
**Socio-economic impacts of mine closure on local mining
communities**

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A research project submitted to the Gordon Institute of Business Science, University of Pretoria, in partial fulfilment of the requirements for the degree of Master of Business Administration.

1st November 2024

ABSTRACT

This study explores the socio-economic impacts of mine closure on local mining communities. Mining makes an important contribution to society. Historically the mining industry has encountered challenges in relation to environmental and social aspects specifically related to mine closure. There are complexities associated with mine closure. This study explores the impact from the perspective of mining communities affected and mining companies that make the decisions to close mines.

A qualitative exploratory approach was adopted to obtain insights from mining community members specifically Small, Medium, Micro Enterprises (SMMEs) and mining companies. Semi-structured, in-depth interviews were undertaken with the various stakeholders. For each interview, a thematic content analysis was adopted.

This study found that transparent continuous engagement with stakeholders, an altruistic approach to sustainable initiatives that would benefit the mining communities during the mine life cycle, provided a platform in which the mining companies would attain social capital and mitigate against the socio-economic impacts experienced by mining communities at closure of mining operations. The study findings add to the literature on the impacts of mine closure on communities.

KEYWORDS

Socio-economic

Mining communities

Life cycle

Plagiarism Declaration

I declare that this research project is my own work. It is submitted in partial fulfilment of the requirements for the degree of Master of Business Administration at the Gordon Institute of Business Science, University of Pretoria. It has not been submitted before for any degree or examination in any other University. I further declare that I have obtained the necessary authorisation and consent to carry out this research.



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1st November 2024

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CHAPTER 1: INTRODUCTION TO RESEARCH PROBLEM

1.1. Introduction to the research problem

The aim of this study is to explore the socio-economic impacts of mine closure on local mining communities through a qualitative research methodology.

Mining makes an important contribution to society, specifically to infrastructure, transportation, energy, and information technology (Fraser, 2021). The approximate number of South African mines abandoned is close to 6,000 (Bester & Groenewald, 2021). Historically, the mining industry has performed poorly on environmental and social aspects of its operations, particularly on closure of mining areas and this has resulted in more stringent regulations (Carneiro & Fourie, 2020). Mining has various impacts including environmental, social, and economic. While it has positively impacted several economies, it has also resulted in negative impacts to the environment and people (Worlanyo & Jiangfeng, 2021). There have been cases where disruptions caused by mining, have brought about distrust in the ecosystem of mining companies, local government, and communities (Van der Watt & Marais, 2021). Mine closures compromise the industry's obligation to sustainability (Sesele et al., 2021). While mining operations can provide employment, education and access to health care services, closure on the other hand can have an adverse impact where mine workers are unable to support their community in the event of job losses (Dikgwatlhe & Mulenga, 2023).

The environment and legislation in relation to mine closure have been considered extensively in contrast to social aspects (Sesele et al., 2021). Social issues that arise from mine closure frequently link to communities' reliance on benefits of extraction of the mineral resources. These benefits extend to infrastructure, provision of services, economic wellbeing, and governance (Bainton & Holcombe, 2018). Socio-economic issues are complex to define than environmental and financial challenges relating to mine closure. (Sesele et al., 2021).

There are 13 social challenges related to around 30 factors of cessation of mining operations (Vivoda et al., 2019). These challenges range from the economy of the local community, local businesses, employment opportunities, education, infrastructure, amenities, livelihoods, land ownership, housing and health, social conditions based on environment, demographics, stakeholder participation and inclusion and general socio-economic considerations (Vivoda et al., 2019).

There is a level of complexity regarding mine closure while considering accountability and capability in relation to managing the social aspects. Bainton and Holcombe (2018) identified

two important aspects, which include the limited understanding on costs of mine closure and the point that a critical number of stakeholders within the industry intentionally engage in evasion tactics in relation to the closure of mines. Prior to initiating mining operations, it is critical to include the communities that will be affected which also builds on the social licence for closure (Siwik & Clemens, 2015; Bainton & Holcombe, 2018).

As discussed above, mine closure may have complexities, and its impacts on stakeholders may vary. This study intends to probe into the socio-economic impacts of mine closure on local mining communities. It should be noted that these impacts on local communities will be looked at through the lens of mine closure, as there are many variables to socio-economic impacts which may not solely be a consequence of mine closure. In South Africa there are many aspects that impact communities, such as corruption, crime, poor service delivery, for example which may not be necessarily attributed directly to mine closure. This study will attempt to focus on those socio-economic impacts attributable to mine closure.

1.2 Research problem

While mining has conclusive positive effects that are seen through economical transformations in countries such as Australia, Canada, the United States and certain areas in Africa, there are social and environmental aspects that can be deemed to be negative (Worlanyo & Jiangfeng, 2021). Mine closures require consideration of long term socio-economic, cultural, and environmental factors (Monosky & Keeling, 2021). Problems arise from inadequate planning for the long-term future in a mine, amongst unsuitable policies and an endorsement of growth and disinclination to consider the end of the mine (Marais & de Lange, 2021). The lack in a clearly documented process outlining a closure plan and an ongoing engagement plan with affected communities exacerbates the effect of the closure (Monosky & Keeling, 2021).

There is limited knowledge and research on the impact of mining effects over the life cycle of the mine, which then extends to mine closure planning (Amoah & Eweje, 2020). Mine closure is purported to cause social challenges, with these issues experienced at the final stages of the lifecycle of the mine (Sesele et al., 2021). There is, however, a lack of information on expected closures especially those relating to the social effects (Marais & de Lange, 2021). Understanding the impact on communities of mine closure effects over the life cycle of the mine (Sesele et al., 2021), and reviewing social licence to operate (SLO) is beneficial to the corporates seeking to identify and address social conflict (Cesar & Jhony, 2021).

The abandonment and ineffective closure of mines has dire consequences for the mining companies, communities, and government as it affects health and safety, employment, and the degradation of the environment (de Barros Galo et al, 2022)

Mining closure impacts the Sustainable Development Goals (SDGs) such as poverty, health, and education created by mining companies, access to clean water, life below water and life on land, decent work and economic growth, innovation and infrastructure, reduced inequalities, and importantly for this study, sustainable cities, and communities (United Nations, n.d.).

Companies' strategies on the back of degradation of the environment and natural resources typically allow introspection solely into aspects of the environment impacts and not social outcomes (Aftab et al., 2022).

Literature (Worlanyo & Jiangfeng, 2021) suggests that the mining industry can have varying socio-economic impacts on communities in the area where the mining takes place. Mining supports local economies and can grow their income through employment and social service opportunities to communities. It is also noted that the mine life cycle can be categorised into exploration, development, and mine closure. Mine closure is defined as the period in which the operations in a mine cease permanently. Inadequate attention has been afforded to the socio-economic effects of mine closure, while the majority of the focus is on the environmental effects (Worlanyo & Jiangfeng, 2021). This presents an opportunity for research on the socio-economic consequences of mine closure.

The socio-economic consequences of mine closure can include decreased living standards based on the loss of direct and indirect employment from the presence of the mine, an increase in migration from the mining community, a rise in crime, dilapidated infrastructure, reduction in future employment opportunities in the area. The social impacts of mine closure are frequently associated with the degree of local dependency on the mining operation and ecosystem for economic activity, local development, and provision of services (Worlanyo & Jiangfeng, 2021).

This study will seek to explore the socio-economic impacts of mine closure, on communities. Further it will have focus on how mining companies can build social capital during the life cycle of a mine, and how mining companies can build social capital at the end of the mine life cycle towards benefiting the local communities post mine closure.

1.3 Purpose statement

The purpose of the research is to explore the impact of mining closures from a socio-economic perspective on communities in South Africa and how mining companies can build social capital during the life cycle of the mine and allow for communities to survive and progress, post closure. The study aims to build on previous studies which explored how mine closure can be planned for in a socially responsible way, including evaluating the consequences and migration of communities at the end of the mine life cycle.

