



**MANDELA MINING PRECINCT**  
MINDS FOR MINES

# Guideline

Understanding of socio-economic transformation impacts at a modern, zinc mining company

**SATCAP2023: WP 2.1 - SKILLS**

# About the Mandela Mining Precinct

The Mandela Mining Precinct is a Public-Private Partnership between the Department of Science and Innovation and the Minerals Council of South Africa. The Precinct is jointly hosted by the Council for Scientific and Industrial Research and the Minerals Council. The Mandela Mining Precinct is an initiative to revitalise mining research, development and innovation in South Africa to ensure the industry's sustainability. This is achieved through the South African Mining Extraction, Research, Development and Innovation (SAMERDI) strategy.

The strategy comprises six research programmes:

1. Longevity of Current Mining;
2. Mechanised Mining Systems;
3. Advanced Orebody Knowledge;
4. Real-Time Information Management Systems;
5. **Successful Application of Technologies Centred Around People;** and
6. Test Mine.

This guideline was developed under the Successful Application of Technologies Centred Around People (SATCAP) research programme. The programme aims to understand the effects, impacts and challenges of mining modernisation on people in the minerals sector. As there is a demand for a balance between people, planet and profit, SATCAP further lends support to the environmental, social and governance (ESG) agenda, with focus on the 'social or benefits to people' aspect.

SATCAP2023 Socio-Economic Transformation Impacts

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# CHAPTER 1

## Introduction & Background

# 1. INTRODUCTION AND BACKGROUND

The South African mining sector contributes 7 - 8% to the nation's gross domestic product (GDP) and sustains over 475,000 livelihoods, with each mine worker employed supporting approximately 10 additional dependents (Minerals Council South Africa, 2023). Further, the vision of the mining industry aligns with the United Nations Sustainable Development Cooperation Framework, which emphasises the Sustainable Development Goals (SDGs) spanning economic growth, poverty eradication, climate protection, health, clean energy, water access, and safe, sustainable production.

Pursuing valuable minerals drives operations deeper, with higher operating costs, squeezed profit margins, and heightened risks to workforce health and safety; modernisation becomes necessary for industry sustainability and worker safety in line with the mining industry's "Zero-harm" goal.

Modernisation is about extending mine life, generating employment, boosting exports, catalysing socio-economic development, and fostering a more sustainable and environmentally responsible mining sector. So, it seeks to contribute to uplifting workforce and community livelihoods, show alignment with the SDGs, and usher in a new era of sustainable, safe, and responsible production.

Mines are grappling with getting a deeper understanding of the changes and impacts brought about by modernisation, specifically from the 'Social' principle of the Environmental, Social, and Governance (ESG) agenda. Consideration needs to be made of, amongst other aspects, understanding community development and support interventions, the impact of automation on jobs, and the efficacy of change management processes in implementing new technology in mining operations.

To lend support to mines, the South African Mining Extraction Research, Development, and Innovation (SAMERDI) initiative's Successful Application of Technology Centred Around People (SATCAP) programme has focused on advancing the *social* principle of the ESG agenda. The related 2022 projects focused on the development of *social* tools for data gathering, which included: a Community Training-Needs tool, a Community Social-Needs tool, a Small, Medium, and Micro Enterprises (SMME) Communications and Engagement tool, a Digital Leadership Competencies gap assessment tool and a Change Management Blueprint for adopting modern technologies. Further, towards understanding of people-related impacts, the SATCAP 2023 projects have focused on developing domain-specific impact evaluation (IE) dashboards, namely: a Socio-Economic Transformation IE Dashboard, an Impact of Automation Dashboard, and a Change IE Dashboard. The SATCAP 2022 related tools were linked to the IE dashboards to enable mines to gauge impacts in a changing landscape.

The SATCAP 2022 tools allowed mines an understanding of:

- Community jobs and skills needs for current and future mining;
- Community social needs to support shared value creation;
- SMME communications and improved engagement for potential entrance into the mine's supply chain;
- Digital leadership competencies gaps to support digital transformation in mining; and
- Change management and the management of change for the adoption of modern technologies.



Verification of the above-mentioned tools through application on mine and interlinking of such tools to impact dashboards was important, as mines needed to be able to gauge impacts on people in mining, through their initiatives and modernisation journey.

A Socio-Economic Transformation IE Dashboard was developed through the 2023 project. It has seven underlying dashboards, with key 46 indicators, representing the impacts of socio-economic transformation in mining host communities. Seven broad categories represent seven sub-dashboards, which aim to answer a specific question for the mines. For example:

- a) **Community Skills:** Aims to address how socio-economic transformation has impacted the skills of the community. The associated indicators in this group are the scope of skills, access to skills development interventions and an analysis of access according to gender.
- b) **Community Needs:** Aims to address how socio-economic transformation has impacted the community's needs. The associated indicators in this group are transparent engagement with the community to ensure awareness of their needs and an assessment of post-mine closure initiatives.
- c) **Community Assets:** This group addresses how socio-economic transformation has impacted community assets. The associated indicator assesses loss of vs. created asset bases.
- d) **Community Jobs:** Addresses how socio-economic transformation has impacted community jobs. The associated indicators in this group are an assessment of jobs created through asset bases and alternate economies.
- e) **SMME Skills and Training:** This group addresses how socio-economic transformation has impacted SMME skills and training. The associated indicators assess the change in SMME needs.
- f) **SMME Information:** This indicator addresses how socio-economic transformation has impacted SMMEs. It assesses the change in SMME needs.
- g) **SMME Stakeholder Engagement:** This group aims to address how socio-economic transformation has impacted SMME vendors and applications. The associated indicator assesses changes in accepted vendor applications with local mines.

Collectively, as per the categories above, the seven sub-dashboards enable the mines to understand how modernisation and their socio-economic transformation initiatives impact on the local host communities and enable mines to proactively gauge their socio-economic transformation impacts.

Further, with linkages evident across the SATCAP projects, the Socio-Economic Transformation IE Dashboard was integrated into an ESG Impacts Lens Dashboard. This ESG Impacts Lens Dashboard showcases three domain-specific IE dashboards: the Socio-Economic Transformation IE Dashboard, an Impact of Automation Dashboard, and a Change IE Dashboard, as these have evident synergies. The 2022 tools were interlinked as part of the set of identified key indicators. The ESG Impacts Lens Dashboard also reflects the broader impacts on key business priorities: safety, cost, production, and people.

For understanding of socio-economic transformation impacts, application was done through a zinc mine partner, with results and learnings obtained. Hence, **this guideline focuses on socio-economic transformation impacts through relevant tools applied in a zinc mining context.** It is important to note that South African mines have different mining contexts and are in various phases of modernisation. An understanding of the learnings, results and impacts as experienced through the tools' application in a modern mining context is important for other mines with similar contexts and experiences.

The guideline, while highlighting the SATCAP ESG Impacts Lens Dashboard, consisting of the three domain-specific dashboards for enabling gauging of impacts, considers more specifically the learning, results and impacts as relating to socio-economic transformation in a specific mining context.





# CHAPTER 2

## Context and Methodology



## 2. CASE STUDY CONTEXT AND METHODOLOGY

### OBJECTIVE

This project's output was an IE dashboard that enables mines to gauge the impact of socio-economic transformation in their host mine communities.

### METHODOLOGY

The methodology considered:

- On-boarding of the mining partner;
- FY2022 tools verification;
- Literature review;
- Co-creation workshops to develop a wireframe for the ESG Impacts Lens Dashboard;
- Presentation to key stakeholders for review, inputs, and refinement;
- User-testing and impacts observations; and
- Finalise.

