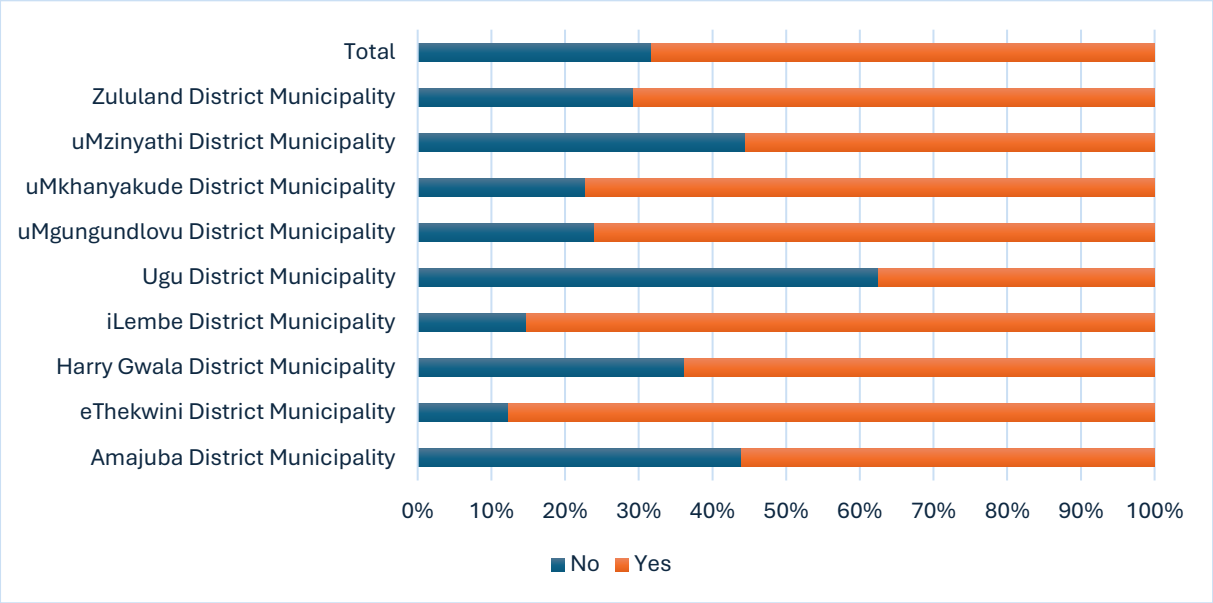

Figure 32: Perceptions of entrepreneurial and small-business opportunities within the province

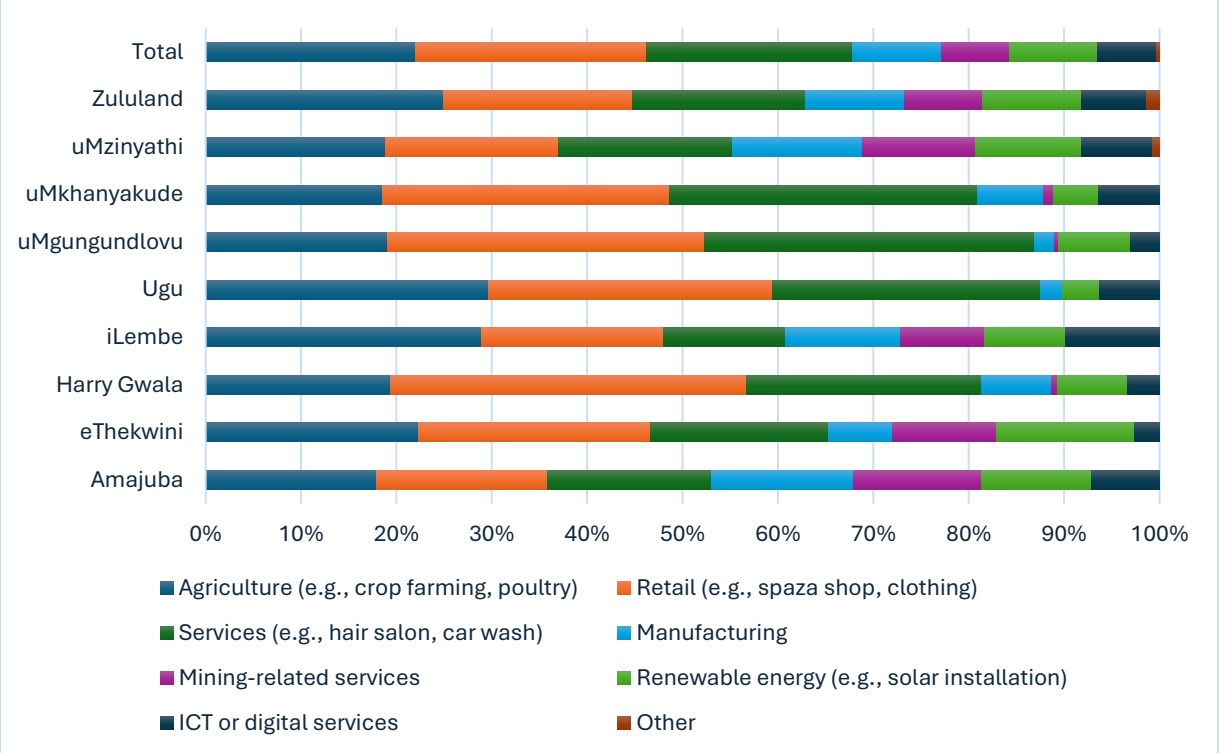

Figure 33: Perceptions of entrepreneurial opportunities within the province

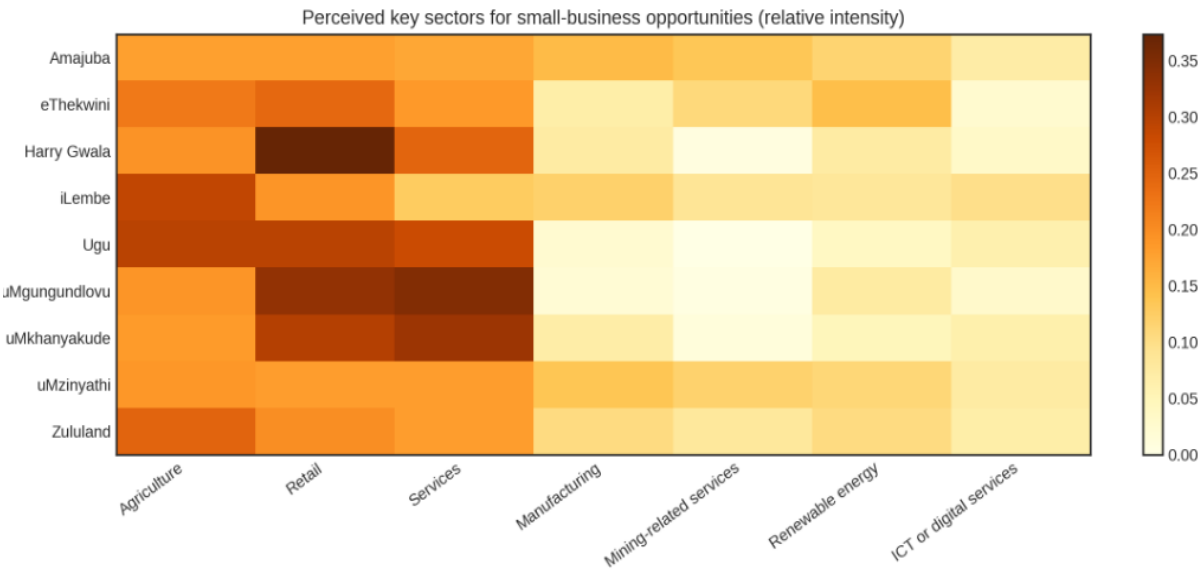

Figure 34: Perceived opportunities for small businesses

In discussing business opportunities in the province, several challenges were noted as affecting those who want to start businesses and those who have businesses (i.e., See figures 35 and 36). For both groups, the top three challenges are lack of capital/funding, lack of business skills/knowledge and limited access to markets.