In order to build sustainable social capital with communities, it is critical for mining companies to do so during the life cycle of its operations to ensure that the surrounding communities benefit. It is important to understand this, and the context of mine closure in relation to local mining communities as shared below.

- **Mine closure**

Mine closure involves the restoration of a mining area which also includes the cessation of its operations and supporting infrastructure (Asr et al., 2019). Extraction of mineral resources has a limitation at which point mining ceases after the depletion of the said resources (Vivoda et al., 2019). The cessation of a mine is driven by a business decision based on viability (Unger, 2020; Measham et al., 2024). Mine closure is the period in which the operational phase of a mine has ceased in which the mine is then decommissioned, and a rehabilitation process follows. The organisation and management of a mine is a process undertaken in advance prior to the commencement of operations (Agboola et al., 2020). The rehabilitation of a mine is conducted with a view to return the state of area to its original condition (Kuan et al., 2020). Rehabilitation activities entail the removal of harmful elements including the clean-up of the physical mine site involving the refilling of soil in the pits, management of equipment and waste post usage (Monosky & Keeling, 2021). Mine closure is driven by several factors which include the economic viability of the mine (Kuan et al., 2020).

Mine closure has a fundamental and lasting impact in the lives of communities in the vicinity from a social perspective (Bainton & Holcombe, 2018). It is understood that the significant socio-economic impacts of a mining operation do not happen at inception but rather at the end of a life cycle of a mine (Nogueira et al., 2023). Instances where mine closure does not take place but rather the mining site is put under care and maintenance, the mine is by all accounts not closed, and in this case the mining company can avoid its obligations to provide additional resources (Sesele et al., 2021).

- **Social capital**

There are numerous social impact assessment tools and contexts that can be adopted to proactively manage mining closure. The premise of social capital is based on relationships and key to this is trust, cooperation and exchange between communities and entities which have a positive impact on society. Fundamental to this, is that it would be the promotion of collaborative action and elimination of behaviour that is unprincipled (Andriani & Christoforau, 2016). Social capital involves this collaborative action between communities and mining companies to foster sustainability efforts (Rodriguez-Plesa et al., 2022).

Outlining existing social capital prior to the commencement of mining operations is critical to projecting social and economic outcomes post closure (Bainton & Holcombe, 2018).

- **Life cycle of the mine**

The mining life cycle involves 6 stages which include, exploration and feasibility, mine design and planning, construction of structures on site, extraction and processing of minerals, mine closure and post mining land use (Asr et al, 2019). The study references closure as the end of the mining life where a retrospective approach necessitates that closure would be considered prior to the actual event and as such proactively reviewing closure allows a financial response that also covers social aspects (Sesele et al., 2021).

It is suggested that the socio-economic community considerations post mine closure should be initiated at inception of the mine (Bester & Groenewald, 2021).

- **Socially responsible mine closure**

The social ramifications of mine closure on communities are deemed to be ongoing for several years despite the closure event being episodic and the extraction activities cease (Bainton & Holcombe, 2018). These effects can have critical negative effects on communities that lead to poverty, loss of service delivery from the mine and migration of community members. The management of mine closure is therefore key in minimising these effects where the mining companies are held responsible for these social aspects. There is a growing expectation from stakeholders that the mining companies would plan the management of these complex and layered effects in advance (Bainton & Holcombe, 2018).

From a South Africa standpoint, there is specific legislature that governs the obligations of mining entities for closure activities, while the Mining Charter excludes reference to closure

(Sesele et al., 2021). Prior to the provision of mining rights, a prospective mining company needs to present a social and labour plan (Bainton & Holcombe, 2018). The National Environmental Management Act, 1998, outlines the legislation in relation to mine closure based on financial provisions for rehabilitation, decommissioning and closure of mines (Republic of South Africa, 2015). The Mining Charter prescribes that the mining entities invest and develop skills within the community (Republic of South Africa, 2018) which aligns with the SLO (Sesele et al., 2021).

Socially responsible mine closure provides a platform for sustainability, looking at various aspects which affected the surrounding community (Bainton & Holcombe, 2018). This also incorporates the aspects of social capital built during the life cycle of the mine between communities and mining companies (Bainton & Holcombe, 2018).

Social aspects of mine closure as highlighted by Vivodia et al., (2019), cover economic elements, employment, security, education, livelihoods, health, environment, and population aspects. Social issues are generally illuminated post closure once the mining company has vacated the site (Crous et al., 2020).

It is important to outline the business and theoretical needs for this study as the engagement and inclusion of communities is important. In addition, the study aims to build on the existing literature through the exploration of these socio-economic impacts on the back of mining closure. Mining's contribution to economic and social development has an indirect effect on other industries as well as policy considerations on sustainability (Alves et al., 2021).

Mining especially in Africa, involves the exportation of the minerals extracted, which in turn contributes to export revenue and Gross Domestic Product (GDP) (Worlanyo & Jiangfeng, 2021). Mining through this extraction of minerals should ideally contribute to the development of communities through employment and public service in addition to economic growth (Alves et al., 2021). However, as businesses focus on clean energy including solar panels, wind turbines, transition minerals from mining are required and create a conundrum through the management of climate change where the means of extraction is detrimental to communities (Buhmann, 2023). Institutional investors consider socially conscious projects and generally seek to distance themselves from the risks of investing in projects with human harm implications. This situation presents an opportunity for these investors and businesses to improve socio-economic conditions for communities and align to the 17 SDGs (Buhmann, 2023). There is considerable risk for mining companies to be associated with violations to human rights due to their operations (Cesar & Jhony, 2021). Historically in South Africa infrastructure investment was previously noted as self-serving as the industry did so for its

own requirements and it was up to the government to implement sustainable policies for economic development (Marais & de Lange, 2021).

Adherence to Mineral and Petroleum Resources Development Act, 2002 (MPRDA) as legislation is important for mining companies to address regulatory requirements in relation to mine closure which sets a precedence within the South African context (Van der Watt & Marais, 2021).

The discussion in this section has highlighted that mine closure will have impact on local mine communities and that mine closure should be done responsibly to potentially minimize impacts to communities. The socio-economic community considerations post mine closure should be initiated at inception of the mine, and that social capital is needed to foster sustainability efforts. These aspects will be probed into further through this study.

1.4 Theoretical and Business need

The study intends to build onto an existing body of knowledge. Stakeholder theory has relevance.

- **Stakeholder theory**

There is a repeated failure to embark upon comprehensive stakeholder engagement on the rehabilitation of the mining sites and associated social programs with affected communities of mining (Vivoda et al., 2019; Measham et al., 2024). A bottom-up approach with key insights from local stakeholders has been cited as being a key success factor in decision making and commitment (Measham et al., 2024). While negative sentiments may exist between communities and mines, it is critical that the industry spends considerable time to invest in stakeholder engagement to ensure sustainable initiatives (Chipangamate et al., 2023). Stakeholder engagement has been cited to produce various beneficial outcomes such as increased trust for stakeholder trust, develop intangible benefits such as social licence to operate and ongoing planning for mining closure (Bainton & Holcombe, 2021; Chipangamate et al., 2023).

A multi-stakeholder approach involves communication coherence between communities, the civil society organisations, government, and mines which is important in building social capital and acceptance of mining companies by the communities (Chipangamate et al., 2023).

For this study, mine closure will potentially require consideration to strengthening of stakeholder collaboration and inclusion. The study will probe further into this aspect.

- **Corporate social responsibility (CSR) and Social License to Operate (SLO)**

For businesses, CSR, and SLO has relevance. Literature has defined CSR as the activities undertaken by an organisation to attain sustainable outcomes through applying the best practices and approaches in relation to economic, environmental, and social impacts created (Dragu & Tiron-Tudor, 2014; Cesar & Jhony, 2021). CSR looks to balance the inequalities in economic conditions for conducting business for which a company's SLO is a critical requirement to comply with regulations. South Africa has a three-part social problem that includes unemployment, inequality, and poverty (Statistics South Africa, 2022).