#### i. LITERATURE REVIEW

The mining sector in South Africa has been a key driver of economic growth and social development for many decades. The industry has contributed significantly to the country's GDP, foreign exchange earnings, employment creation, infrastructure development and poverty alleviation (Ngobese, 2015). However, the mining sector faces many challenges, such as fluctuating commodity prices, labour unrest, environmental degradation, and social conflicts (Ngobese, 2015). These factors make the mining industry a highly cyclical and unpredictable one, with significant impacts on the well-being of workers and communities. Boom-and-bust cycles reflect a period of rapid growth and decline in productivity and profitability of the mining sector (Marais et al., 2022). One way to understand the boom-and-bust cycle is to examine how short-term fluctuations in demand affect the local host communities that depend on economic activities (Marais et al., 2022). When demand is high, the local economy experiences a boom, which creates jobs, income, and development opportunities. However, a boom phase may also bring challenges such as inflation, congestion, pollution, social inequality, crime, cultural erosion, and environmental degradation (Stacey et al., 2010). Moreover, a boom phase may create dependence on a single or dominant industry or market, making the local economy vulnerable to external shocks and fluctuations. When demand declines, the local economy suffers a bust, which leads to unemployment, poverty, and social problems (Marais et al., 2021). A bust cycle can result in reduced production, layoffs, or mine closure.

The impact of a mine closure on the local host community can be devastating and long-lasting. The community may lose its primary source of income, employment, and infrastructure and face environmental degradation, social disruption, and cultural loss (Nthatisi, 2022). Mine closures significantly impact the smaller communities that host them, especially when communities are in remote areas with limited sources of alternative income (Nthatisi, 2022). The local population may rely on the mine for employment, infrastructure, and social services and face challenges adapting to the post-mining transition. Research by Minerals Council South Africa has reported that the average mine worker has a dependency ratio 1:10 (Casey, 2019). Therefore, mine closure planning should consider the socio-economic aspects of the affected communities and involve them in the decision-making process.

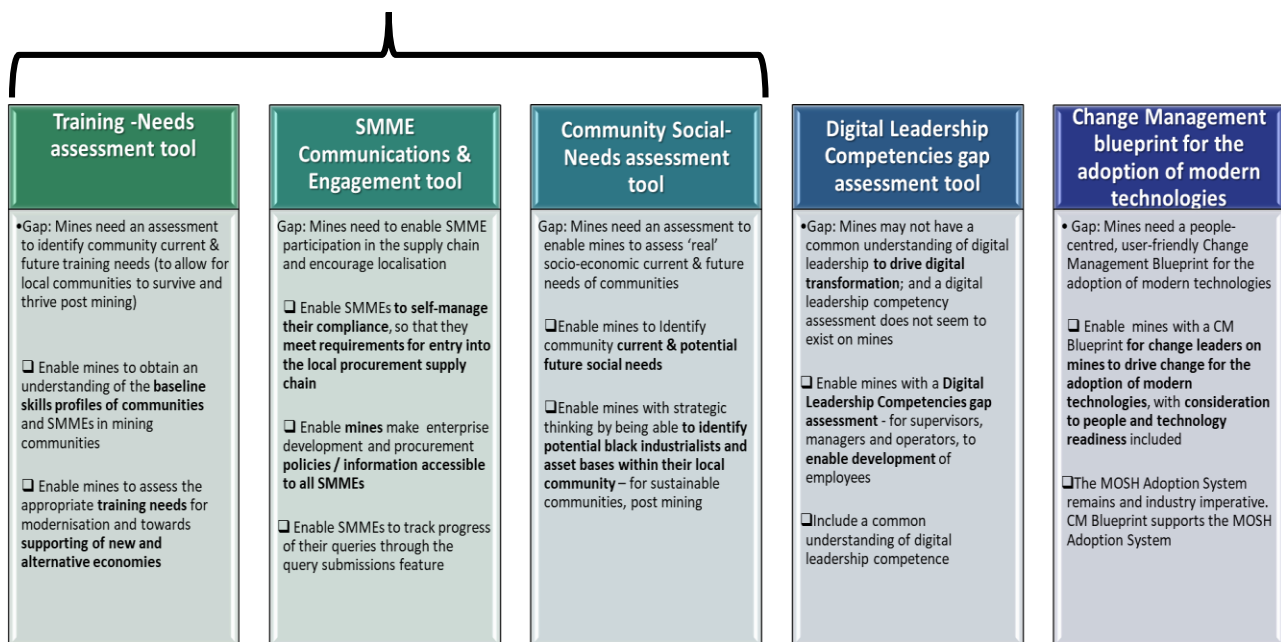
Socio-economic transformation in mine local host communities in South Africa is a complex and multifaceted process that involves addressing systemic inequalities, promoting social justice and inclusion, enhancing economic opportunities and livelihoods, and fostering environmental sustainability (Stacey et al., 2010). The transformation of socio-economic structures in local host communities is vital because of its advocacy of sustainability and development. According to Ngobese (2015), socio-economic transformation refers to the effect that can improve the living conditions of a local host community's present and future inhabitants. Socio-economic transformation can be influenced by different factors such as policies, institutions, culture, and environment (Ngobese, 2015). Socio-economic transformation aims to achieve sustainable and equitable development for the local host community and its members.

The discussions above have highlighted the need for mines to get an understanding of socio-economic transformation initiatives in their local mining communities and their potential impacts.

## ii. UNDERSTANDING OF SOCIO-ECONOMIC TRANSFORMATION IMPACTS

### ▪ DATA GATHERING TOOLS

Mines required enabling tools to gather data around social/community-related aspects for informed decision-making, and hence digital data gathering tools were designed, by SATCAP in 2022, as shown in Figure 1.



**Figure 1: SATCAP data gathering tools**

With specific focus on socio-economic transformation, the three community-related tools in Figure 1 had relevance for the 2023 related project to enable mines to gauge of socio-economic transformation impacts. The 2022 tools provided some of the key indicators for understanding of socio-economic transformation impacts, but as a baseline for understanding of socio-economic transformation impacts, these needed to be extended further; and more so, with a need for an IE dashboard being required for gauging of related initiatives undertaken by mines.



## ▪ SOCIO-ECONOMIC TRANSFORMATION IE DASHBOARD CONSIDERATIONS

Based on the discussion in the literature review above and as per mines' needs, key questions which motivated the design of the IE dashboard, and which needed to allow for reflecting on the impact that socio-economic transformation interventions have on mining host communities were considered, as follows:

- Does the dashboard contribute to understanding the progress and achievements of community development interventions?
- Have community development interventions had the desired impact (e.g. return on corporate social investment)?
- Does the dashboard help identify the skills needs of the communities and SMMEs?
- Does the dashboard indicate a change in representation (female vs. male) in viable economic activities surrounding the mines?
- Does the dashboard indicate improved communication between the mine and its stakeholders?
- Does the dashboard provide a macro-level view of the current and future social needs of the surrounding communities and SMMEs?
- Does the dashboard align with global ESG reporting practices and SDGs?

In turn, five driving factors as relevant for gauging socio-economic transformation within mining companies were also identified:

- **Economic development:** The process by which communities with a low standard of living work towards sustainable development, involving qualitative and quantitative improvements in various aspects of the economy, such as technology, productivity, and infrastructure (Market Business News, 2023).
- **Social development** Is a change in a society or group's social structures and processes. It involves acquiring skills, attitudes, relationships, and behaviours that enable individuals to interact with others and function as members of society (Parke, 2020).
- **Diversity, Equity, and Inclusion:** A conceptual framework that promotes the fair treatment and full participation of all people, especially in the workplace or community, including populations who have historically been under-represented or subject to discrimination because of their background or identity (McKinsey & Company, 2022).
- **Good governance and best practices:** Refers to concepts that aim to improve the quality, efficiency, and effectiveness of an organisation or a process. They involve following ethical principles, complying with relevant laws and regulations, ensuring accountability and transparency, and engaging with stakeholders and beneficiaries (McKinsey & Company, 2022).
- **Environmental security and safety:** The act of protecting of natural resources and ecosystems from human-induced threats, such as pollution, climate change, deforestation, and overexploitation (UNEP, 2019). Environmental security and safety also imply preventing ecological degradation that could lead to social conflicts, violence, or instability.

These above-mentioned questions and driving factors were consolidated into seven broader categories, with associated indicators, towards enabling the gauging of socio-economic transformation impacts.