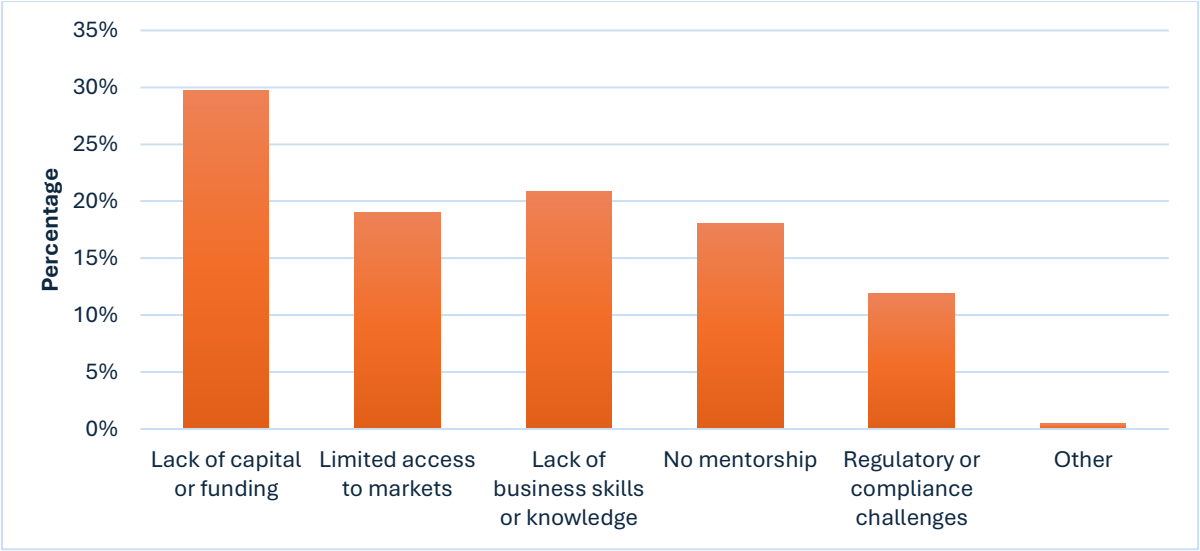

Figure 35: Factors affecting the establishment of small businesses

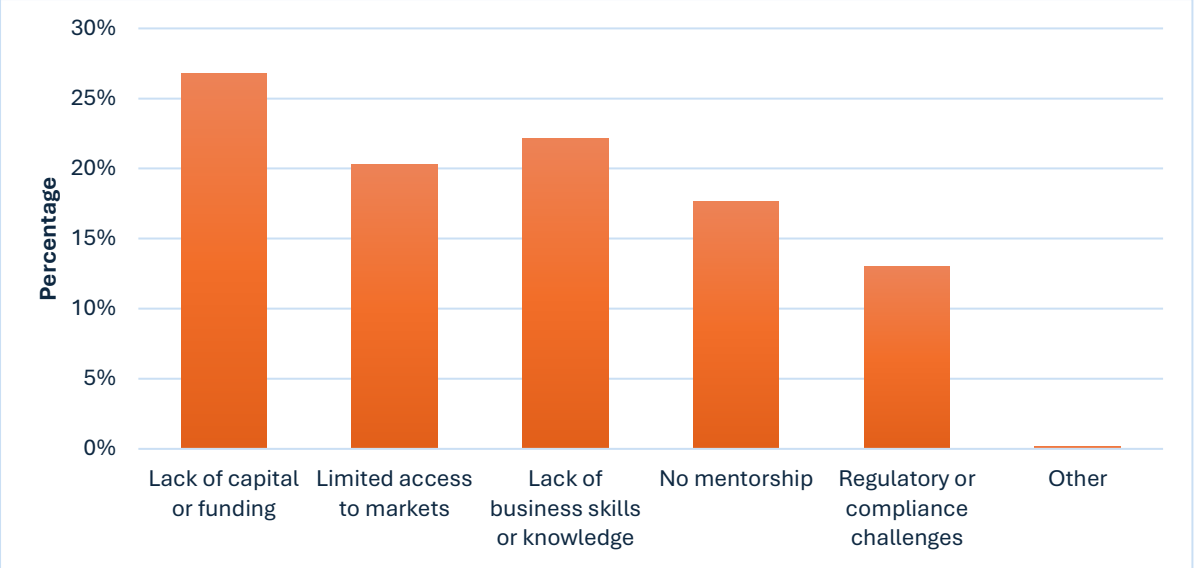

Figure 36: Factors affecting the performance of existing small businesses

With the lack of business skills/knowledge emerging amongst the main challenges, participants highlighted several skills that are needed and the top three skills are financial management (i.e., 21%), business skills (i.e., 20%) and marketing (i.e., 18%) (i.e., See figure 37).

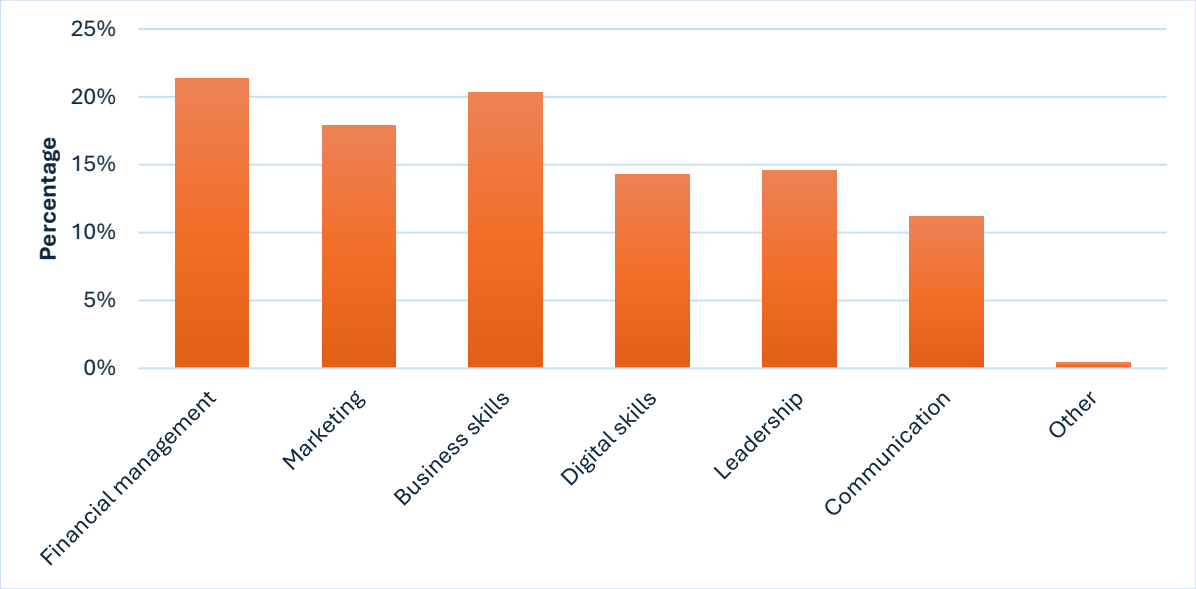

Figure 37: Entrepreneurial skills needed by community members

4.2.4. Skills development and training programmes

The next section turns the attention to the perceptions of community members on the skills development and training programmes implemented in the province. This was done to assess the effectiveness of these programmes in addressing the skills needs of the communities.

Additionally, specific questions were directed at community members to solicit their views on the MQA and its role in skills development within the mining sector.

Firstly, participants were asked whether they are aware of any mining-related training available in their communities. Of the total participants, 95% answered “No” with only 5% indicating “Yes”. Overall, awareness is very low indicating a major information gap about opportunities that needs to be looked at. Across district municipalities, the highest awareness is recorded in Zululand and eThekwini while zero awareness is found in Harry Gwala and uMgungundlovu.

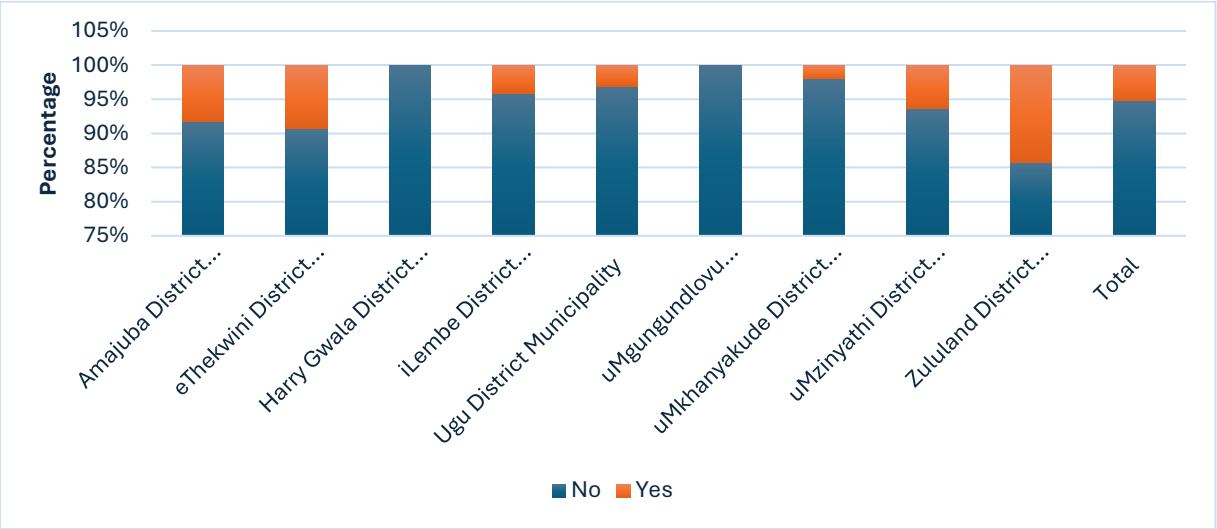

Figure 38: Awareness of mining-related training programmes in the province

Another question posed was on the accessibility of training programmes, and about 60% rated programmes “very difficult” and “difficult” to access. About 31% submitted that they are not sure. Less than 10% of the participants shared that programmes have been “accessible”.