CSR is an approach that mining companies undertake to meet or exceed expectations of its stakeholders through the integration of social, environmental and ethical factors measured against their financial and governance performance. The SLO, in most cases, is a part of the mining company's CSR strategy (Cesar & Jhony, 2021). There are two aspects that pertain to perception of existing mining operations. The first is on the mining communities' positive reflection of the efforts by the mining company to minimise negative impacts of mine closure while the second is their inclusion into the decision-making process regarding mining impacts on the community (Cesar & Jhony, 2020).

This research will lean into the convergence of the business and theoretical needs based on legislation of South Africa in relation to mining and compliance required by the mines and the rationale for engagement during the mining life cycle to ensure sustainability through theories such, CSR, SLO theory, and stakeholder theory.

Conflict between mining companies and communities surrounding the environmental impact, social responsibility, local rights, and governance have been recorded with some culminating to the disruption of mining operations (Fraser, 2021).

1.5 Outline of this study

The study will be divided into chapters: Chapter 1 defines the problem; Chapter 2 focuses on the literature review; Chapter 3 formulates the problem statement and research objective; Chapter 4 proposes the research methodology; Chapter 5 lays out the results; Chapter 6 discusses the results; and Chapter 7 considers the conclusion and recommendations.

1.6 Conclusion

Chapter 1 has considered the need for this study. Chapter 2 will focus on a literature review as relevant to the topic under investigation.

Chapter 2. Literature Review

2.1 Introduction

The literature review for this study looks to expand on the problem highlighted around socio-economic impacts of mining operations at closure. In addition, key to the literature review are the definitions provided for mine closure, social capital, mine life cycle and socially responsible mine closure. This will be interwoven with theoretical concepts on social licence to operate (SLO), corporate social responsibility (CSR) and stakeholder theories. The literature will seek to expand on these concepts based off several studies and provide an outline and insight into the regulatory environment of mines from a South African perspective, specifically around mine closure. The themes explored will be instrumental in the formulation of research questions applicable to this study under Chapter 3.

At inception, mines attract a significant number of people that seek employment and mining companies naturally gear up for this, through investment of infrastructure and other means. Strategies around mine closure typically look at ensuring there is planning for rehabilitation and seek to implement activities that lead to economic diversification (Marais & de Lange, 2021).

2.2. Life cycle of mining and mine closure

The life cycle of the mine is described through six phases, exploration, planning and design of the mine, the construction of specific mining structures required for the site, the actual mining of minerals, closure of the mine and lastly the post mining activities related to the land use (Asr et al., 2019). At the various stages of the mine life cycle, it is important that mining companies consider the social aspects involved and not only when undergoing the actual process (Sesele et al., 2021). This is encapsulated through the enactment of laws that cover requirements for mine companies during the mine closure process (Bester & Groenewald, 2021). The MPRDA, the Mining Charter and National Environment Act in South Africa provide the scope of legislative requirements for mining companies and cover expectations relating to mine closure. Critically though is that the MPRDA covers processes and controls around rehabilitation of mines in relation to the environment and does not reference the effects on communities (Marais & de Lange, 2021).

With mine closure typically being driven by the financial viability and success of the mining operation, the social considerations in relation to this closure on communities are seemingly not provided with corresponding urgency (Kuan et al, 2020; Bainton & Holcombe, 2018).

Social capital that involves a functional relationship between the mining company and communities is built on trust and the benefit of the community fostering sustainability within this environment of mine closure (Rodriguez-Plesa et al., 2022).

Mine closure requires a collaborative effort that includes constant communication between the community, government, and Non-Governmental Organisations (NGOs) and is a process that can take up to 20 years or even longer. Inclusivity results in each party having input into the planning process around decommissioning and process and the overall impact on the environmental and social issues (Sesele et al., 2021).

2.3 Social and economic aspects to mining closure

Marais and de Lange (2021) considered that there are limited studies in relation to social effects of mine closure and sought to explore how mining companies could incorporate social responsibility planning in their operations. Through anticipation and forward thinking, the mines can plan for the consequences that would be experienced by communities post mine closure while being subjected to governance through the enactment of mining regulations (Marais & de Lange, 2021). South African legislation in relation to mining tends to focus on environmental aspects and the financial provisions required for mine closure, however it overlooks the social issues of the closure and implications on communities (Sesele et al., 2021).

Mining impacts include social, economic, and environmental factors, while the focus of mining companies has typically been to restore the mined areas to minimise the environmental effects. Recommendations on mine closure rehabilitation approaches outline that co-creation with communities is ideal especially in Africa where legal and illegal small-scale mining exists (Worlanyo & Jiangfeng, 2021). This is then carried forward by the intentions of mining companies that also view mining closure from these perspectives. Mining companies need to consider the social aspects of mine closure post the life cycle of the actual mining operation. The challenge lies in the mining companies being able to forestall potential long-term dependencies by the community through emphasising the social aspects at inception of the mine's life cycle (Sesele et al., 2021).

The impacts of mining vary in different areas, as mining companies, during the life cycle of the mine, provide essential services such as clean drinking water, health care and education infrastructure for communities. Some larger companies can provide extended services such

as training and upskilling workshops for its workers, that are involved in operational areas of the company as well as for agricultural farmers (Worlanyo & Jiangfeng, 2021).

There are significant costs associated with mine closures that are incurred by governments and mining companies. Mining inadvertently causes interdependencies which are disrupted through the closure process (Sesele et al., 2021). Closure causes problems in areas that have both low economic activity and potential and limited government capacity where such closure makes the community vulnerable (Sesele et al., 2021). Economic impacts of mining include increases in foreign direct investment, GDP growth, provision of infrastructure that includes schools, medical facilities such as clinics and rehabilitation centres, creation of employment, provision of capacity building including training and skills that can be applied beyond mining and farming (Worlanyo & Jiangfeng, 2021). Social impacts include migration and an increase in population in communities associated with mines, crime, groundwater contamination, increased health concerns depending on the type of mining (Worlanyo & Jiangfeng, 2021). Some of the negative social impacts identified include crime and conflict (Venkateswarlu et al., 2016; Worlanyo & Jiangfeng, 2021) due to varying social dynamics caused by migration to the mining community. In considering the closure of mines, a long-term view needs to be adopted in relation to community and environmental safety (Monosky & Keeling, 2021).

2.4 Social issues

2.4.1. Artisanal mining

Artisanal mining which is unregulated excludes mechanised mining, knowledge, safety, and financial investment, it involves manual labour and contrasts with small scale mining which is regulated, semi-mechanised and requires low start-up capital (Bester & Groenewald, 2021). Artisanal mining typically takes place on abandoned mines and historic mining communities and is not included by the MPRDA (Bester & Groenewald, 2021). The MPRDA outlines that to lawfully mine in South Africa, an entity needs a mining licence (Bester, 2023). As it is not regulated and included in any legal framework, it is illegal (Bester & Groenewald, 2021; Bester, 2023). It is important to note however the social issue of artisanal mining has been identified as being driven by poverty and unemployment (Bester, 2023). MPRDA places the responsibility on the mining company in the absence of a closure certificate where violence usually transpires. Health and safety are other factors artisanal mining bring to the fore. The lack of safety protocols and equipment expose the artisanal miners to various health and safety factors (Bester, 2023). Studies in South Africa have not provided practical solutions that could address the issue, nor has it explored the contribution of mining companies on the issue

(Bester & Groenewald, 2021). Artisanal mining plays an important economic role in the economic strategies of rural and poverty-stricken communities contributing to their livelihood. (Bester, 2023).