## ▪ SOCIO-ECONOMIC TRANSFORMATION IE DASHBOARD UNDERPINNINGS

### Sub-Dashboards

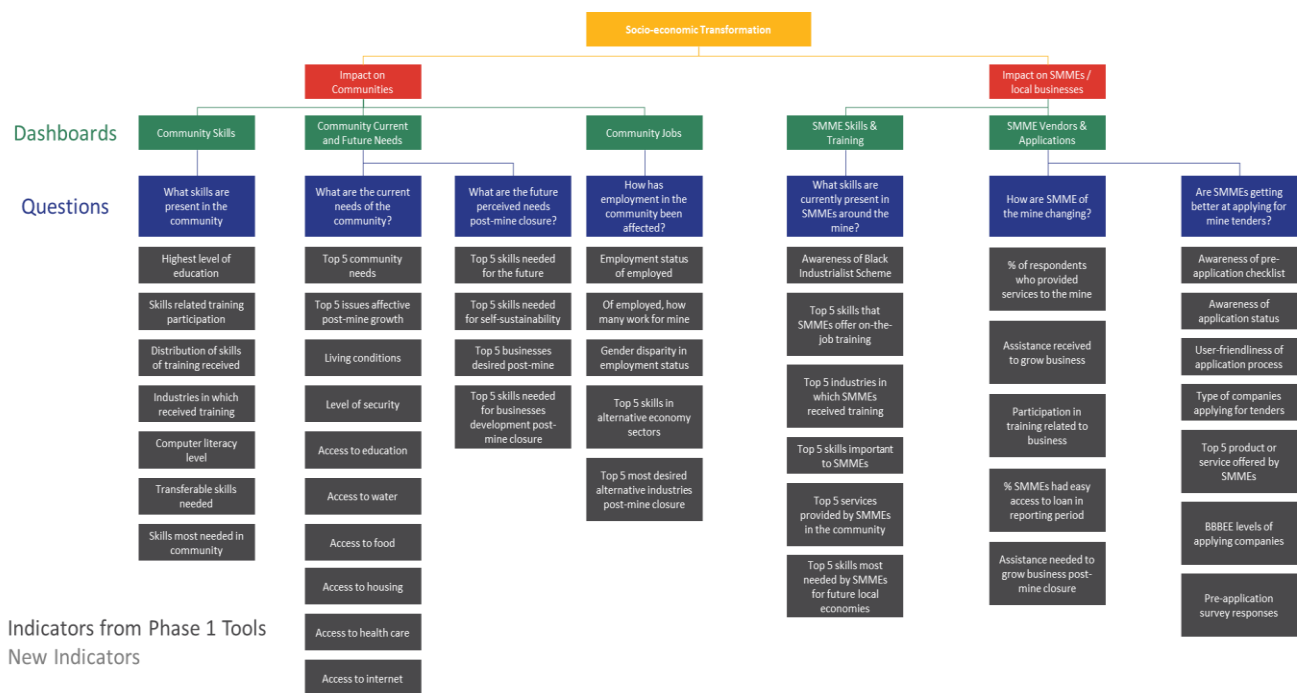
The seven broad categories represent seven sub-dashboards which aim to answer a specific question for the mines. For example:

- a) **Community Skills:** Aims to address how socio-economic transformation has impacted the skills of the community. The associated indicators in this group are the scope of skills, access to skills development interventions and an analysis of access according to gender.
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- c) **Community Assets:** Addresses how socio-economic transformation has impacted community assets. The associated indicator in this group is an assessment of loss of vs. created asset bases yearly.
- d) **Community Jobs:** Addresses how socio-economic transformation has impacted community jobs. The associated indicators in this group are an assessment of jobs created through asset bases and alternate economies.
- e) **SMME Skills and Training:** This group addresses how socio-economic transformation has impacted SMME skills and training. The associated indicator assesses the change in SMME needs per annum.
- f) **SMME Information:** This indicator addresses how socio-economic transformation has impacted SMMEs. It assesses the change in SMME needs over the last year.
- g) **SMME Stakeholder Engagement:** This group aims to address how socio-economic transformation has impacted SMME vendors and applications. The associated indicator assesses changes in accepted vendor applications with local mines.

Collectively, as per the categories above, the seven sub-dashboards enable the mines to understand how modernisation and socio-economic transformation initiatives have impacted the local host communities, and enable mines to proactively gauge their socio-economic transformation impacts.

## ▪ KEY INDICATORS

The sub-dashboards have 46 indicators, as shown in Figure 2 Community Training-needs assessment, Community Social-needs assessment tool, and SMME Communications and Engagement tool. This dashboard's target audience/users are mine officers responsible for stakeholder relations, corporate affairs, social performance, vendor and enterprise development, social responsibility, compliance reporting, and sustainability – so the related identified indicators have relevance (**Figure 2**).



**Figure 2: Socio-Economic Transformation IE Indicators**

### iii. MINE CONTEXT: MODERN ZINC MINE

Zinc mining is mainly geographically placed in the Northern Cape. The host population in the Northern Cape area of interest was the Khai-Ma region, which has a population of 14,574 people. This province's small size means that the allocation of resources is limited, and there needs to be diversification of economies throughout the province, posing high risks and challenges for remote geographies. Like other mining communities worldwide, zinc mining communities in South Africa face various socio-economic challenges. These challenges can vary depending on the specific location, size of the mining operation, and the policies in place. Here are some of the common socio-economic challenges facing zinc mining communities in South Africa:

- Health and Safety Risks:** Mining operations can pose health and safety risks to community members, including mine workers and nearby residents. Exposure to dust, chemicals, and other hazards can lead to respiratory issues and other health problems (Maloisane, 2023).
- Environmental Degradation:** Mining activities can have a significant impact on the local environment, including soil and water pollution, deforestation, and habitat destruction. This can affect the livelihoods of communities dependent on agriculture and natural resources (Forget & Rossi, 2021).
- Employment:** While mining can provide job opportunities, there are often challenges related to job security, fair wages, and decent working conditions. More local skills development may also be needed, leading to a reliance on non-local labour (Cole & Broadhurst, 2022).
- Income Inequality:** Mining can sometimes exacerbate income inequality within communities. Some individuals may benefit significantly from mining-related employment or business opportunities, while others may see a slight improvement in their economic well-being (Maloisane, 2023).



- e) **Infrastructure and Services:** The influx of people and investment associated with mining can strain local infrastructure and services like housing, schools, healthcare facilities, and transportation. This can lead to inadequate services for both mining and non-mining communities (Mail & Guardian, 2023).

The development of mines in a sustainable manner involves engaging with stakeholders at various levels to understand their operational context (ICMM, 2022). According to the International Council on Mining and Metals, two mutually reinforcing approaches to stakeholder engagement enhance social and economic development (ICMM, 2022). These approaches include early meaningful engagement to fully understand and incorporate local stakeholders' concerns, aspirations, and perspectives and ensure that affected stakeholders can raise concerns, issues or questions and obtain fair, transparent, and equitable resolutions.

By adopting these approaches as suggested above, proactive and constructive communication can be established, leading to a more precise and better understanding of the priorities of the mine and host communities (ICMM, 2023).