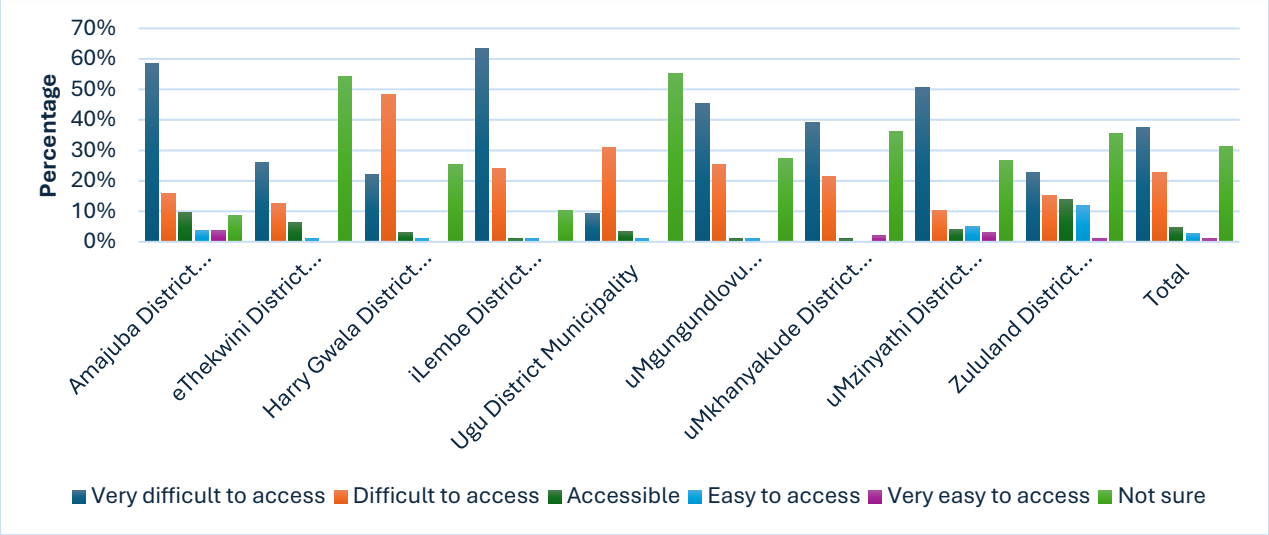

Figure 39: Communities' perception on the accessibility of training programmes

Several barriers were identified by community members as affecting inclusive participation in training programmes, and these are illustrated in figure 40. The lack of information about training opportunities emerges as the major constraint. It is followed by high cost of training, distance to training centres and entry requirements.

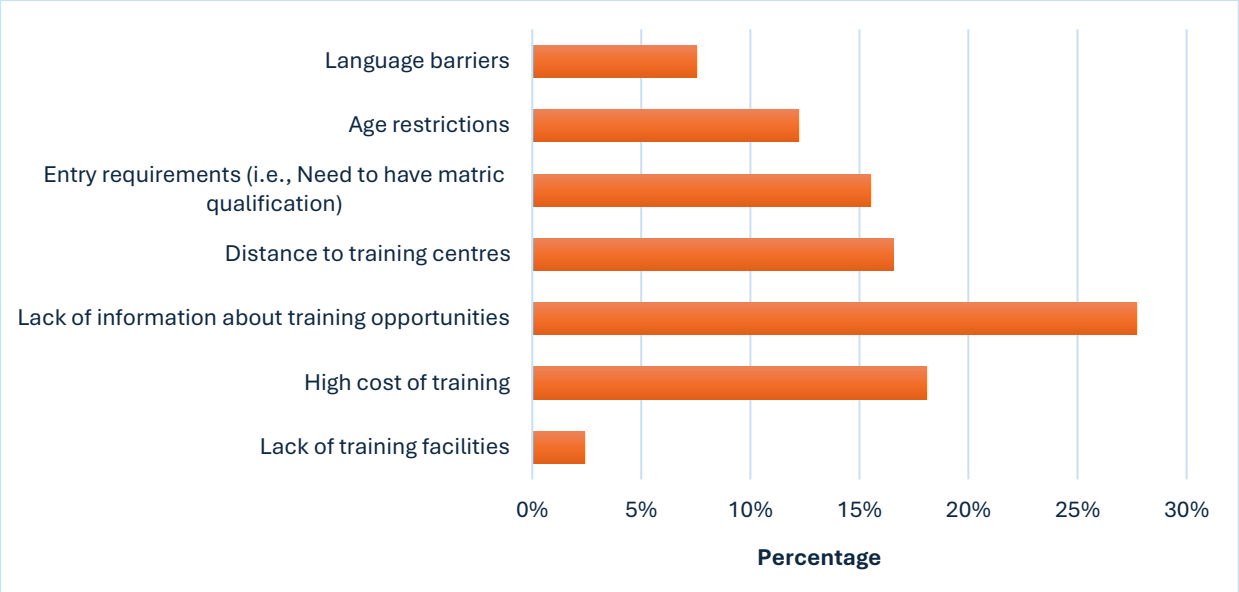

Figure 40: Factors affecting participation in training programmes

When asked where skills initiatives should concentrate on in the province, participants ranked high the need to prepare youth for mining careers (i.e., 28%), support local businesses that serve the mining sector (i.e., 25%), upskill current mining workers (i.e., 22%), and develop alternative skills for diversification (i.e., 22%). The suggest focus for support (i.e., two main priorities) across the district municipalities is as follows:

- Amajuba – Upskilling current workers and preparing youth for mining
- eThekwini – Preparing youth for mining and developing alternative skills
- Harry Gwala – Upskilling current workers and supporting mining-serving businesses
- iLembe – preparing youth for mining and upskilling current workers
- Ugu – preparing youth for mining and supporting mining-serving
- uMgungundlovu – preparing youth for mining and developing alternative skills
- uMkhanyakude – supporting mining-serving businesses and developing alternative skills
- uMzinyathi - developing alternative skills and supporting mining-serving businesses
- Zululand - supporting mining-serving businesses and preparing youth for mining

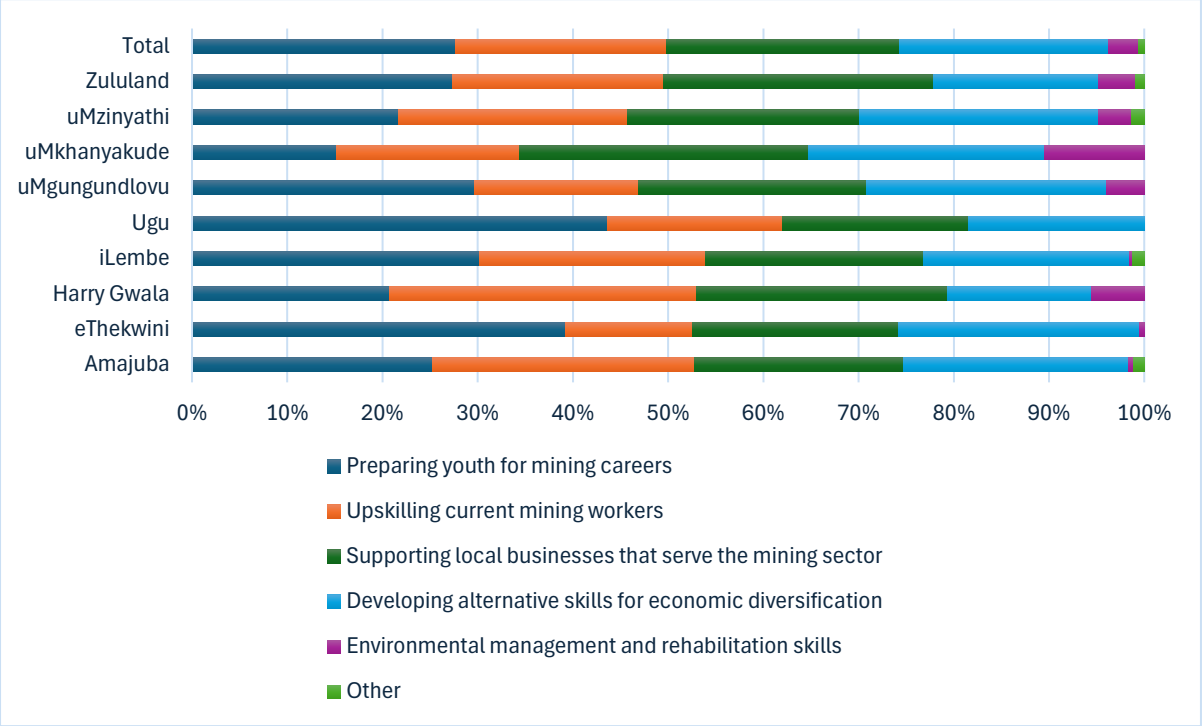

Figure 41: Suggested areas for skills development and training programmes

The MQA plays a key role in skills development and training and so it was important to solicit feedback on awareness of its work and programmes in the province. It was established that familiarity with the MQA was low overall in the province with about 81% of the participants saying that they are not familiar with MQA. Only 4% were aware of MQA. This underscores the need for stronger outreach and clearer communication about who the MQA is and how to engage its programmes