2.4.2 Women

Sesele et al, (2021) highlight that challenging social aspects exist within the mining industry, as these are encountered at the closure of mines as opposed to the inception of operations. The effect on women is highlighted through three issues, the social effect based on the mining community, the omission of women from employment at mining operations and their under-representation in matters relating to social licence (Sesele et al., 2021). The low participation by women in mine community related processes affect their contribution to SLO. This is exacerbated by mining companies viewing communities as being homogenous and not considering the various roles played by men and women in communities (Sesele et al., 2021).

Sesele et al., (2021) outline that the negative effects of mining in general affect women in various forms such as domestic violence and abuse and limited social networks. The SDG Target 5 seeks to increase gender equality, and this extends to opportunities including those within an artisanal mining setting that has implications for women's livelihood (Buss et al., 2021). The socio-economic effects during the life cycle of the mine are illustrated through scenarios where women are unable to take part in the economy due to child caring activities. There is a burden that women would carry having to deal with domestic responsibilities in the face of mine closure (Sesele et al., 2021).

The International Council on Mining and Metals (ICMM) oversimplifies the issue on mine closure affecting women and does not provide clear guideline on the participants on its social questions for the development of a mine closure plan, as such, women end up being excluded during the closure planning process (Sesele et al, 2021).

2.4.3 Employment

Mining generally contributes positively to the economy of a country including South Africa and its society. As such any disruption to mining operations could have a detrimental effect on the South African economy and security including the social well-being of communities. (Dikgwatlhe & Mulenga, 2023). This extends to the mining industry providing employment opportunities during the active life cycle of the mine including small commercial businesses and other social services. It is noted that a significant portion of this is unskilled employment, that generally does not generate high remuneration (Dikgwatlhe & Mulenga, 2023).

With relatively high unemployment rates of 47.1% in South Africa as of 2021 and coupled with the closure of gold mines at the end of the mine life cycles, this social and economic issue is exacerbated. It affects surrounding communities, and the government and industry players are seen to be liable in neglecting the artisanal sector instead of improving sustainable development opportunities. (Bester, 2023). Bester & Groenewald (2021) indicate there is a link between abandoned mines, retrenchment, employment, and poverty where there are inadequate processes for mine closure, failure to upskill workers and lack of strategies that affect livelihood of communities.

It is worth noting that the literature reviewed did not provide clear evidence that mine closures have a direct effect on employment or other social effects despite playing a contributory role.

2.4.4 Water pollution

Access to water is one of the United Nations 2030 Sustainable Development Goals and is an important aspect in which to address company and community interests (Fraser, 2021). The impact of mining affects the environment, and this extends to water pollution due to acid mine drainage (AMD). AMD occurs when sulphide-stained rocks have exposure to oxygen and water which then ends up causing water pollution. Artisanal mining has also been cited as a cause of AMD in Australia and Ghana. In these specific cases, it ended up having an adverse effect on local communities' drinking water. It is worth noting that this contamination correlates with the mineral extracted and the size of the mining operation (Worlanyo & Jiangfeng, 2021).

2.5 Mine closure legislation

Legislation in the form of the Minerals and Petroleum Resources Act, the Mining Charter and the National Environmental Management Act has typically directed the mining companies' corporate social responsibility efforts.

2.5.1 Mineral and Petroleum Resources Development Act, 2002 and amendments (2020)

South Africa has unparalleled levels of inequality (Chatterjee et al., 2022), due to its history which has prompted the government to enact the MPRDA (Republic of South Africa, 2018). The act was amended on the 27 March 2020, and it is the most critical legislation pertaining to socio-economic transformation (Bester & Groenewald, 2021). The objective of the MPRDA is to tackle the historical challenge of socio-economic inequality where it provided powers for the Minister of Mineral Resources and Energy to review and develop a Broad-Based Black Economic Empowerment Charter for the South African Mining and Minerals Industry (Mining

Charter) in 2004. (Republic of South Africa, 2018). The Act gives effect to section 24 of the Constitution that ensure that mineral and petroleum resources are developed in a sustainable manner while simultaneously adhering to social and economic development. As such it legislates that mining entities play a role in the socio-economic development of the areas in operation (Republic of South Africa, 2002).

The Act makes provision for increasing opportunities for historically disadvantaged individuals to partake in the mineral industry and benefit from the country's resources (Bester & Groenewald, 2021). For corporate social responsibility, MRPDA considers corporate social responsibility through economic growth and development through promotion of employment advancing socio-economic welfare for mining communities.

2.5.2 Mining Charter

Due to challenges in the implementation of the Mining Charter, a 2010 amendment introduced a sustainable development factor. In 2014, an assessment by the Department of Mineral Resources and Energy (DMRE) on the Charter revealed that the transformation envisioned at the Act's inception was low, compliance to the Charter was only adhered to for protection of the SLO by the mines, where there was rife poverty in the mining communities. This prompted another review in 2015 by the government. The 2015 Mining Charter sought to enhance social and economic welfare while promoting sustainable growth of the industry. Inclusive procurement, supplier and enterprise development is another objective where the holder of a mining right is expected to promote economic growth through supporting small, medium, micro enterprises (SMMEs) and suppliers of mining goods and services. The Charter makes provision for the mines to invest in and develop skills. Section 2.5 refers to mine community development where the mine is required to actively contribute to community development that is aligned with a SLO. The charter in its revised form set to implement an essential stance on transformation and social development in the industry (Bester & Groenewald, 2021). The mine is required to collaborate with municipalities, mine communities and affected stakeholders to identify priority projects prescribed in an approved Social and Labour Plan (SLP) (Republic of South Africa, 2018). Housing and living conditions are other social aspects covered within the Mining Charter specifically focused on the social, physical, and economic integration of human settlements (Republic of South Africa, 2018). Despite the above, the Mining Charter does not refer to mine closure (Sesele et al., 2021).

In South Africa, an SLP is required for a mining entity to have access to mining rights. The SLP outlines the mining entities' intentions of using its resources attained from mining for the benefit of a community (Cole & Broadhurst, 2021). As part of the development of SLP, the entities are expected to engage the local communities and align the socio-economic benefits

it can provide to the communities' needs and this is done at a municipal level (Cole & Broadhurst, 2021). An SLP represents the focus of compliance within the MPRDA of 2002 and the Mining Charter, to enable transformation of affected mining communities (Bester & Groenewald, 2021). Mines are each expected to develop and submit an SLP every five years to the DMRE (Bester & Groenewald, 2021). Alignment and collaboration between mining companies and government on SLPs with Integrated Development Plans (IDPs) of municipalities is critical for the attainment of mining licenses (Van der Watt & Marais, 2021).

2.5.3. The National Environmental Management Act

The National Environmental Management Act, 1998 (Act No. 107 of 1998), and amended Act 8 of 2004 makes provision for mining companies to have a rehabilitation, decommissioning and mine closure plan. The plan primarily focuses on the mines making financial provisions for rehabilitation, decommissioning and closure activities (Republic of South Africa, 2015). Section 28 of the Act refers to the measures adopted by mines to manage any environmental degradation through conducting an environmental impact assessment (EIA). The EIA process also specifically considers preparation for mine closure during the mine life cycle (Bester & Groenewald, 2021).

2.6 Social Licence to Operate

Social licence to operate (SLO) is continuous and dynamic as companies typically gain it over a long period and it is used as an indicator by mines to gauge the relationships with communities in which they operate (Cesar & Jhony, 2021). The concept of SLO is at an advanced stage, where businesses have measured SLO as approval by society and communities on their conduct and legitimacy. It is commonly applied in industries that are extractive such as mining where there is some impact on the environment and communities (Demuijnck & Fasterling, 2016). There is an inclination for mining companies to prioritise economic performance based on the value of minerals mined over potential negative impacts of mining activity (Worlanyo & Jiangfeng, 2021). There has been increased scrutiny in the ways that mines impact communities and past studies have shown the social conflict elements that play a role in the provision and withdrawal of SLO (Cesar & Jhony, 2021). While there is consensus on the management of mine closure, that it should be done at the beginning of the mine life cycle, it must be noted that practically this may be difficult as mines first need to attain the SLO through the community and this typically makes up most of the focus as opposed to mine closure (Sesele et al., 2021). Some mines do not apply effective CSR programs that are

sustainable but rather focus on SLO for public relation purposes with the communities (Selmier & Newenham-Kahindi, 2020).