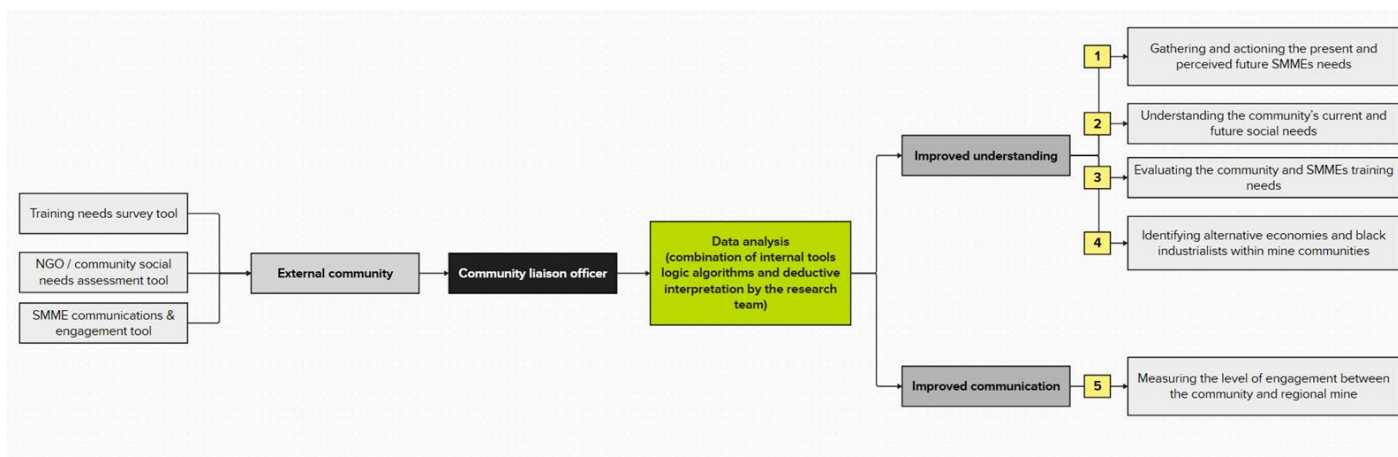
Mines have reported through stakeholder engagements that they often grapple with discovering the true needs of communities. Mines have indicated accessing communities' needs through their mobile device may be an option to consider. Digital tools deployment may allow for enhancing the understanding between the mine and host communities, and thus allow for more open and transparent line of communication between the parties. Additionally, using digital tools may focus on enhancing data collection to support the stakeholder engagement strategy with the mine and the surrounding community.

To lend support to mines for a better understanding of community needs, to improve engagement, and to allow for SMME entry into the vendor pool, the SATCAP digital tools developed serve as a means by which needs and data can be collected from mining communities for mines' analysis and decision-making. This was applied in a zinc mining context – which has similar community challenges as experienced by other mines.

#### iv. DATA GATHERING AND VALIDATION

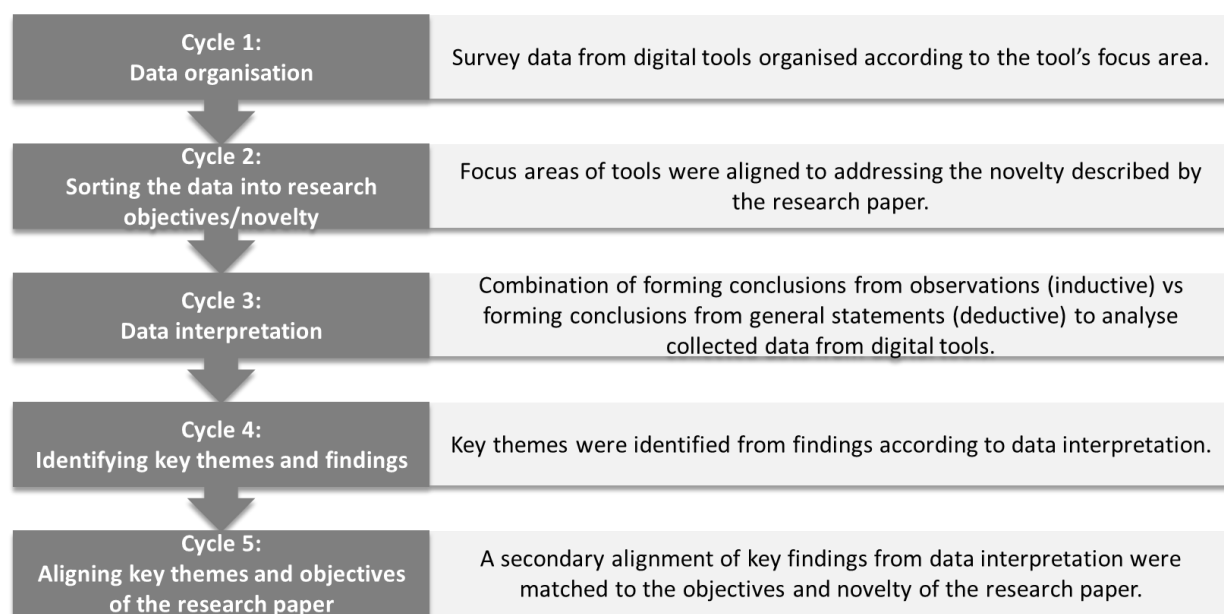
For conceptualisation and development, a *Stanford Design Thinking* process was followed. The process included understanding and synthesising desktop research, insights from focus groups, and pilot testing to obtain qualitative and quantitative data. The insights from the research informed the ideation and analysis phases, which ensured alignment between the design concepts' functions and users' needs. Through a series of testing, iteration, and refinement, the SATCAP tools and IE dashboard were developed - in collaboration with technical, academic, and mining partners.

Data gathering and validation in the mining operation were done using the Community Liaison Office within the zinc mine host community. The digital tools were deployed within the zinc mine itself. Segmenting the population for the research sample was driven via the foot traffic that entered the Community Liaison Office in the five regions of host communities located around the regional zinc mine. **Figure 3** depicts the inputs, processing, and outputs required for the data gathering and validation.



**Figure 3: Data gathering and validation process**

No comparative data sets exist as this is the digital tool's baseline dataset. The research team engaged in deductive and inductive interpretation to identify key themes represented by the data, which can inform future decision-making (Bingham & Witkowsky, 2022). These themes were then categorised to maintain alignment with the survey questions and make meaning of the survey inputs received. **Figure 4** represents the data analysis and interpretation of the collected information.



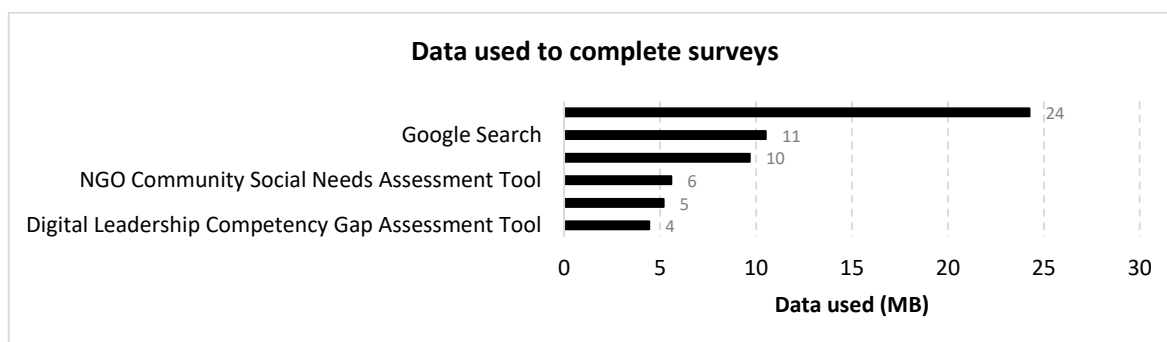
**Figure 4: Data analysis and interpretation process.**

The participants in the study were not intentionally selected for the study; instead, their interest and autonomy were encouraged to ensure that their interests were being considered in the regional mine's development interventions.