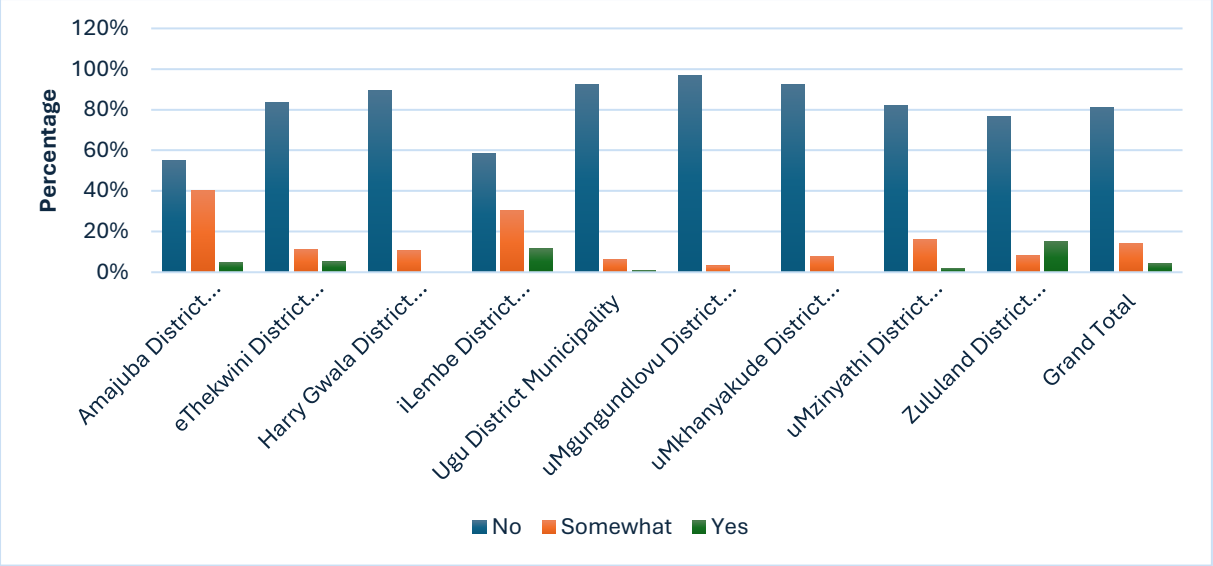

Figure 42: Levels of familiarity with MQA

As seen on the figure, Zululand and iLembe are the only district municipality where over 10% of the participants were aware of MQA. There is zero awareness in uMgungundlovu, uMkhanyakude, Harry Gwala, and hence these should be prioritised for outreach campaigns.

When soliciting these insights, the community members suggested several areas of improvement. As seen on figure 38, the need for better communication about available programmes is coming out high (i.e., 32%). It is followed by the need for variety for programmes, easier application process and better alignment with job market needs.

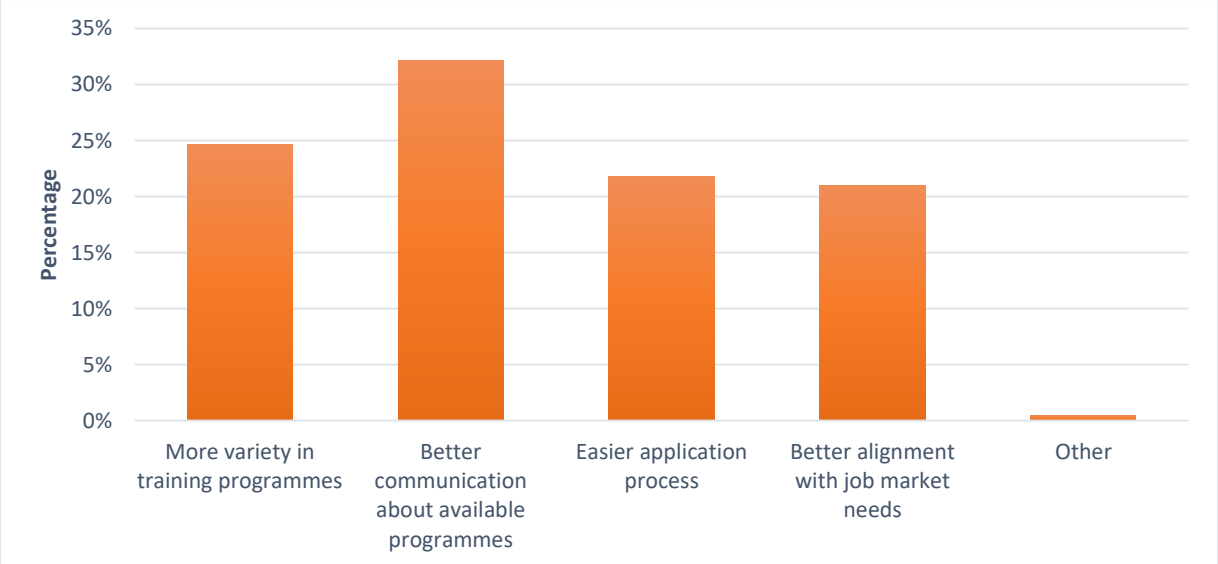

Figure 43: Suggested areas of improvement

When talking about training programmes, participants were asked if they know of any skills development and training programmes delivered in your community by other economic sectors (i.e., See figure 44). The word cloud shows concentration of training in agriculture and construction, with a few mentions of training on renewable energy. The participants also mentioned training that focused on hands-on trades such as plumbing, upholstery, cabinet making, and sewing.

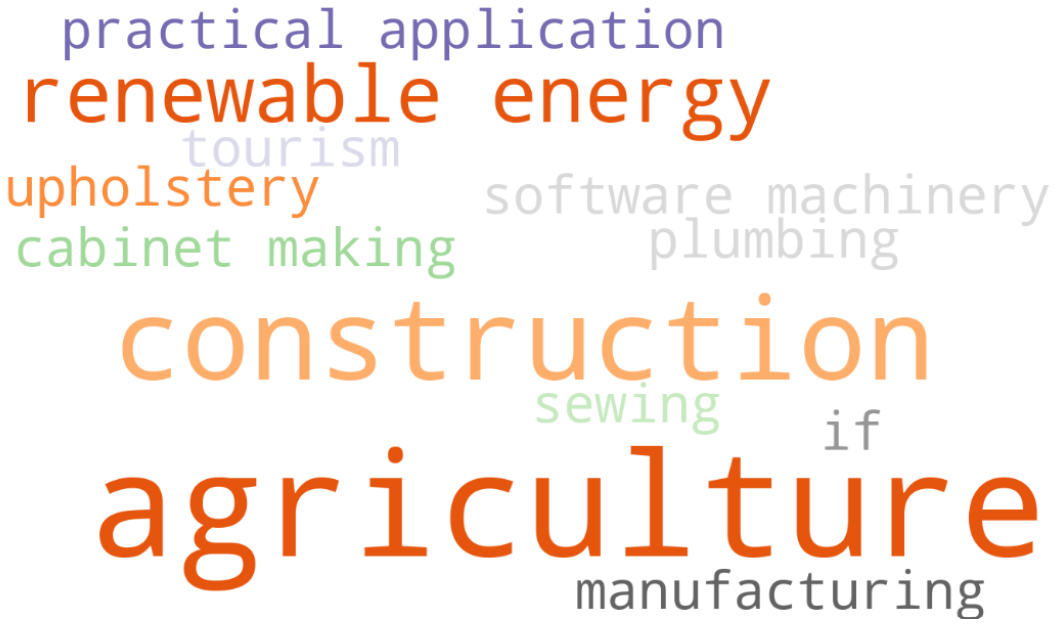

Figure 44: Focus of skills development and training in the province

4.3. Skills demand and industry needs

This next section turns the attention to understanding skills demand and industry needs in the province. This is understood through an analysis of the Workplace Skills Plan (WSP) and Annual Training Reports (ATRs) data, focusing on hard-to-fill vacancies, top-up skills, and community training programs. Hard-to-fill vacancies are defined as "occupations that an employer was unable to fill within 12 months or took longer than 12 months to find a suitably qualified and experienced candidate" (DHET, 2019, cited in MQA, 2023). In contrast, top-up skills refer to skills gaps that typically require short training interventions (DHET, 2019, cited in MQA, 2023).

Both hard-to-fill vacancies and top-up skills highlight skills gaps and serve as proxies to understand the skills demand in the mining sector. Additionally, the training programmes implemented by mining companies indicate priority areas for training, thereby reflecting the

demand for specific skills. By analysing these programmes, the areas where training is needed can be identified to meet the industry's requirements and align them with the skills needs of the community.

4.3.1. Hard-to-fill vacancies

Table 8 outlines the occupations identified by mining companies in the KwaZulu-Natal province as hard-to-fill vacancies. The listed occupations were reported across multiple submissions, indicating recurring challenges in sourcing suitably qualified and experienced candidates for these roles. Analysis of the data shows that the most frequently cited hard-to-fill occupations are Auto Electrician, Diesel Mechanic/ Diesel Field Service Technician, and Section Engineer / Engineering Manager. These roles are critical to the maintenance, engineering, and operational performance of mining operations and are characterised by persistent shortages linked to experience requirements, qualifications, employment equity considerations, and working conditions.