The front-end approach entails activities undertaken by mining companies to manage social issues related to mining and typically includes significant investments to build on the SLO (Sesele et al., 2021). A back-end approach entails an earlier approach in relation to mine closure. It involves pre-planning of financial resources at the end of the mine life cycle. However, excluded in this planning is often the social aspects at closure at which point mining entities have limited resources to address the social consequences (Sesele et al., 2021).

2.7 Stakeholder engagement theory value for mine closure

Fraser, (2021), looks at the management of conflict caused by the imbalance of power due to mining operations, through collaborative relationships that seek to review sustainable development initiatives that benefit both mining companies and communities. The legitimacy of mining companies hinges on stakeholders' ability to balance environmental, legal, business, and social considerations as illustrated by deliberate initiatives to positively influence social and environmental impacts of mining (Manjengwa et al., 2023). Bainton and Holcombe (2018), outline that a natural conflict exists in terms of stakeholder visions for the future post mine closure. Stakeholder engagement theory is embedded where mining companies pursue value creation for both stakeholders and shareholders. It is in the interests of mines to ensure the reduction of conflict with communities in which they operate as this has a detrimental effect on their operations including mine closure (Fraser, 2021). The theory is built around the assumption that corporates need to consider the interests of stakeholders in totality and not only the shareholders based off legal, economic, and ethical reasons (Tang et al., 2020). Stakeholder engagement fosters an environment where the mining companies can prepare and implement structures and technology within the life cycle of the mine which then translates to SLO (Chipangamate et al., 2021). It is important for mining companies to understand and communicate with stakeholders to attain transparency and align to such a strategy (Bainton & Holcombe, 2018; Pons et al., 2021).

2.8 Socio-economic risks of mine closure

South Africa's complex past, inadequate social and economic support post-apartheid, the imbalance of power with mining companies and focus on economic diversification post mine closure without a definitive legislation to social and economic aspects causes challenges

(Marais & de Lange, 2021). Mine closure impacts are determined by the dependency of the community on the mineral extracted and extend to economic benefits, infrastructure and services that are provided based on the existence of the mine (Bainton & Holcombe, 2018). Closure of the mines disrupts the community, while the current legislation is not clear on the responsibilities of the mining companies in relation to support of the communities upon closure (Marais & de Lange, 2021). Closure has contributory factors such as human rights, family dynamic impacts, cultural heritage and human development and occur based off declining activity and production of the mine as well as socio-economic development expectations. (Bainton & Holcombe, 2018). Closures have negative effects on communities as they contribute to poverty, impact service provision and lead to migration from the area. Inadequate closure can aggravate these impacts and cause reputational damage to the mining companies (Bainton & Holcombe, 2018). Marais and de Lange (2021) studied the impact of shrinking cities where the economy of a mining town in South Africa declined over a 20-year period and migration from the town was threefold. The risks encountered at closure include the future of housing infrastructure previously occupied by the miners which were set up by the mining companies, abandonment of towns where mining occurred putting pressure on municipalities to support these developments in the absence of the mining company post closure (Bainton & Holcombe, 2018). Municipality bankruptcy that occurs on the back of a reduction of rate collection income and migration of middle-class migration from the mining town, results in the inability to support the infrastructure put in place by the mining company (Marais & de Lange, 2021). Mining companies inadvertently cause economic issues post closure as they create a dependency of the local economy on their purchases of inputs which creates a revenue hole in the absence of this income to sustain the various local suppliers (Bainton & Holcombe, 2018). The absence of rightsizing planning during the mine life cycle has an adverse spatial effect at closure and puts pressure on the local municipality while the lack of a diversification strategy leads to abandoned towns. Critically the IDP outlines that an economy should not be dependent on mining as it is bound to cause complications post the mining activity (Marais & de Lange, 2021).

2.9 Community engagement and inclusion around mine closure

The complex history of South Africa based on a racially segregated environment and economic exclusion from mining industry benefits, has led to the prioritisation of endeavours that seek to promote collaboration and inclusion between mines, local government, and communities (Van der Watt & Marais, 2021). While collaboration does not guarantee success, especially where there is a need to avoid barriers and provide a platform for trust, commitment,

and consensus (Van der Watt & Marais, 2021). Monosky & Keeling (2021), highlight cases in Canada where mining company closure plans were categorised into community engagement, application of intel obtained from the communities and socio-economic impacts of closure, which then provided transparency around engagement and inclusion with the local communities and perspectives.

Stakeholder collaboration may be limited in instances due to the perceived imbalance of benefits derived by mining companies at the perceived expense of the community. This can be countered in cases where sustainable tangible benefits can be derived post mine closure and mines and communities seek active engagement and collaboration (Fraser, 2021). It is critical that plans for mine closure by mining companies should be initiated at an early stage of the mine's life cycle to facilitate progressive steps towards the end. During this period, it is also important to engage the community and obtain various views (Measham et al., 2024). Mining companies are bound to collaborative efforts in designing social and labour plans which facilitate the ability to obtain their mining licences (Van Der Watt & Marais, 2021). According to the MPRDA, mining companies need to contribute to the socio-economic development of the mined areas (Dikgwatlhe & Mulenga, 2021). Frequent engagement with the communities is required for mine closure (Sesele et al., 2021) and this builds social capital (Rodriguez-Plesa et al, 2022). The Mine Charter outlines that engagement and inclusion with the community is critical as community projects should be prioritised in an SLP and supported through the municipal IDPs (Republic of South Africa, 2018). Some of the limitations of SLPs is that in certain cases, they do not prescribe the form of engagement and outcomes and in the instances, that they do, the reference to mine closure is excluded and further, no definitive period during the mine life cycle is targeted (Monosky & Keeling, 2021).

Communities are typically not prepared for mine closure, and it is important that training is provided which is transferable and not limited to mining to prepare for post closure of a mine (Measham et al., 2024).

2.10 Analysis

The literature outlines the stages in the mine life cycle where mining companies need to consider the environmental, social, and economic impacts on stakeholders. South African law requires the mining companies to develop SLPs collaboratively with communities. Taking into consideration that social capital is built over a long period, it is important that upon its attainment, the mining companies maintain it post mine closure. Social issues arising from mine closure such as artisanal mining, impact on women, employment need to be assessed further as mine closure contributes to artisanal mining, impact on women and employment

and however is not the only factor. While mine closure is directly involved in the possible contamination of water and poverty, other social issues experienced in South Africa are part of broader socio-economic factors within the country that are not necessarily associated with the mining life cycle.

2.11 Conclusion

The literature review sought to explain the socio-economic impacts of mine closure on mining communities. It sought to outline the business need as well as the theoretical needs. Artisanal mining, employment, water and gender equality challenges were highlighted as community related factors to consider at mine closure. The study did not seek to outline other factors associated with mining in general but rather to focus on what impact mining closure has on society based on the current South African legislature landscape. The study used SLO and stakeholder theory to cover the factors at play regarding collaboration and trust required during the mine life cycle in order to ensure that communities are better off once the mining companies cease their operations.

CHAPTER 3: RESEARCH QUESTIONS

3.1 Purpose of the research

This study is focused on the impacts of mine closure on local mining communities within the South African context. The Gauteng and North West provinces will be considered for this study, with regulators, mines and local mining communities from Gauteng and North West provinces included.