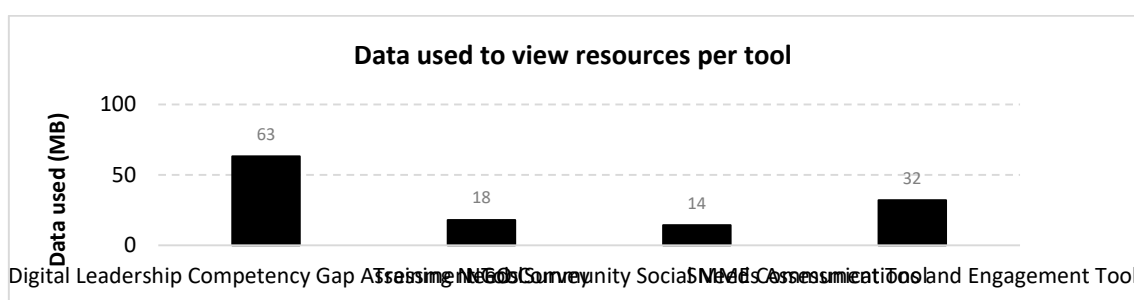
## v. LESSONS AND LEARNINGS

The lessons learned from implementation produced the following insights, which informed the subsequent recommendations:

- Mines need to utilise existing campaigns in the communities where the community leaders and a significant portion of the engaged community are present. These campaigns may be extended to explain the value of the tools and share a compelling motivation around the potential outputs from the tool.
- Mine and community leadership is needed to influence, drive uptake and use of the tools within the community.
- Utilising the technological assets (i.e. computers and internet connection) within the Community Liaison Office is essential to spur additional community participation and excitement. The mine may create curiosity and excitement within the community towards regular visits to the Community Liaison Office.
- The average completion time per survey was 15 minutes. Mines need to be aware that participants from communities may be less willing to spend time completing long surveys. Hence, the data-gathering tools may be merged and further customised to meet mine-specific needs.
- Data usage emerged as an essential consideration for completing the survey by community members. Mines need to make provision for free Wi-Fi/Wi-Fi hotspots for the community. The required data may be shared ahead of the process as shown in **Figures 5 and 6**, which depict each tool's actual data usage (megabytes) compared to known examples.



**Figure 5: Data usage to complete surveys**



**Figure 6: Data needed to view survey resources**

In conclusion, the attainment of insightful information to make data driven decisions is increased if the above data analysis and interpretation cycles and respective learnings are followed.





# CHAPTER 3

## Results & Insights

### 3. RESULTS AND INSIGHTS

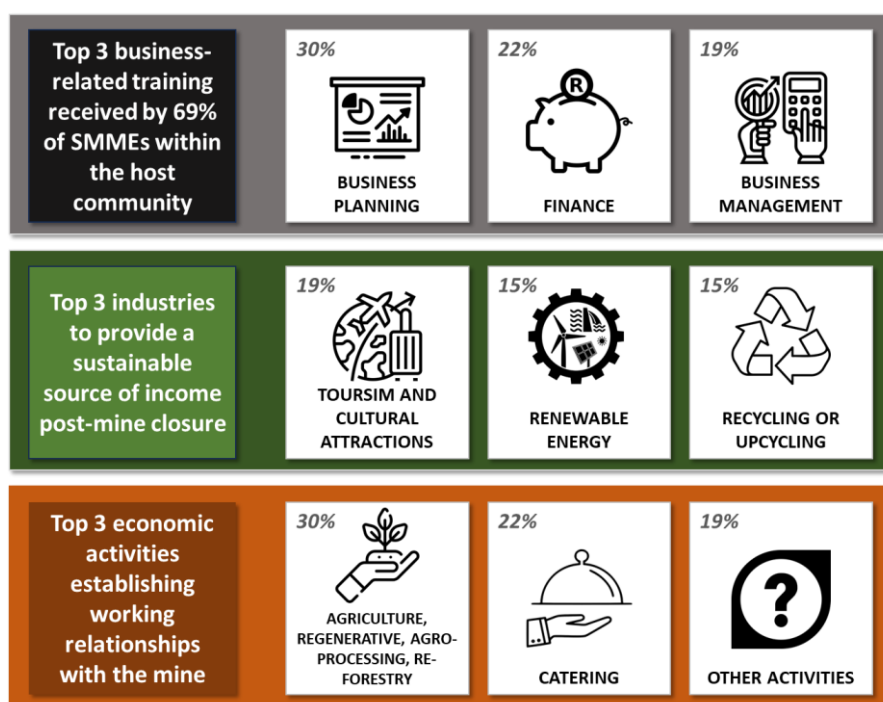
This section is a snapshot of the results as per the tools application, on-mine.

**Table 1** shows the sampled dataset per tool. The highest number of participants (59) completed the Training-needs survey.

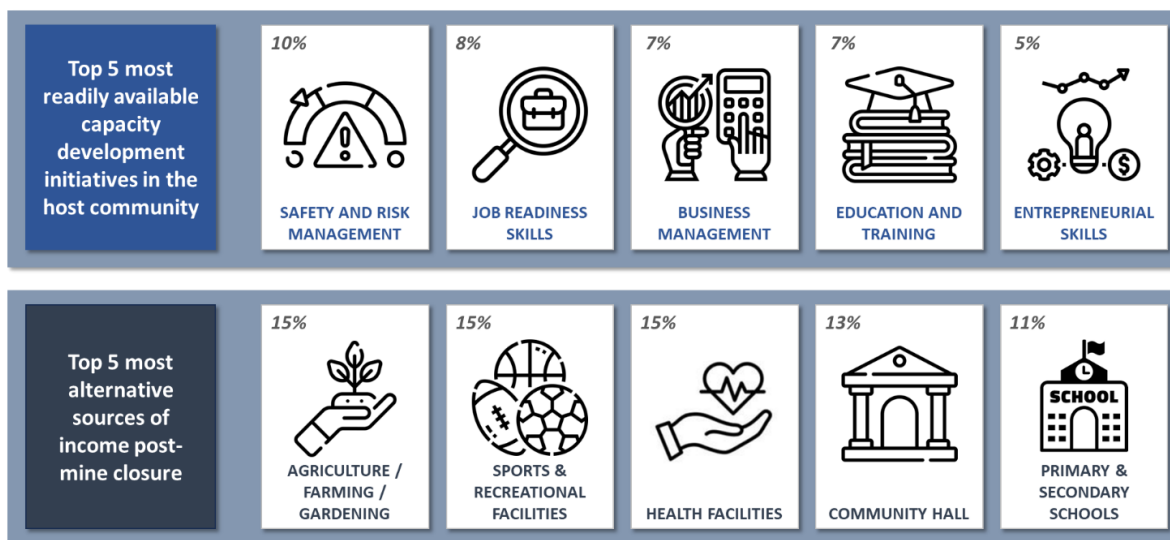
**Table 1: Sample size per digital tool**

| Tool                                    | Number of participants |
|-----------------------------------------|------------------------|
| Training-needs survey                   | 59                     |
| Community Social-needs assessment tool  | 33                     |
| SMME Communications and Engagement tool | 28                     |
| <b>TOTAL:</b>                           | <b>120</b>             |

The assessment results provide insights for developing the regional mine in the future. Key insights for each focus area are summarised in **Figures 7 and 8**.



**Figure 7: Summary of training, sustainable industries post-mine closure, and economic activities with host mine**



**Figure 8: Summary of readily available development initiatives and alternative sources of income post-mine closure**

#### ▪ **Gathering and actioning the SMMEs' present and perceived future needs**

The insights below pertain to the SMMEs' survey responses regarding their success rate on loans, their actions with the obtained capital grants, and the alternative sources of income available within the community apart from mining.

- SMMEs that applied for loans and grants had a success rate of 75%.
- Those who received financial assistance used it for one of two purposes: 66% of SMMEs used the funds to expand their businesses, while 34% utilised it to hire more employees.
- To uplift the community, SMMEs have identified several assets that can stimulate community development after mine closure. The top five alternative sources of income were agriculture, farming, and gardening (15%), sports and recreational facilities (15%), health facilities (15%), a community hall (13%), and primary and secondary schools (11%).

According to the data, the host communities are enthusiastic and ready to establish sustainable businesses that generate household income independent of the mine's operational activities. These businesses cater to the community's needs, indicating that the host community wants to promote economic activity outside of mining and seeks to address their social needs. The mine can use these insights to determine and invest in the industries that require corporate social investment support.