Table 8: Hard-to-fill vacancies in KwaZulu-Natal

Specialisation / Occupation	**OFO Code**	**Reasons for difficulties in recruitment**
Auto Electrician	2021-671208	Lack of relevant experience; lack of relevant qualifications; unsuitable job location; equity considerations; poor remuneration; unsuitable working hours; slow recruitment processes; new or emerging job not defined before
Diesel Mechanic / Field Service Technician (Diesel)	2021-653306	Lack of relevant experience; lack of relevant qualifications; unsuitable job location; equity considerations; poor remuneration; new or emerging job not defined before
Section Engineer / Engineering Manager / Engineering Maintenance Manager	2021-132104	Lack of relevant experience; lack of relevant qualifications; equity

		considerations; poor remuneration; slow recruitment processes
Mining Manager / Mine Manager / General Manager Mining / Quarry Manager	2021-132201	Lack of relevant experience; unsuitable job location; lack of relevant qualifications; equity considerations; slow recruitment processes
Mine Overseer (Production)	2021-312101	Lack of relevant experience; lack of relevant qualifications; equity considerations; slow recruitment processes
Engineering Foreman	2021-312103	Lack of relevant experience; lack of relevant qualifications; equity considerations
Reliability Engineer	2021-132107	Lack of relevant experience; poor remuneration; unsuitable job location; slow recruitment processes; equity considerations
Human Resource Manager	2021-121201	Lack of relevant experience; lack of relevant qualifications; unsuitable job location; equity considerations
Occupational Health and Safety Manager / Advisor	2021-121206 / 2021-226302	Lack of relevant experience; equity considerations; slow recruitment processes
Instrumentation Technician	2021-311401	Lack of relevant qualifications; unsuitable job location; equity considerations
Instrument Mechanician	2021-672105	Lack of relevant experience
Mining / Quarrying Blaster	2021-684201 / 2021-684202	Unsuitable job location; poor remuneration; lack of relevant experience; lack of relevant qualifications; equity considerations

Environmentalist	2021-213302	Unsuitable job location; lack of relevant qualifications; slow recruitment processes
Occupational Health Nurse	2021-222104	Slow recruitment processes; lack of relevant experience; unsuitable working hours

Several factors have been identified as contributing to recruitment challenges within the KwaZulu-Natal mining sector. These include a lack of relevant experience, insufficient qualifications, unsuitable job location, equity considerations, slow recruitment processes, and the emergence of new or evolving occupations.

Figure 45 illustrates the distribution of these challenges, with lack of relevant experience emerging as the most frequently cited primary reason for hard-to-fill vacancies, accounting for approximately 49% of reported cases. This is followed by lack of relevant qualifications (21%), while unsuitable job location, equity considerations, and slow recruitment process each account for 9% of cases. New or emerging job roles represent a smaller proportion of reported recruitment challenges (3%).

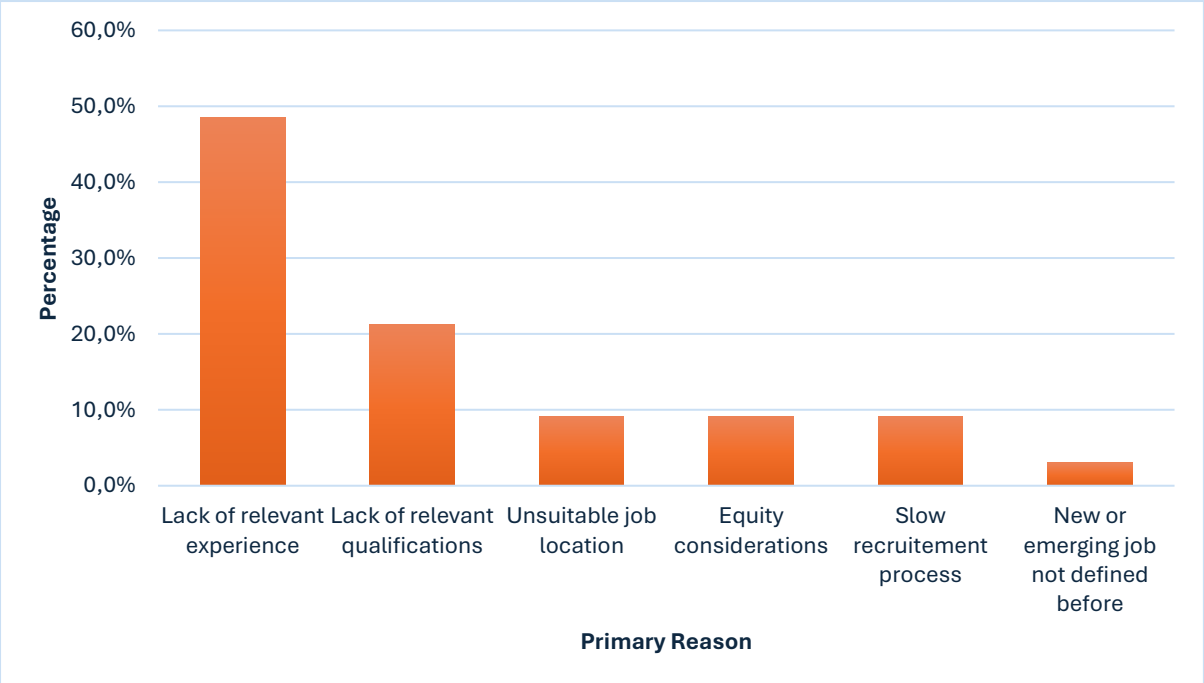

Figure 45: Primary reasons for hard-to-fill vacancies in KwaZulu-Natal MMS

4.3.2. Top-up skills

Table 9 presents the occupations for which mining companies in the KwaZulu-Natal province have identified top-up skills requirements through their WSP-ATR submissions. The highlighted occupations were reported by at least two mining companies, indicating recurring skills development needs across the sector. The table reflects the range of generic and transversal skills identified as necessary to complement existing occupational competencies across operational, supervisory, and support roles within the mining sector.

Table 9: Top-up Skills Required for the MMS in KwaZulu-Natal

Specialisation/Occupation	**OFO Code**	**Generic Skillset**
Industrial Engineer	2021-214101	Technical (job-specific)
Computer Engineer / Instrumentation Engineer	2021-215201	Advanced IT and software
Designer (Hardware – Digital / Software) / Software Engineer	2021-251201 / 2021-251202	Advanced IT and software
Refractory Mason	2021-641303	Technical (job-specific)
Diesel Mechanic	2021-653306	Technical (job-specific)
Diesel Fitter	2021-653304	Technical (job-specific)
Mechanical Fitter	2021-653303	Mine production process
Earthmoving Equipment Mechanic	2021-653307	Interpersonal skills, leadership, supervisory skills, communication, problem-solving
Auto Electrician	2021-671208	Advanced IT and software; technical (job-specific)
Mining Operator	2021-711101	Computer literacy
Coal Miner	2021-312102	Operations management
Mine Overseer (Projects) / Quarry Foreman / Shift Overseer (Mining)	2021-312101	Leadership; operations management
Production / Operations Supervisor (Manufacturing) / Production Plant Supervisor / Beneficiation Plant Foreman	2021-312201	Management; leadership; mine production process
General Engineering Supervisor (GES)	2021-312103	Leadership

Bricklayer	2021-641201	Planning and organising
Mining / Quarrying Blaster	2021-684201	Computer literacy; technical (job-specific)
Administrative Assistant	2021-411101	Customer service skills
Human Resource Manager	2021-121201	Computer literacy
Human Resources Clerk / Human Resources Records Clerk	2021-441601	Computer literacy
Stores Clerk / Officer	2021-432101	Office administration
Business Group Accountant	2021-241107	Computer literacy
Payroll Clerk	2021-431301	Technical (job-specific)
Hydrogeologist	2021-211401	Planning and organising
Environmental Officer	2021-213302	Occupational health and safety skills
General / Company Buyer	2021-332301	Leadership
Production Foreman	2021-432201	Computer literacy; supervisory skills; leadership; communication; problem-solving
Sales Clerk / Officer	2021-524903	Sales and marketing; leadership; problem-solving
Business Operations Manager	2021-121901	Operations management
Transformation Manager	2021-242102	Leadership

While the occupations identified in Table 10 are largely technical and operational roles, the skills gaps reported by mining companies are not confined to technical competence alone. Across multiple occupations, companies consistently indicated the need for leadership, supervisory capability, computer literacy, communication, and problem-solving skills as critical top-up requirements. This pattern is particularly evident among foremen, overseers, and senior artisan roles, where individuals are expected not only to perform technical tasks but also to coordinate teams, manage workflows, interpret digital systems, and respond effectively to operational and safety challenges.

The recurrence of computer literacy and advanced IT-related skills further reflects the increasing integration of automated and digitally enabled systems within mining operations. These findings suggest that employability and progression within the sector depend on a

combination of technical proficiency and broader workplace competencies, highlighting the importance of skills development interventions that strengthen both dimensions rather than focusing exclusively on trade-specific training.

4.3.3. Community skills development and training programmes

The WSP-ATR community training data for KwaZulu-Natal in the 2024 financial year reflects a high level of implementation activity across a diverse range of training interventions. In total, 106 training initiatives were implemented compared to 74 originally planned, with 618 beneficiaries trained against a planned target of 701. This pattern indicates strong delivery capacity in terms of programme execution, alongside partial achievement of planned beneficiary reach across selected training categories.

Academic support interventions were implemented through two distinct pathways: degree-level support and general bursary provision. Bachelor's and higher degree programmes, including Honours and Master's qualifications, recorded 28 beneficiaries trained against eight planned, reflecting strong implementation in specialised professional fields such as medicine, law, actuarial science, and engineering disciplines. In contrast, bursary programmes supported a broader mix of technical and administrative qualifications, with 19 beneficiaries trained against 22 planned, indicating more conservative uptake across fields such as financial management, extraction metallurgy, and geology.