This research aims to answer four questions that have been developed from the literature review. These are given below.

3.2. Research questions

Research question 1

How do mines and mining communities perceive the impact of mining closures?

Research question 2

How can mining companies build social capital during the life cycle of a mine?

Research question 3

How can mining companies build social capital at the end of the mine life cycle towards benefiting the local communities post mine closure?

CHAPTER 4: RESEARCH METHODOLOGY

4.1 Introduction

The study sought to understand the socio-economic impacts of mine closure on communities further from a South African context and specifically looked at mines in South Africa. The choice of research design adopted was qualitative and exploratory as the study sought to understand new information in relation to socio-economic impacts due to closure of mines. Exploratory research design is explained by Saunders & Lewis (2017) as research that can provide initial answers and narrows the topic to specifics of the problem.

This chapter will describe the research methodology that was adopted in this study. Based on the objectives outlined as well as the literature reviewed, a qualitative study was chosen. This would then map the approach adopted for the research method and design, the research methodology and the data analysis process.

4.2 Research Philosophy

Research philosophy entails the development of knowledge based on assumptions on the potential outcome (Saunders & Lewis, 2017). Ontological assumptions exist within the realm of reality specifically on what is there and what can be understood (Ataro, 2020), and in the case of the proposed research, the impact on the community is subjective and open to interpretation. Epistemology assumptions adopt a philosophy that delves into knowledge (Saunders & Lewis, 2017), and the study lent itself to adopting an interpretivism philosophy that sought to understand directly from impacted communities their challenges during mine closure. It was imperative then to understand how mining companies build social capital with the communities during the life cycle of a mine. Interpretivism is a philosophy seeks to research a phenomenon in a setting of research subjects based on their interpretation (Saunders & Lewis, 2017).

4.3 Research Method and Design

The methodological choice adopted was a mono-method, which uses a qualitative method for collection and analysis of information (Saunders & Lewis, 2017). Qualitative research seeks to develop theory providing meaning based on a real-world event with non-quantifiable data (Saunders & Lewis, 2017), and in the context of the proposed study where the community was the primary actor in identifying issues and studying it in its natural environment, it allowed for the interpreting information on social, economic, cultural and physical aspects (Hennink et al., 2020).

An inductive approach was adopted which was built on the social license to operate theory and a conceptual framework where the information gathered provided an in-depth understanding of the impact on mining communities themselves based on their experiences of mine closures. The inductive approach involves the observation of dynamics and deducing whether patterns emerge that can be explored (Saunders & Lewis, 2017).

4.4 Population

Saunders and Lewis (2017), describe population as a comprehensive set of cases where a sample, a sub-group of the population, will be taken. The appropriate sample was devised on the usefulness of the information provided in answering the research questions. For this study the population were mining companies in South Africa, with their local communities. However, as it was not possible to include the entire population into this study, a sample population was selected.

There was a need to gather insight from various mining companies with their local communities and industry experts to obtain accurate data. The entire target population was impractical to source information from due to time constraints and as such, it will be ideal to sample the population (Saunders et al., 2009). The importance of sampling in the study was to ensure that the information collected from the sub-group of the community was appropriate to the research question (Saunders & Lewis, 2017).

A census consisted of representatives from mining companies with their local communities within South Africa, Mine representatives include two Social and Labour Plan Managers, an Environmental Social and Governance Consultant, a Stakeholder Relations Manager, two Community Liaison Managers, four Small, Medium and Micro Enterprises (SMMEs), a Community leader and a Community Activist were selected to provide their insights into the topic.

4.5 Sampling Method and Size

The collection of information was derived from a sample and not population which would have been impractical and had constraints (Saunders & Lewis, 2017). A complete list of the population, sampling frame, was not available based on the specific population, being a community, and as such probability sampling was not possible (Saunders & Lewis, 2017).

Non-probability sampling is a technique used in the absence of a population list and is applicable for qualitative research (Saunders & Lewis, 2017). The study sample was across the spectrum of individuals associated with community and on that basis was heterogeneous, being more diverse and not the same. This approach was based on the study which required in-depth understanding of the impact and as individuals are typically impacted in various ways, this sampling sought to obtain as much variation as possible in the information collected (Saunders & Lewis, 2017).

Purposive sampling is applied where individual cases are not difficult to identify and a small sample can be used for the study while the acknowledging that the sample size being representative of the population is low (Saunders et al., 2009). The purposive sampling which allowed the researcher to apply some level of judgement also allowing a degree of generalisation which needed to be logical based on criteria used (Saunders et al., 2009). The sample size sought to align with the standard qualitative, non-probability purposive sampling size of 12 to 16 interviews, which was similar to other studies conducted on the same theme (Fraser, 2021). For this study however 12 interviews were undertaken as per Table 1.

In terms of the SMME Community Members, the mining companies' representatives provided referrals of the SMMEs that were already participating in the mines supply chain, to enable the researcher's purposive sampling of community participants, for their insights. SMMEs become relevant for this study as they are impacted during mine closure and understand the impacts to communities during mine closure as they are also community members.

Table 1. Study sample breakdown

	SLP Manager	Environmental Social and Governance Consultant	Stakeholder Relations/ Community Liaison Officers	SMME Community members	Community Leader	Community Activist
Participant number	2	1	3	4	1	1

4.6 Unit of analysis

The research design of phenomenology outlines the unit of analysis as several individuals that have shared experiences to an event or occurrence (Creswell et al., 2007). In the proposed study, the unit of analysis were individuals who form part of the mining community and had shared experiences to that of the community. The relevant mining company representatives were included as participants. A participatory action research design's unit of analysis looked at an entire community, however the practicality was a challenge (Creswell et al., 2007). The potential participants will be Stakeholder Relations and Community Liaison Managers, Social and Labour Plan Managers, SMME Community Members, a Community Leader and a Community Activist, (Selmier & Newenham-Kahindi, 2021). The aim was to obtain data from the participants who had rich information to share. It is important that SMMEs were relevant for this study, as they are impacted during mine closure and understand the impacts to communities during mine closure as they are also community members as well.

4.7 Measurement instrument

The proposed qualitative study employed the use of in-person or internet, in-depth, semi-structured interviews for primary data. The rationale in adopting this instrument is based on how related studies have been conducted as it enabled flexibility and new insights (Parr, 2015; Idemudia et al., 2020). This flexibility aligns with the exploratory research design adopted as it incorporates new findings (Saunders et al., 2009). The interviewees identified were in a position(s) to provide insightful views on their experiences to determine the impact of a mine closure on their communities. It assisted in obtaining relevant and reliable information for the study (Saunders et al., 2009). The proposed instrument needed to be flexible to include in person interviews as well as Microsoft Teams or similar communication applications, where applicable. Upon obtaining consent to conduct the interview, an invitation was sent through to the participants.

The semi-structured interviews sought to establish common themes in relation to the study and considered the specific participant's background and position in relation to the mining community (Saunders et al., 2009). Open ended questions allowed for more probing follow up questions that provided more insightful information than a focus group (Adams, 2015). Focus groups have shortcomings, as the multiple viewpoints can become the overall group view based on social dynamics (Saunders et al., 2009). The interviewees were in a position to outline the various socio-economic areas that affect them personally which will provide important and insightful information. The interviewer was then be able to probe further where

it was necessary in order to obtain more information on responses provided during the interview (Saunders & Lewis, 2017). An interview guide was designed to ensure all topics are covered and provide some structure for the researcher, with initial questions on the interviewee's background prior to engaging on their understanding of socio-economics (Saunders & Lewis, 2017). The guide was importantly included the purpose of the research and the aspects of the research questions that will be covered. The interview time taken will vary between 30 to 45 minutes which will be dependent on the interview guide.

The interview guide probed into:

- Mines and local communities including SMMEs' perceptions of the impact of mining closures was secured. In addition, mining companies' tactics to build social capital during the life cycle of a mine and mining companies' tactics to build social capital at the end of the mine life cycle towards benefitting local communities post mine closure was in focus.