#### ▪ **Understanding the community's current and future social needs**

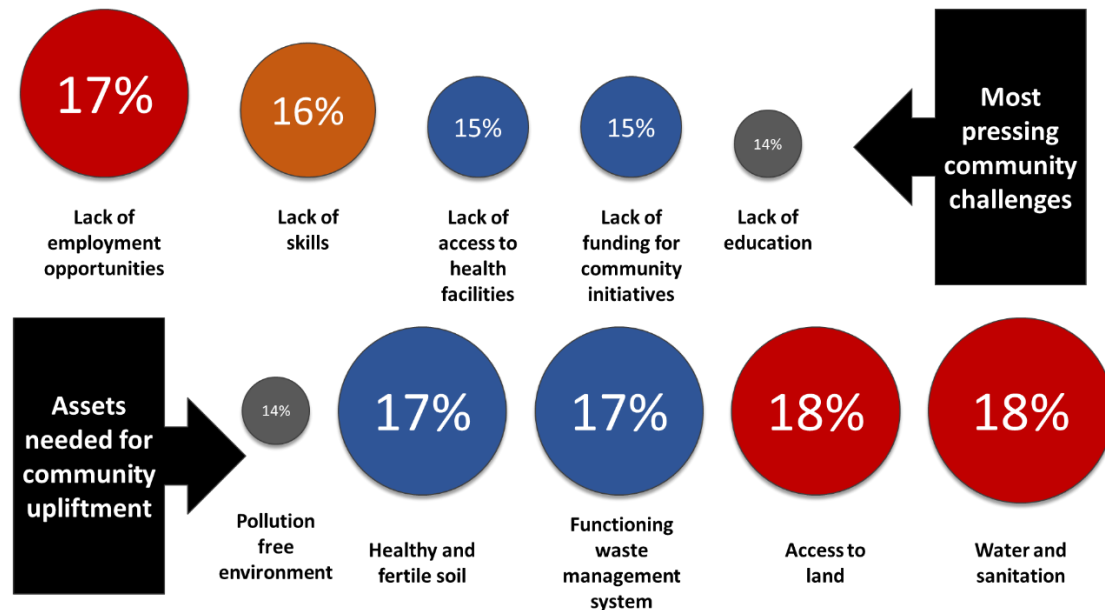
To improve the effectiveness and impact of socio-economic development programs, it is essential to have a deep understanding of the current and future social needs of the community being served. These needs can be identified by analysing the community's most pressing challenges and identifying the necessary resources and assets needed to promote positive change and development.

- The community members indicated that the five most pressing challenges in the community include lack of employment opportunities (17%), lack of skills (16%), lack of

access to health facilities (15%), lack of funding for community initiatives (15%), and lack of education (14%).

- With regards to community upliftment, the participants indicated that the top five assets required for community upliftment include water and sanitation (18%), access to land (18%), functioning waste management systems (17%), healthy and fertile soil (17%), and a pollution free environment (14%) as shown in **Figure 9**.

The current and future needs expressed by the communities can serve as direct indications of where the mines can provide backing for and obtain additional support from the communities. Addressing these social needs will ensure the mine maintains its social license to operate within the region.



**Figure 9: Host community challenges and needs**

#### ▪ Evaluating the community and SMME's training needs

It is necessary to consider the various training needs required by the community and SMMEs to address the community's social needs. To plan socio-economic capacity development initiatives, aligning the community's needs, available training opportunities, and future income sources for the host communities after mining operations have ended is crucial.

- The community has previously engaged in skills training. The top five most readily available capacity development initiatives have been: safety and risk management (10%), job readiness skills (8%), business management (7%), community education and training (7%), and entrepreneurial skills (5%).
- Of the 69% of SMMEs that received business-related training within the community, the top three most prevalent training initiatives were related to business planning (30%), finance (22%), and business management skills (19%).

The mine may utilise the existing skills base to facilitate business development in the community. Rather than being the sole funder, the mine may grow relationships with community members with complementary skills and assets. This approach may foster relationships between community members who have the potential to



successfully run and manage a business, addressing critical societal needs. By doing so, the mine can improve its relationships with the community members while enhancing the sustainability of economic activities post-mine closure.

- **Identifying alternative economics and industrialists that meet the Broad-Based Black Economic Empowerment (B-BBEE) criteria within mine communities**

Industrialists play a vital role in the economic growth of communities after mining activities have ceased. They can become the major economic contributor within the region. SMMEs have the potential to benefit from industrialist schemes. However, they need to be aware of the presence and requirements of these programs. Additionally, the regional mine can further assist SMMEs that show the potential to become industrialists within the region.

- 67% of economically active community members were unaware of the Black Industrialist Scheme.
- The community has identified industries that could provide sustainable income after the mines close. These industries include tourism and cultural attractions (19%), renewable energy (15%), and recycling/upcycling (15%).
- 11% of community members were not interested in selecting an industry for income post-mine closure. Therefore, additional engagement is required to determine their specific training needs related to sustainable commercial industries within the community.

These datasets indicate a misalignment between what the mines communicate with the communities and what the communities understand about the various initiatives and support the mine offers. Regarding informing future decisions, this data would suggest that a more precise and consistent promotion strategy relating to the different support offerings is required to ensure the community can leverage the support offered.

- **Measuring the level of engagement between the SMMEs and the regional zinc mine**

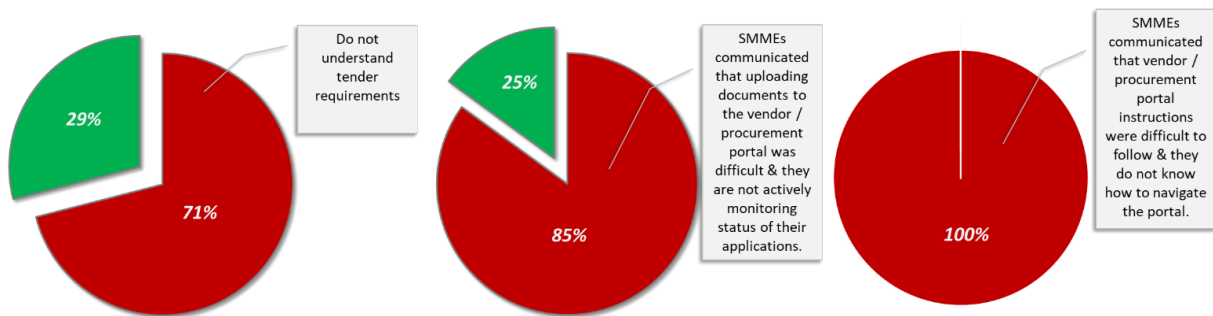
It is necessary to measure the level of communication between regional mines and host communities to ensure that each stakeholder understands the needs of the other and how they can be met through available tools and portals.

- The majority of SMMEs (71%) communicated that they do not understand tender requirements.
- 85% of SMMEs communicated that uploading documents onto the regional mine's vendor/procurement portal was difficult. This is supported by 100% of participants sharing that the vendor/procurement portal instructions were difficult to follow.
- It has been found that 85% of participants are not checking the status of their applications on the vendor/procurement portal. This could be because they are unaware of where to find the portal and how to navigate it. None of the participants (100%) know the location or the process of navigating the portal, as depicted in **Figure 10**.
- More than 86% of SMMEs are registered with the Companies and Intellectual Property Commission and have a tax number. Still, many are not registered with the South African

Revenue Service or the Department of Labour’s Compensation Fund and do not understand tender requirements.

- Of the SMMEs that have working relationships with the mine, the top three economic activities are agriculture, regenerative agriculture, agro-processing, re-forestry (21%), catering (14%), and other activities (14%).

The main finding of this dataset is that SMMEs possess the basic qualifications required to trade services with the zinc mine in the region. However, they lack the technical knowledge to register on the vendor platform successfully. Moreover, the platform is not easy to use and does not provide a user-friendly experience to SMMEs during registration. These results suggest that the mine should invest more time mentoring SMMEs on the advanced requirements of the vendor platform and show them how to navigate it effectively so that both parties can benefit from mutually beneficial relationships.



**Figure 10: SMME engagement with host mine vendor portal**

In summary, the SATCAP digital tools provide a more detailed perspective of most elements questioned within a mine’s materiality assessment (see **Table 2**). They may also enable more instantaneous and regular feedback with host communities.