Short courses remained the primary vehicle for community reach, with 407 beneficiaries trained against 487 planned. These interventions focused on safety induction and portable skills development, including driver's licensing and equipment operation. Although beneficiary delivery fell slightly below planned targets, short courses continue to play a central role in providing accessible, short-duration training aimed at improving immediate employability within and beyond the mining sector.

Adult Education and Training (AET) significantly exceeded planned delivery, with 13 beneficiaries trained against one planned, reflecting sustained demand for foundational literacy and numeracy skills. This highlights the continued importance of addressing basic education gaps as a prerequisite for progression into further training and employment.

Technical and vocational training interventions demonstrated mixed performance. Learnerships were delivered to 39 beneficiaries against a plan of 42, primarily in electrical and mechanical engineering fields, indicating relatively strong alignment between planning and implementation. MQA qualifications, although unplanned, resulted in 16 beneficiaries completing technical certificates, including millwright, instrumentation, and boiler making qualifications, illustrating responsiveness to emerging skills needs. In contrast, trade training underperformed in terms of beneficiary volume, with 18 individuals trained against a planned target of 46, despite covering a diverse range of trades such as plumbing, diesel mechanics, and electrical work.

The province also maintained a steady pipeline for work-based learning through internships and work placements, with 34 internship beneficiaries trained against 38 planned, and 28 work placement beneficiaries trained against 28 planned. These interventions supported practical workplace exposure across professional, technical, and support functions, contributing to skills development aligned with labour market entry and progression.

Overall, the KwaZulu-Natal community training data reflects a delivery model characterised by high implementation activity, strategic use of short-term interventions, and selective investment in longer-term academic and technical pathways. While certain structured and resource-intensive programmes experienced lower beneficiary uptake, the overall training profile demonstrates a balanced approach that combines immediate employability support with longer-term human capital development, positioning community members to access opportunities across mining and related sectors of the provincial economy. Table 10 provides an overview of the planned and implemented community development initiatives in KwaZulu-Natal.

Table 10: KwaZulu-Natal Summary of Planned and Implemented Training Programmes

Programme Planned	Training Planned (Line Items)	Training Done (Line Items)	No. of Beneficiaries (Planned)	No. of Beneficiaries (Trained)
Adult Education and Training	1	2	1	13
Bachelors / Higher Degree	8	18	8	28
Bursary	12	15	22	19
Certificate	2	5	5	8
Internship	20	19	38	34
Learnership	7	8	42	39
MQA Qualification	0	4	0	16
National Diploma	5	6	5	8
Short Course	8	13	487	407
Skills Programme	1	0	15	0
Trade	7	5	46	18
Work Placement	3	11	28	28
TOTAL	**74**	**106**	**701**	**618**

The KwaZulu-Natal data indicates a differentiated approach to community skills development, with investment spread across both academic and occupational training pathways. Degree-level support and bursaries reflect targeted investment in specialised professional and technical fields, including engineering, science, health, legal, and financial disciplines, supporting longer-term skills pipelines. At the same time, short courses feature prominently in terms of beneficiary reach, underscoring their role in providing accessible, short-duration training focused on safety induction, portable skills, and entry-level employability within and beyond the mining sector.

The KwaZulu-Natal data further allows for limited but meaningful insight into the demographic distribution of community training beneficiaries. Participation by both men and women is evident across multiple programme categories, with patterns differing by training type. Women are well represented in academic pathways, internships, and large-scale safety and induction programmes, while men remain more prominent in certain manual, driving, and equipment-related skills. Notably, near parity is observed in selected trade and learnership interventions, suggesting early shifts in participation within traditionally male-dominated occupations.

In contrast, the inclusion of persons with disabilities within community training remains extremely limited. Only one beneficiary with a disability was recorded across all KwaZulu-Natal community training interventions, concentrated within Adult Education and Training, despite a total of 14 disability-targeted training interventions planned across multiple programme categories. This indicates a significant gap between planning and implementation, highlighting the need for more deliberate accessibility, outreach, and support mechanisms within community-based training initiatives. While the data reflects a high level of implementation activity overall, it also highlights variation between planned and delivered training across programme types.

More structured interventions, such as trade training and certain formal qualification pathways, recorded lower beneficiary uptake relative to planned targets, while delivery in other areas exceeded initial plans, particularly within short courses, Adult Education and Training, and selected academic pathways. This pattern suggests a flexible and adaptive

implementation approach, while also pointing to the importance of strengthening alignment between planning assumptions, delivery capacity, and learner readiness across different training modalities.

4.3.4. Key insights from key informant interviews

The following insights were drawn from key informant interviews with representatives from mining companies and training experts operating in KwaZulu-Natal:

- A persistent mismatch between local skills supply and mining operational requirements emerged as a central insight across key informant interviews. While mining companies expressed a strong preference for local recruitment, respondents consistently noted that community members often lack job readiness due to foundational education gaps, particularly in Matric-level Mathematics and Science, limited exposure to mining-relevant technical standards, and insufficient safety awareness. This mismatch continues to constrain local labour absorption despite ongoing demand for semi-skilled and skilled roles. These findings align with the literature review, which highlights structural barriers within the post-school education and training system, including subject prerequisites for entry into technical and engineering pathways and persistent gaps in transversal competencies required for workplace participation.
- Interviewees highlighted significant weaknesses in the skills pipeline linking schooling, training, practical experience, and employment, particularly for youth and first-time labour market entrants. Fragmented pathways, limited access to work-integrated learning, and experience requirements imposed by industry create barriers to progression from school leaver to semi-skilled or artisanal roles. This cycle mirrors concerns raised in the White Paper for Post-School Education and Training and related policy frameworks, which identify weak school-to-work transitions and insufficient experiential learning opportunities as ongoing structural challenges within the skills development system.
- The technical complexity and integration of mining operations in KwaZulu-Natal were identified as key drivers of differentiated skills demand across departments. Mining activities span extraction, processing, smelting, maintenance, and downstream production, requiring highly specialised, role-specific competencies. In response,

some companies have established department-aligned learning and development structures to ensure compliance, operational continuity, and workforce readiness. This observation aligns with the literature, which emphasises the need for industry-aligned, occupationally directed training pathways that reflect the complexity of modern mining and manufacturing environments.

- Technological change is increasingly reshaping skills demand within the provincial mining sector. Respondents noted that automation, digitalisation, and system-based monitoring are affecting roles such as operators, machine drivers, and Trackless Mobile Machinery (TMM) operators. As a result, there is growing demand for digital literacy, computer-based skills, and the ability to interact with automated systems. At the same time, interviewees stressed that human oversight remains critical, particularly at supervisory and management levels. This insight is consistent with literature findings that highlight the growing importance of digital skills, productivity tools, and adaptive competencies in response to technological change and the transition toward more automated and sustainable mining practices.
- Occupational health and safety (OHS) emerged as a cross-cutting skills priority, extending beyond technical compliance into behavioural and cultural dimensions. Training specialists emphasised challenges associated with addressing “invisible hazards”, such as electricity and health-related risks, and highlighted the need for innovative, context-specific training approaches that embed safety awareness through storytelling, metaphors, and lived practice. Leadership accountability, particularly at foreman and supervisory levels, was identified as central to sustaining safe work environments. This finding reinforces the literature review, which consistently identifies OHS as a critical skills gap across KwaZulu-Natal, while adding practical insight into how safety training is internalised at operational level.
- There is growing recognition among respondents that skills development initiatives should not focus exclusively on mining-specific competencies. In response to mine closure risks and long-term community sustainability concerns, several companies are investing in portable and transferable skills applicable across sectors, including agriculture, food production, and small business development. These initiatives aim to enhance employability beyond mining and reduce long-term community dependency on the sector. This perspective aligns with policy emphasis on

entrepreneurship, transferable skills, and economic diversification within mining-affected communities, as reflected in Social and Labour Plan objectives and broader provincial development strategies.

- Local procurement and enterprise development were identified as important pathways for community economic participation, but persistent barriers remain. Community-based Small, Medium and Micro Enterprises (SMMEs) face challenges related to limited access to capital, equipment, and technical capacity, constraining their ability to scale into higher-value segments of mining supply chains. While some training in new venture creation and procurement processes has been implemented, respondents noted that sustained post-training support remains limited. These challenges echo literature findings that highlight the need for integrated enterprise development models combining technical training, business skills, mentorship, and market access.
- Partnerships were consistently highlighted as critical enablers of skills development in KwaZulu-Natal. Mining companies reported collaborations with training providers, universities, sector-specific training organisations, and development trusts to address skills gaps in areas such as mineral processing, laboratory work, metal production, engineering, adult education, and portable skills. However, the sustainability of these partnerships is influenced by funding availability, accreditation processes, and regulatory clarity. This observation aligns with the literature's emphasis on multi-stakeholder collaboration as a cornerstone of effective skills development, while also underscoring implementation risks associated with coordination and funding constraints.
- The Mining Qualifications Authority (MQA) is generally viewed as a credible and improving partner in skills development, though operational challenges remain. Respondents acknowledged increased responsiveness and engagement but raised concerns regarding limited MQA visibility at community level in KwaZulu-Natal, delays in discretionary grant approvals, and uncertainty linked to the transition to the Quality Council for Trades and Occupations (QCTO). These insights complement the literature review, which documents MQA's role in supporting learnerships and occupational training, while highlighting areas where operational efficiency and communication could be strengthened.