The interview guide questions as per Appendix B were derived from Chapter Three, while Appendix C is the consent letter for the individual participants.

4.8 Data gathering process

Prior to conducting the semi-structured interviews, a pilot-test was important to determine whether the specific questions asked were comprehensible, impartial and would provide the necessary information required for the study (Saunders & Lewis, 2017). The potential threat to reliability in conducting the interviews with community members were subject or participant bias (Saunders et al., 2009). Pre-conceptions on the subject, socio-economic impact of mining closures, were biased and could have affected the interpretation of the information by the interviewer when received. Similarly, the interviewee, as a participant, may be providing what they perceive to be the correct answer. To mitigate against the latter, it was important to outline the anonymity of the study and data (Saunders et al., 2009). To address the former, the interviewer needed to be mindful to adopt useful interview techniques of retaining the interview transcripts and notes for transparency and to counter reliability issues (Saunders et al., 2009).

It was important to ensure that a location convenient to the participants that had agreed to take part in the interview, either face to face, or internet was used. The interviewees were required to confirm their most convenient medium to conduct the interview. Once consent had been obtained, the identified interviewees were contacted and informed on the purpose of the interview and study (Fraser, 2021). This engagement also outlined the approximate duration

of the interview (Saunders & Lewis, 2017). The format of the semi-structured interview was designed to ensure the interviewees could openly discuss the topic without imposing time constraints, which would have been a limitation on the interview (Saunders et al., 2009).

The research strategy to be applied will be phenomenology which aligns with interpretivism which sought to understand a particular event and make sense of it (Saunders et al., 2009). As the study was focused on a community to determine the impact of mine closures, the individual interviewee's experiences played a significant role in the data collection and interpretation. The study was cross sectional based on practicality of time constraints (Saunders & Lewis, 2017). It was for a specific period in which the engagement was conducted with the communities.

In order to align to research ethics, access to SMME community member participants was obtained through the mining companies' SLP Managers, Community Liaison Manager and Stakeholder Relations Manager's referrals. The SMME Community Members interviewed were protected by ensuring that the ethical principle of not causing harm and anonymity was upheld. Identifiers were used. SMME Community Members consents were obtained, and the researcher ensured that the SMMEs identified were able to speak English without the requirement of an interpreter. No vulnerable participants were selected for the study. Participants were notified that the interviews were voluntary to avoid any undue pressure or coercion. The researcher approached each respondent by establishing a respectful and empathetic rapport.

Questions were non-leading, confidential and the respondent retained the anonymity as the study excluded any mention of names. The location of the interview was determined by the interviewee and their place that was comfortable to them.

The respondents were provided a consent form for their sign-off and were informed of the contents of the consent form prior to each interview. The consent form outlined that the interviews were voluntary, and the interviewee had the right to withdraw from the interview. Confidentiality on the data that was acquired and anonymity in the individuals interviewed was affirmed prior to the commencement of the interviews. Permission was requested from the interviewees to record the interviews.

Appendix C provides the consent form provided and read to participants.

4.9 Analysis approach

The study involved 12 semi-structured interviews where the interviewer reached data saturation, being the point where no new information was gathered from interviewees and all various viewpoints have been reached (Saunders et al., 2009). This occurred prior to the initial target of 16 interviews. Through conducting interviews with various stakeholders for the study, saturation was reached as no additional insights were provided on each incremental participant as the information provided during the interviews was repetitive indicating that the ideal sample size was reached (Hennink & Kaiser, 2022)

The interviews were collected in written form, text, and audio recordings from the responses from the interviewees. The data was both transcribed where the text and audio recordings were word processed. This data collection aligned to the qualitative research method where the answers from the interviewees was noted. (Saunders & Lewis, 2017). The analysis focused on the key words and themes that emerge from the interview. The transcriptions were reviewed including the possible audio recordings to ensure they are accurate through the use of Atlas.ti based on the constructed codes (Fraser, 2021; Cesar & Jhony, 2021). Electronic data capturing required time for analysis where interviewee responses were anonymised through separate coding. The categorisation of data resulted in the ability to recognise relationships and develop test propositions, enabling the qualitative analysis and conclusions. The inductive approach to the analysis ensured that the study did not start with a theory or framework but rather the theory emerges from the data collection and analysis.

4.10 Quality controls

The research proposal was submitted to the Gordon Institute of Business' Ethical Committee and adhered to the requirements prescribed. The subjective nature of the study brought into question the reliability and validity of the research. Validity and credibility looked at whether the outcome of study findings was legitimate and the ways in which these were achieved was through ensuring that the interviewees are a good representation of the population, and were impartial to the interviewer through the data collection process (Saunders & Lewis, 2017). Reliability over time can be attributed to dependability as a control under qualitative research. Consistency is key in the findings under reliability and dependability (Saunders & Lewis, 2017). It was important to ensure that the research questions were developed in line with what is known and unknown in theory to be used for the interview questions.

Factors that needed to be addressed that can compromise reliability included researcher bias, where misinterpretation was possible due to the subjective nature of the research. Through

coaching and awareness, the researcher minimised this possibility. Subject bias is another factor that could have influenced reliability, as the interviewees could have possibly provided perceived favourable answers which were not a true depiction of their true insights. Transferability looks at whether the study's findings can be extended to other contexts (Riggs & Treharne, n.d.). For the purposes of the study, this translated to whether the socio-economic impacts of mine closure were applicable in developed countries as it would be in South Africa. As such it is important to ensure that through the avoidance of bias, rich information was gathered and critically reviewed within context. Authenticity as a control would be whether the study allows for different viewpoints (Riggs & Treharne, n.d.).

4.11 Research Limitations

The study had various limitations in relation to the qualitative research and methodology:

1. The sample size could be considered too small in the context that different mining communities may each have nuanced experiences and not holistically reflective.
2. The semi-structured interviews contained elements of response bias as some of the mining company respondents displayed apprehension towards the inherent expectations of the mining communities and as such would gravitate towards responses that positively reflected efforts made by the mining companies.
3. In addition, the respondent bias could also be a factor as those interviewed may be conservative in their responses despite the assurance of anonymity.
4. The researcher's lack of formal training on semi structured interviews and techniques to be employed could have impacted the data collection approach.
5. The researcher's bias on specific responses could have been a factor in relation to preceding interviews.
6. The DMRE was unable to respond timeously for an interview that would entail its representatives providing insights to the study on the regulator's perception of socio-economic impacts on mine and views on how mining companies collaborate with mining communities. This limitation affected the ability to obtain triangulation for the study.

7. The study was cross sectional based on the constraints of time and as such the analysis was restricted to a specific time frame whereas a longitudinal study would have provided insights over a longer period and contrasted different responses from respondents associated with mining companies during the lifecycle of the mine.

CHAPTER 5: RESULTS

5.1 Introduction

As regards to the nature of the study, the research adopted an exploratory design based off the qualitative methodology. This design sought to delve into the problem identified as well as understanding the socio-economic impacts further, based on specific information gathered from the semi-structured interviews. The results from the interviews conducted are outlined in Chapter 5 and are based on the research questions in Chapter 3. The details of the semi-structured interview contents and themes are discussed further in this chapter.

5.2 Description of the Sample

The sample consisted of 12 respondents where 14 semi-structured interviews were conducted. The interview with one of the respondents was discarded as it emerged that the respondent's background was more proficient within the context of environmental impacts rather than socio-economic aspects of a mining operation in relation to community relations. The rationale for discarding the interview was also based on the context of the literature review, Chapter 2 on the socio-economic impacts of mine closure which would be a critical aspect of the study and would require insights from individuals that worked within the field and could provide insights related to socio-economic impacts on mining communities rather than environmental impacts. Further one of the interviews conducted with the Community Activist had to be conducted twice as the voice recording software malfunction which inhibited the ability to transcribe. The interviews from the respondents were categorised into two stakeholders, those from a mining company perspective, including industry experts that are working as independent consultants and those in the mining community.