**Table 2: Materiality comparison with digital tools**

| Mine Social Metric<br>(Secured after annual materiality surveys) | Identified using the Digital Tool<br>(secured during November 2023) | Justification for Response                                                                                                                                                                              |
|------------------------------------------------------------------|---------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Put safety first in the Community                                | Yes                                                                 | The community was keen to participate in safety and risk management training (10%) to prevent fatalities and injuries.                                                                                  |
| Number of social incidents reported, investigated and actioned   | No                                                                  | It is not included in the digital tools and is not highlighted by the Communities as an issue/concern based on the good relationship with the mines.                                                    |
| Human Rights Assessment completed, and recommendations actioned  | No                                                                  | It is not included in the digital tools and is not highlighted by the Communities as an issue/concern based on the good relationship with the mines.                                                    |
| Local employment                                                 | Yes                                                                 | Skills development for business-related capabilities was favoured by 69% of the host community, where skills to improve their ability to create a sustainable business were favoured and tended towards |

|                                                                                       |     |                                                                                                                                                                                                                                                                                                                                              |
|---------------------------------------------------------------------------------------|-----|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                                       |     | business planning (30%), finance (22%), and business management (19%).                                                                                                                                                                                                                                                                       |
| Local procurement                                                                     | Yes | Through the SMME Communication and Engagement tool, 100% of SMMEs in the host community expressed interest in providing services to the regional mine. However, 71% expressed difficulty understanding tender requirements. Those who were successful provided agricultural, agro-processing, catering, and other activities to the mine.    |
| Families impacted through skills development.                                         | Yes | The Training Needs Assessment Survey provides insight into the specific skills development requirements desired by the host community and indicates that job readiness (8%) and entrepreneurship (5%) are crucial in ensuring sustainable economic activities to improve the living conditions of families.                                  |
| Community beneficiaries employed                                                      | Yes | The Community Social Needs Assessment Tool indicates the success rate of SMMEs who applied for grant funding (75%) and the degree of awareness of Black Industrialist Schemes (33%) offered by the mine. The utilisation of the specific funds tends towards expanding their business (66%) rather than offering immediate employment (33%). |
| Women and Children are uplifted through education, nutrition, healthcare and welfare. | Yes | The Community Social Needs Assessment Tool provides insight into the host community's needs and challenges and what specific industries can lead to community upliftment.                                                                                                                                                                    |





## CHAPTER 4

### ESG IMPACTS LENS DASHBOARD



## 4. ESG IMPACTS LENS DASHBOARD DESIGN

### ESG Impacts Lens Dashboard

As this work package has linkages to SATCAP 2023 WP 2.2 (Impact of Automation) and WP 2.3 (Change Impact), partner mines suggested a visually integrated ESG Impact Lens dashboard, to enable visualisation of impacts across the three areas, as per evident synergies amongst the impact dashboards. Thus, the three domain-specific IE dashboards (WP 2.1 Socio-economic Transformation, WP 2.2 Automation, and WP 2.3 Change) were drafted and visually integrated into an ESG Impacts Lens Dashboard.

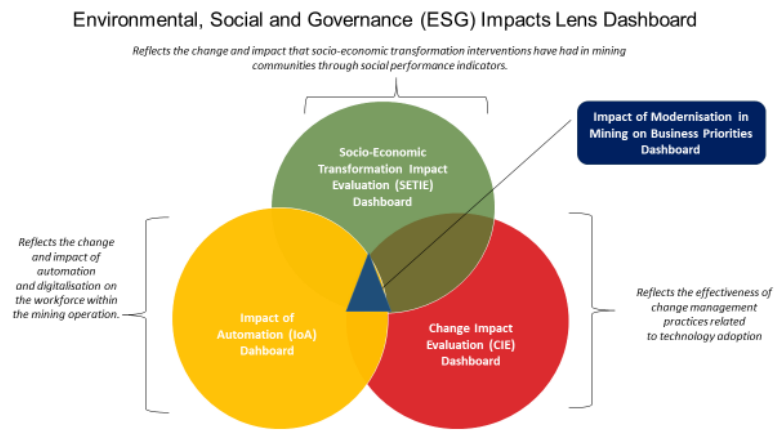
The ESG Impacts Lens Dashboard allows mines to understand the impact of their modernisation journey against their internal benchmarks. This dashboard comprises three integrated domain-specific dashboards (**Figure 11**), namely, a Socio-Economic Transformation IE Dashboard, an Impact of Automation Dashboard, and a Change IE Dashboard, with 15 core questions linked to 19 underlying sub-dashboards, and housing over 85 specific indicators. Distinguished by its integrated approach to data collection, the dashboard seamlessly integrates with digital tools, forming connection with the PowerBI dashboard. The ESG Impacts Lens Dashboard also includes a business priorities impact view, which reflects the broader impacts on key business drivers: cost, production, safety, and people (internal workforce and stakeholders), which may be directly influenced by mining modernisation, automation, and digital transformation initiatives).

Specifically, the Socio-Economic Transformation IE Dashboard, with related indicators, enables gauging the impact of socio-economic transformation in mine host communities. The Socio-Economic Transformation Dashboard considers the impacts of change directly attributable to mining modernisation, possible closure of mines and support and preparation of the local communities regarding engaging in alternative economies, viz. entrepreneurship training, skills for engaging in alternate economies and the development of asset bases in communities.

The Impact of Automation Dashboard considers the impacts of change directly attributable to initiatives initiated by the mine in terms of automation and digital transformation, viz., the introduction of new processes and technologies, the implementation of skills and training, and the changes in skills profile and employee levels.

The Change IE Dashboard is specifically aimed at monitoring changes around five critical success factors that should be considered when introducing initiatives in the mine that have a direct impact.

*The dashboard is not meant to replace existing dashboards that may represent data on other initiatives within the mining environment, nor is it fully exhaustive. It intends to provide a baseline of indicators companies can add to the PowerBI environment.*



**Figure 11: Purpose and interconnection of ESG Impacts Lens Dashboard**

### Socio-Economic Transformation IE Dashboard

More specifically, the domain-specific dashboard, namely the Socio-Economic IE Dashboard, has seven underlying dashboards with 46 indicators representing the impacts of socio-economic transformation in mining host communities (**Figure 12**). The data sources for these dashboards included the integration and links from the SATCAP 2022 community tools. Each indicator has a “help” icon, which describes what it represents and how it can be interpreted to inform decision-making.

The value of the Socio-Economic Transformation IE Dashboard is that it may assist mines in measuring the long-term effects of their corporate social investment activities within the host communities in which they operate. It enables mines to gauge the impact of their socio-economic transformation initiatives on mining communities.

The dashboard aims to provide information that may:

- 1) Contribute to the understanding of whether community development interventions have had the desired impact (i.e. social return of investment);
- 2) Help identify the skills needs of communities and SMMEs;
- 3) Indicate the change in representation (female vs. male) in viable economic activities surrounding the mine;
- 4) Measure the quality and degree of communication between the mine and its external stakeholders;
- 5) Highlight the macro-level view of current and future social needs of the surrounding, host communities and SMMEs;
- 6) Assist mines in understanding the baseline skills capability within host communities and specific future training needs; and
- 7) Allow for the host communities' awareness towards upliftment initiatives such as Black Industrialist Schemes.