- There is a strong expectation that skills reviews and stakeholder engagements should translate into clear action plans and tangible outcomes**.** Interviewees emphasised the importance of feedback mechanisms, coordinated implementation, and visible impact at community level. This expectation aligns with policy objectives that frame skills planning as an applied, outcome-oriented process rather than a purely diagnostic exercise.

4.4. Synthesis of findings and priority skills areas

The community surveys and key informant interviews revealed key insights that have a bearing on skills development and training intervention in KwaZulu-Natal province. These are highlighted below.

- Women represented the largest share of participants, which aligns with the provincial gender profile where females constitute the majority of the population. While skills development initiatives must remain inclusive, programmes must intentionally target women, given their significant presence in the province. Notably, districts such as Amajuba, eThekwini, uMgungundlovu, uMkhanyakude, and uMzinyathi recorded particularly high levels of female participation. This trend suggests that female-focused programmes would be impactful within these district municipalities.
- The study sample was predominantly youth-centred, reflecting the age profile of the province, where young people constitute the largest proportion of the population with the median age of 28 years. Across district municipalities, the highest representation of participants in the 18–25 age group was observed in Ugu, Zululand, and iLembe. In municipalities such as Harry Gwala, uMgungundlovu, and uMkhanyakude showed a notable presence of older youth (25–35 years) who remain in transition toward stable employment. This strong concentration of young people highlights the need for interventions that would strengthen school-to-work pathways, support early career development, and address the barriers that hinder youth entry into the labour market.
- From literature, it was established that about 40% of the population (i.e., aged 120 years and older) completed secondary education, which is above the national average of 37%. This is the second-highest secondary school completion percentage in South Africa. In line with this, 47% of study participants reported having a matric

qualification, which corresponds closely with the provincial pattern. However, concerns remain regarding the relatively low proportion of participants who hold post-school qualifications. Additionally, a notable share of participants in districts such as Amajuba, uMzinyathi, and Zululand reported not having completed matric, highlighting the need for targeted interventions to improve foundational and post-secondary educational outcomes in these areas.

- The participants reported completing a diverse set of school subjects, with Life Sciences, Mathematics, Mathematical Literacy, Geography, and Physical Sciences being the most common. Several of these subjects fall within the domain, which is important in accessing technical, scientific, and industry-aligned training opportunities. There are concerns about learners moving away from Maths and the reasons cited were difficulty, weak teaching quality, unclear links between Mathematics and future careers, and anxiety about failing.
- Among those who have progressed beyond matric, participants have pursued a wide range of fields. Mining related disciplines, education, business administration, mechanical and electrical engineering, finance, IT, environmental science, health sciences, and law are all represented. While the overall number of people holding post school qualifications is relatively small, there is representation across both technical and professional fields, including disciplines aligned with STEM and industrial development priorities.
- The labour market situation across the province remains challenging, with most study participants reporting that they are unemployed. In Q1 2024, KwaZulu-Natal recorded an official unemployment rate of 31.5%, which is higher than the national average. Employment patterns vary significantly across district municipalities: districts such as Amajuba and uMzinyathi face high unemployment pressures, while areas with stronger economic activity, such eThekwini and uMgungundlovu demonstrate comparatively better employment absorption capacity.
- Employment is concentrated in few economic sectors such as government services, finance and business services, construction, and agriculture. Mining employment is notable but localised, with only a few districts showing participation in mining.

- Self-employment activity varies across the province spans finance and business services, transport, construction, agriculture, and a small presence in mining. However, business ownership remains small, and many households relying on social grants, with salaries supplementing income where formal employment is available. The relatively small contribution of business income highlights the challenges faced by emerging entrepreneurs.
- Communities identified a mix of engineering, safety, and operations related skills as being important for accessing opportunities in the MMS. Electrical engineering, mining engineering, occupational health and safety, and mechanical engineering stand out as priority areas.
- Young people emphasised a dual need for technical skills and soft skills. The latter including communication, teamwork, leadership, and mentorship support. The common view is that without strong soft skills, youth will continue to struggle to access opportunities even with technical qualifications. Entrepreneurship also comes out, but the results suggest that many young people regard it as a second step after becoming more employable.
- It was established that awareness of new and emerging skills particularly those associated with the Fourth Industrial Revolution, automation in mining, and renewable energy is limited. Although renewable energy is slightly better understood, knowledge of digital and automated systems remains low.
- In addition to mining, several economic sectors were noted as providing economic opportunities in the province, and these are agriculture, construction, and manufacturing. Tourism and renewable energy were also mentioned by a considerable percentage of community members. According to the literature, manufacturing and construction together contribute approximately 20% to provincial GVA, while agriculture accounts for about 5%. The largest share of GVA, however, is generated by the tertiary sector, which includes trade, transport, finance, and community services.
- Most respondents believe that opportunities exist for small businesses, especially in agriculture, retail, and services. Manufacturing and renewable energy also hold potential, though at a smaller scale. However, several barriers limit entrepreneurial

success, including access to capital, limited business knowledge, weak market linkages, and insufficient mentorship. These constraints are consistent across both startups and existing businesses.

- The most widely valued transferable skills are project management, health and safety, and digital literacy. These foundational capabilities cut across multiple industries and are seen as essential for improving employability, supporting enterprise development, and enabling workers to adapt to changing labour market conditions. The top skills needed to support entrepreneurship in the province are financial management, business skills and marketing.
- In terms of training programmes, the study identified visibility and access challenges. Only a small percentage of participants were aware of mining-related training programmes, and most find existing training difficult to access. Familiarity with MQA was found to be extremely low. In view of this, participants called for for clearer communication, broader programme offerings, and simpler application processes.
- It was noted that while mining companies prefer local recruitment, many community members lack the foundational education and technical knowledge to access opportunities in the MMS. Gaps in Mathematics and Physical Science at Matric level, limited understanding of mining standards, and inadequate safety awareness contribute to this mismatch. The ongoing demand for semi-skilled and skilled labour, local hiring remains constrained.
- Young people find it hard to move from school into training, then into workplace experience, and finally into a job because the process is not well-connected. There are not enough opportunities for practical, on-the-job learning, and companies often require experience that young people do not yet have. This makes it difficult for them to gain the skills and experience needed for entry-level jobs, trapping many in a cycle where they cannot progress.
- The mining sector in KwaZulu-Natal is characterised by diverse operations, including extraction, processing, smelting, and downstream manufacturing. These activities require specialised skills. To meet these needs, some companies have developed internal training facilities to support skills development of their workforce.

- Automation, and digitalisation are transforming roles such as machine operators and TMM drivers. This shift requires workers to develop digital literacy, computer-based competencies, and the ability to interact with automated systems.
- Safety training continues to be a cross-cutting priority, with particular emphasis on "invisible hazards" like electrical risks and occupational health concerns. Respondents noted that effective safety learning often requires practical, context-specific approaches such as storytelling and relatable examples. Leadership at foreman and supervisory levels are important in maintaining a safe work culture.
- To address future mine closures and reduce community dependency on mining, several companies are investing in wider skills programmes. These include training in agriculture, food production, and entrepreneurship, which help broaden job prospects beyond the mining sector.
- Mining companies rely on partnerships with training providers, universities, SETA-aligned entities, and development trusts to address specific skills gaps. These partnerships support training in areas such as mineral processing, laboratory work, engineering, and adult education. However, their sustainability depends heavily on funding availability, accreditation processes, and regulatory clarity, which can limit long-term impact.
- Participants generally view the MQA as a credible and increasingly responsive partner, but some challenges persist. Concerns were raised about low MQA visibility within KZN communities, delays in discretionary grant approvals, and uncertainties associated with the ongoing QCTO transition. These issues can affect planning, training implementation, and community-level engagement.
- Across interviews, stakeholders expressed a strong desire for skills reviews and engagements to translate into targeted action plans. They emphasised the need for feedback, coordinated implementation, and measurable results at community level.

4.5. Conclusion

This chapter presented an integrated overview of the skills development context in KwaZulu-Natal, drawing on community surveys, key informant interviews with mining companies and training specialists, together with analysis of WSP-ATR data, including community skills development interventions. The findings highlighted persistent skills gaps within mining

operations, particularly in technical, engineering, artisanal, and supervisory roles, as reflected in recurring hard-to-fill vacancies. These challenges are shaped by constraints within skills pipelines linking education, training, and employment; limited access to accredited training provision, trade test facilities, and work-integrated learning opportunities; and increasing skills demands associated with automation, digitalisation, and occupational health and safety requirements. The analysis also demonstrated the role of mining operations in supporting skills development through a combination of internal training systems, partnerships, Social and Labour Plan initiatives, and community-based training programmes, while revealing ongoing challenges related to workforce readiness, inclusion, enterprise participation, and coordination across the skills development ecosystem. Collectively, the evidence presented in this chapter provides an evidence-based foundation for the recommendations outlined in the subsequent chapter.