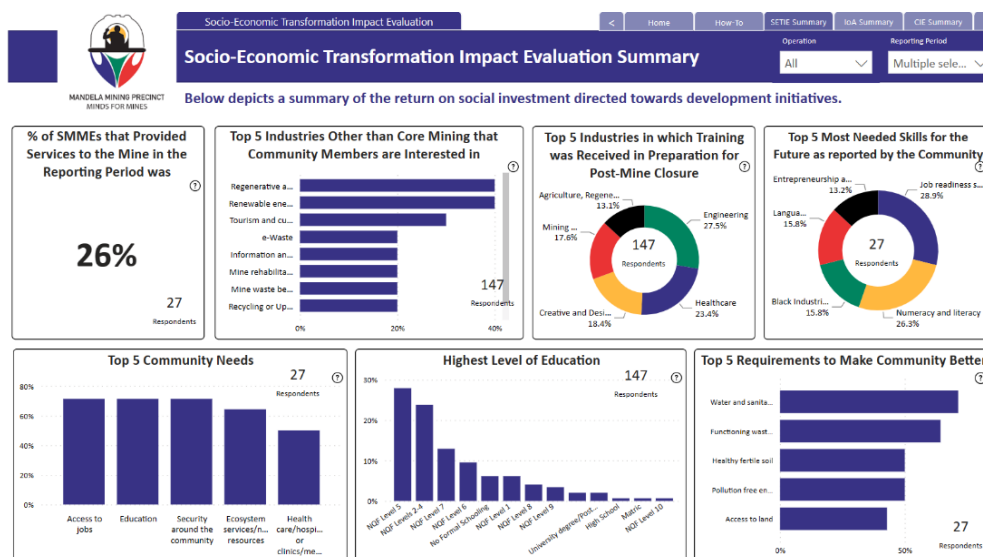


Figure 12: Screenshot of Socio-Economic Transformation IE Dashboard

## User-Guidance

The ESG Impacts Lens Dashboard is the visualisation output incorporating two separate data input sources: the SATCAP 2022 digital tools data and the respective users' raw data into an *Excel Workbook*. Therefore, three different steps are required to embed the entire package.

- 1) **The data Firebase Project:** This data collection tool for the five SATCAP 2022 digital surveys that serve as source data for the socio-economic transformation and digital leadership competency assessment for the Impact of Automation dashboard. This is the database where the surveys and survey data are stored. The appropriate code required to establish this connection is described in detail in the *User Guideline*.
- 2) **The Excel Workbook:** This is where the manually sourced data and Key Performance Indicators need to be stored. The respective administration user will input the separate mine's data here, and it is set up by adding the data to the file and saving it on SharePoint. The *Excel Workbook* enables the data capture needed for the Business Priorities Impacts, Impact of Automation, and Change Impacts.
- 3) **The PowerBI dashboard:** This is set up by connecting the data, publishing the report and making a scheduled refresh. The comprehensive dataset is visualised in the PowerBI dashboard but can be accessed directly through the Firebase Consol. Once the dashboard has been published, it is unnecessary to set it up again, only to get more updated data by sharing the survey links and manually adding data to the *Excel Workbook*.

The effectiveness of the ESG Impacts Lens Dashboard will depend on the communication of any synergy between four primary champions within each mine. The mine champions will act within the four roles described in **Table 3**.

**Table 3: Associate roles and responsibilities of mine champions**

| Role                           | Responsibility                                                                                                                                                                                  | Purpose                                                                                                                                                                                                                                                                                                                                            |
|--------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Project Owner</b>           | This individual is the champion for managing the initiative within the organisation.                                                                                                            | They may be from senior management whose functional responsibility is managing ESG reporting and liaison and engagement with key team members from other departments, including stakeholder relations, information technology and digital transformation, corporate governance, learning and development, mining modernisation, health and safety. |
| <b>Dashboard Administrator</b> | This individual or team should know information systems management and IT administration.                                                                                                       | Their essential functions are to set up and maintain the dashboard, orient users, and assist users with back-end troubleshooting. They should be familiar with Google Firebase and PowerBI.                                                                                                                                                        |
| <b>Dashboard Manager</b>       | The dashboard manager is responsible for granting users access and ensuring data integrity.                                                                                                     | Measures to ensure that the source data captured from surveys ( <i>data Firebase Project</i> ) and manual data input ( <i>Excel Workbook</i> ) are accurate and up to date. The dashboard manager is also responsible for refreshing data on the dashboard.                                                                                        |
| <b>Dashboard User</b>          | These users may range from managers at the senior level to other employees in different departments who may need access to the various dashboards housed within the ESG Impacts Lens Dashboard. | These are the final key decision-makers within the respective mines who will interpret the information presented in the ESG Impacts Lens Dashboard. Subsequently, use the insights to inform future decisions.                                                                                                                                     |

The above guidance is a snapshot of the comprehensive User-Guideline on the Mandela Mining Precinct website.

The ESG Impacts Lens Dashboard is an integrated IE dashboard that utilises data inputs from the SATCAP 2022 digital tools and the respective mine's information. Therefore, the integrity and accuracy of the data outputs depend on the interconnectedness with the SATCAP 2022 tools, and the correctness of the data inputted into the *Excel Workbook* by the specific user. **Figure 13** depicts where and how to ensure success when implementing the dashboard.

| Dashboard Property                                               | Recommended Usage                                                                                                  | Significance                                                                                                                                                                                                                                |
|------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Interconnectedness to SATCAP 2022 digital tools</b>           | Ensure guidelines to embed the SATCAP 2022 digital tools and link the dashboard are followed precisely.            | A bespoke API was created to link the dashboard to the SATCAP 2022 tools data and automatically, in real-time, extract any data collected through the previous tools.                                                                       |
| <b>Google Firebase integration</b>                               | Create a Google Firebase account (billing details required to setup the profile but there should be zero charged). | The SATCAP 2022 digital tools use a cloud-based database to store the data collected from the tools. An account must be established to ensure the dashboard can extract information from the previous tools.                                |
| <b>Additional data inputs required through an Excel Workbook</b> | Ensure the correct and accurate input of data into the Excel Workbook.                                             | Ensuring the ESG Impact Lens Dashboard presents impactful and relevant information hinges on the accuracy of the data inputted. Keeping dashboard best practice of "garbage in, garbage out (GIGO)" top of mind.                            |
| <b>Over 85 specific indicators</b>                               | Each user should familiarise themselves with how each indicator ties into the mine's broader strategic intentions. | The dashboard provides detailed information across many specific socioeconomic transformation, automation, and change factors. The value assigned to each indicator is how the mine uses the information to inform its strategic decisions. |
| <b>The primary language used is English, but tailorable</b>      | Review and translate the dashboard headings according to what works best for the specific organisation.            | English may not be the predominate language within the operation. Hence, to ensure ease of interpretability the headings and subheadings can be tailored according to what works best for the specific operation.                           |
| <b>Data outputs span across users and departments</b>            | Identify the core users who have access to the data required and ensure closer working relationships.              | Multiple data inputs are required from many different sources across the mine. A key individual should be assigned from each relevant department to capture the information and work closer with the other key individuals.                 |

**Figure 13: Success factors for the implementation of the ESG Impact Lens dashboard**

In addition, mines need to be cognisant and compliant with legislative and security measures regarding data collection, management, storage and use, in the application of the SATCAP tools.





# CHAPTER 5

## Conclusion



## 5. CONCLUSION

Managing stakeholder relationships between regional mines and host communities is challenging. Clear communication and engagement are essential to balancing priorities and needs. To achieve this, it is necessary to develop a comprehensive understanding of the host community's social needs, training needs, and the needs of local SMMEs. It is also essential to consider how the community's socio-economic development may contribute to the operational sustainability of the regional mine.

Specifically, the Socio-Economic Transformation IE Dashboard, with its related indicators, gauges the impact of socio-economic transformation interventions on mining communities in terms of:

- What skills are present in the community?
- What are the current needs of the community?
- What are the perceived future needs of the community?
- How has employment in the community been affected?
- What skills are currently present in SMMEs around the mine?
- How are SMME vendors to the mine changing?
- What is the impact on SMME vendor applications?

Digital tools and dashboards can be used to collect data from the community and provide a synthesis of the information, which may be used to inform future decision-making regarding corporate social responsibility. The ESG Impacts Lens Dashboard is an example of such a tool, designed to integrate multiple sources of information and display it in an easy-to-interpret, comprehensive, and practical manner. Clear communication across various divisions within the respective mines is critical to ensure the effectiveness of such tools. A guideline has been developed as supplementary to the dashboard, which provides detailed user instructions.

The ESG Impacts Lens Dashboard is available on the Mandela Mining Precinct's website at <https://mandelaminingprecinct.org.za/successful-application-of-technologies-centred-around-people-satcap/>

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