5. CONCLUSION AND RECOMMENDATIONS

5.1. Conclusion

This study was undertaken to assess skills development needs and workforce readiness within the MMS in the KwaZulu-Natal province, with a focus on establishing the skills development needs in the province considering the demand in the MMS and other key economic sectors in the province. The MMS in the province is relatively small compared to other provinces, contributing about 1% to the provincial Gross Domestic Product (GDP) (Trade and Industrial Policy Strategies, 2024). Despite this, there is potential to increase this contribution, as there are untapped mineral resources. Therefore, examining the skills needs in the province is essential to unlocking this potential and driving economic growth by ensuring that there are skills that support not only the MMS but other sectors of the economy.

The study employed a mixed-methods approach that involved collection both primary and secondary data. Primary data was collected through surveys and key informant interviews. A total of 869 surveys were conducted with community members across nine district municipalities in the province. Additionally, interviews were conducted with representatives from mining companies and post-school education and training institutions. Secondary data was gathered through literature review and document analysis. To understand skills demand

in the province, study made use of the MQA's Workplace Skills Plans (WSPs) and Annual Training Reports (ATRs) data. The information collected was synthesised to provide understanding of the skills development needs of the province considering both the skills supply and demand.

The study shows that KwaZulu-Natal's participant profile is largely young and predominantly female, mirroring provincial demographics. Many young people, especially those aged 18–25, are still struggling to transition into stable employment, while a considerable number of older youth (25–35) remain in prolonged periods of labour-market uncertainty. Although secondary school completion in the province is relatively strong, a large share of participants lacks post-school qualifications, and some districts still face high numbers of people without matric. This uneven educational foundation affects access to technical and industry-aligned opportunities. Employment across the province remains limited, with high unemployment rates and heavy reliance on a few economic sectors such as government services, finance, construction, agriculture, and pockets of mining.

Communities highlighted strong interest in engineering, safety, and operations-related skills, while young people emphasised the need for both technical and soft skills—such as communication, teamwork, and leadership—to improve employability. Awareness of emerging skills linked to automation, digital technologies, and the green economy remains low, despite increasing relevance. Entrepreneurship is seen as a pathway for income generation, but business ownership remains small due to barriers such as lack of capital, market access, mentorship, and technical business knowledge. Key transferable skills valued across sectors include project management, digital literacy, and occupational health and safety. Opportunities also exist in agriculture, manufacturing, construction, tourism, and renewable energy, but tapping into these requires better skills alignment and stronger support systems.

In the mining context, companies prefer local recruitment but report significant mismatches between community skills and industry needs—particularly in Mathematics, Physical Science, safety awareness, and technical readiness. Youth face difficulties moving from school to training and into work due to weak work-integrated learning pathways and high experience requirements for entry-level jobs. While companies have developed some internal training

capacity and rely on partnerships with training providers and universities, sustainability challenges persist. Participants expressed very low awareness of MQA programmes and identified the need for clearer communication, simpler processes, and more accessible training. Overall, stakeholders called for coordinated action plans, stronger feedback mechanisms, and tangible community-level impact to ensure that skills development efforts translate into meaningful opportunities.

5.2. Priority areas for skills development and training in the province

Against these findings, the following have been identified as priority areas for skills development and training in KwaZulu-Natal province.

- Strengthening Foundational Education and Technical Readiness - Many community members struggle to access technical or mining-related opportunities because they lack strong foundations in subjects like Mathematics and Physical Science. Targeted interventions are needed to support both learners and educators addressing both the uptake of STEM subjects as well as the quality of teaching.
- Expanding Work-Integrated Learning and Entry-Level Work Experience – There is a need to support young people with transitions from school to training, training to workplace exposure, and finally into employment. Programmes such as learnerships, apprenticeships, internships, and workplace placements would help youth gain the real-world experience they need to secure entry-level jobs.
- Technical and Occupational Skills for mining and manufacturing - Communities highlighted the importance of engineering, safety, and operations-related skills for accessing jobs in mining and manufacturing. Training programmes should focus on technical and operation skills that are in demand in these sectors.
- Digital Skills and Emerging Technologies – There is need for training that will build digital literacy skills so that working-age population can adapt to changing technologies and benefit from new opportunities in the green and digital economy.
- Soft Skills and Workplace Readiness – Youth continue to struggle in the workplace because they lack soft skills such as communication, teamwork, and leadership. These skills are essential for career progression and should be integrated into training programmes to help young people navigate the workplace more confidently and effectively.

- Strengthening Occupational Health and Safety (OHS) Capacities - Safety remains a top priority in the MMS, especially when it comes to risks that are not easily visible, such as psychological hazards. Training should include leadership skills for practitioners at at supervisory levels to support safe working environments.
- Entrepreneurship and Enterprise Development Skills – Opportunities for entrepreneurship have been identified in the province, but many people lack basic business skills and support. There is need for training that focuses on financial management, marketing, and business planning, combined with mentorship and access to markets to help small businesses grow and remain sustainable.
- Portable and Transferable Skills for Economic Diversification - Communities need skills that can be used beyond mining to improve long-term livelihood options. Training in agriculture, construction, manufacturing, tourism, and renewable energy can help people adapt to different sectors and reduce dependence on mining.
- Improving Access to and Awareness of Training Opportunities - Awareness of training opportunities, especially those offered by the MQA, is very low. Improving communication and increasing visibility of programmes in communities would ensure more people can benefit from available training.

5.3. Recommendations

The following recommendations are based on the key findings of the study:

Recommendation 1: Strengthen school-to-work skills pipelines

It is recommended that the MQA strengthen and expand targeted school-to-work and bridging initiatives across the province. This should be done in close collaboration with the Department of Basic Education, TVET colleges, mining companies, and local training centres to ensure alignment between schooling outcomes and industry requirements. The MQA should support structured bridging programmes in Mathematics, Physical Science, and technical literacy by funding preparatory courses, Saturday classes, and focused learner support. These interventions will help learners meet entry requirements for mining- and engineering-related qualifications and improve their readiness for technical career pathways.

Recommendation 2: Expand work-integrated learning and experiential training

To address the lack of practical exposure, the MQA should incentivise mining companies to offer more learnerships, apprenticeships, internships, and workplace-based learning. This could include conditional grants for companies that host learners, structured partnerships with TVET colleges, and community-level placement hubs. Strengthening these pathways will help young people gain the work experience required to enter semi-skilled and artisan roles.

Recommendation 3: Increase accredited artisan training and trade test capacity

The review highlights ongoing constraints in access to accredited artisan training and assessment facilities, contributing to hard-to-fill technical and artisanal vacancies. Strengthening local training and trade test capacity aligns with national priorities to expand occupationally directed training in under-served regions. It is recommended that MQA Provide capacity-building support to training providers and explore the expansion of trade test facilities within KwaZulu-Natal.

Recommendation 4: Improve Digital and Emerging Technology Training

Given low awareness of digital and automation-related skills, the MQA should support the development of short courses focused on digital literacy, automated mining systems, analytics, remote operations, and renewable energy fundamentals. Once developed, these courses should be delivered through accessible platforms to ensure wide community reach in the province.

Recommendation 5: Strengthen occupational health and safety training approaches

The MQA should support the development of innovative OHS training methods that use practical demonstrations, simulation, and real-life case studies. Training should target both entry-level workers and supervisors, with special emphasis on addressing “invisible hazards” that are often overlooked in risk assessments.

Recommendation 6: Integrate Soft Skills into All Training Programmes

Soft skills such as communication, teamwork, problem-solving, and leadership should be built into all MQA-funded programmes. Many young people struggle to succeed in the workplace

even when they have technical skills, so the MQA should ensure that employability training and mentorship support are mandatory components of learnerships and apprenticeships.

Recommendation 6: Promote portable and transferable skills development

In response to mine closure risks and long-term community sustainability concerns, skills development initiatives should include portable and transferable skills applicable beyond mining. This approach aligns with policy emphasis on economic diversification and resilience in mining-affected communities.

Recommendation 7: Strengthen support for local enterprise development

While local procurement and enterprise development are prioritised, community-based SMMEs continue to face barriers related to technical capacity, equipment, and business readiness. Targeted skills development can support progression into higher-value segments of mining supply chains, consistent with SLP objectives.

Recommendation 9: Establish a provincial pool of experienced industry practitioners

The study highlights the value of experienced practitioners in shaping practical, behavioural, and supervisory training, particularly in occupational health and safety. Formalising access to such expertise can strengthen training quality and relevance. It is recommended that MQA establish a provincial pool of experienced industry practitioners to support curriculum development, mentoring, and training delivery.

Recommendation 10: Strengthen visibility, communication, and dissemination of skills development information in KwaZulu-Natal

The study findings indicate that while stakeholders recognise the role of the MQA in skills development, its visibility and perceived impact at community and provincial level in KwaZulu-Natal remain limited. Respondents noted that skills research findings and training opportunities are not consistently communicated back to communities, training providers, and local stakeholders, reducing awareness and limiting uptake. This challenge is also reflected in skills planning literature, which emphasises the importance of transparent communication and feedback in strengthening stakeholder participation and trust. It is therefore recommended that the MQA strengthen its visibility and communication presence in KwaZulu-Natal through structured dissemination of skills review findings and training

opportunities, including district-level outreach, regular feedback engagements, and accessible communication channels such as community radio and digital platforms. Improved dissemination will support greater awareness, clearer participation pathways, and stronger translation of research into implementation.

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