Table 2: Interview sample

Description	Quantity
Number of respondents	12
Number of respondents in mining companies	6
Number of respondents in community	6

Table 3 provides a view of the respondents' designations. These individuals were approached based on their experiences and ability to provide insights to the study from the perspective of the mining company, mining community and industry.

Table 3: Respondent details

Identifier Number	Participant title
Participant 1 (P1)	Environmental Social and Governance Consultant
Participant 2 (P2)	Stakeholder Relations Manager
Participant 3 (P3)	Community Liaison Officer
Participant 4 (P4)	Senior Community Liaison Officer
Participant 5 (P5)	Social Labour Plan Manager 1
Participant 6 (P6)	Social and Labour Plan Manager 2
Participant 7 (P7)	Community Leader
Participant 8 (P8)	SMME Community Member 1
Participant 9 (P9)	SMME Community Member 2
Participant 10 (P10)	SMME Community Member 3
Participant 11 (P11)	Community Member 1
Participant 12 (P12)	Community Activist

All the respondents were each presented with consent letters prior to partaking in the interview. The interviews each outlined the purpose of the study, highlighting the intention to gather further insight and encouraging participation while explicitly indicating the voluntariness and the option for potential respondents to withdraw at any time. Additionally, the respondents were assured of confidentiality of the information gathered and that their responses would be anonymous. This would also extend to the exclusion of the name of the company and respondent in the study.

Most of the respondents with exception of three, consented to the usage of Microsoft Teams as a medium in which the interview would be conducted, including the recording and transcription. The three respondents encountered difficulties in accessing the platform which would then allow digital transcription and as such it was conducted through a telephonic discussion supported by voice recording software and then manually transcribed.

As intended under the design methodology referenced in chapter 4, a pilot interview was conducted prior to engaging with all respondents to assess the appropriateness of the questions and potential probing questions that could be required (Saunders & Lewis, 2012).

The pilot interview was conducted with an individual that was currently involved in the mining industry and could provide feedback on the research questions and their relevance.

The average period of each interview was around 39 minutes. The duration of each interview is highlighted below on Table 4.

Table 4: Interview duration

Description	Quantity
Number of interviews	12
Total duration of interviews	7 hours 52 minutes
Average period of interview	39 minutes 30 seconds
Minimum period of interview	29 minutes 30 seconds
Maximum period of interview	1 hour 20 minutes

5.3 Presentation of results

The analysis of each interview was conducted post the occurrence to avoid a lag in the interpretation and the transcription where it was noted by the researcher that the transcription software misinterpreted some words. This then necessitated a further review and revision of the transcript to capture the correct words as expressed by each respondent. The researcher followed the interview guide to pose the three research questions with each consisting of a subset of two to five questions. The overarching questions would then serve as a theme for each of the designated respondents. All questions were posed to all respondents and sought to obtain insights on their views, regarding how the mining communities could build social capital. The interviews provided a basis in which a thematic analysis could be facilitated. The thematic analysis involved a process where the transcripts were uploaded onto Atlas ti which then allowed the researcher to code the themes attained. The process adopted progressed from open coding where multiple pages of text existed based on the overall transcripts to axial coding where multiple segments were analysed. Further to this, gradually the multiple segments were then reduced applying selective coding.

This process would apply to re-occurring codes as well as quotations from the respondents on the interview questions. The codes are contained in Appendix D while the responses provided from the interviews are outlined below.

5.4 Results for Research Question 1

Research Question 1: How do mining communities perceive the impact of mine closure?

This research question sought to identify the perceived impacts of mine closure from the perspective of mining community members including those that are SMME businesses that form part of the mining company procurement ecosystem. It included, in addition, the perspectives of mining companies. Three questions were posed to community members which were made up of SMME community members, a Community Activist, an Environmental Social and Governance Consultant, a Stakeholder Relations Manager, a Community Liaison Managers and a Social and Labour Plan Manager. The questions were as follows:

- What do communities perceive to be the impact of mine closure?
- What does the community think is causing this impact?
- What can mining companies do to support communities in preparation for mine closure?

The view of the mining communities including those of SMME owners was relevant to the study as it provided context on how the perceived experiences of the community correlated with mine closure. The distinction of the general community responses from those of the SMME owners was necessary based on the anticipation of potentially different experiences however this approach was negated by the fact that the responses of both, were aligned.

5.4.1. Communities' perception on the impact of mine closure

Figure 1 depicts the high-level responses from the respondents on the perceived impact of mine closures. The respondents inferred to the negative perceived impacts of mine closure categorised by loss of employment, loss of income, loss of social amenities and social ills occurring in the community.

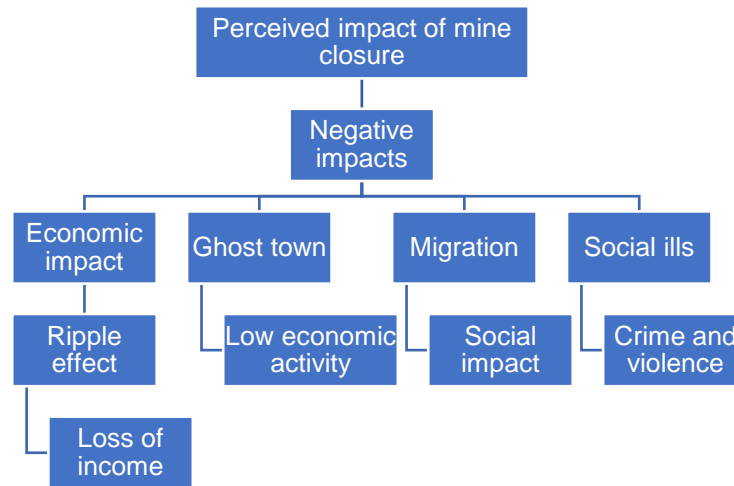


Figure 1: Perceived impacts of mine closure by communities and SMMEs

The interviews held with the mining community members including SMMEs and mining companies required their personal insights and experiences on impacts they had observed themselves or shared experiences with other community members when mining operations were closed.

All respondents indicated the common theme of loss of employment and income in relation to the perceived impact of mine closure. This had a consequential effect economically within the community. Additionally, the impact of mine closure resulted in the migration of mine employees as they sought alternative employment, causing ghost towns where the previous infrastructure in place was abandoned based on significantly reduced economic activity. Crime was cited by two respondents as being a result of mine closure and subsequently migration.

The following indicates the responses obtained from the interviews:

“The minute you start talking about closure, people become vulnerable because they think of their well-being. Especially those that are dependent on the mine for survival.”
(Social Labour Plan Manager 1)

“When news like hits, it sort of unsettles the majority of the community members because a lot of people are dependent on the mine in terms of income generation.”
(Community Liaison Officer)

“There is panic within the community because there are direct households that are going to lose income and the economical bind that is being created by the existence of that economical hub. The SMMEs are going to be the most hit more than any other person in the community.”

(Community Activist)

“SMMEs feel it the most, houses are repossessed, lost cars, lost livelihoods. The impact is horrifying on businesses because they are not able to move to another community or mine.” (Environmental Social & Governance Officer)

“Mines generate a lot of income for a lot of people. One salary is supporting something like 10 businesses. Adverse effects of mine closures are as a result of that income not flowing anymore.” (Stakeholder Relations Manager)

“We live with the mine when it is operating and when it is closed, we will stay with ghost towns, crime is developing, gender-based violence and everything. Mine closure does not benefit anyone. The only people who are benefitting are the ones that were running that mine” (Community Leader)

“The crime level is going to rise. A lot of businesses are going to suffer because there will be no income.”

(SMME Community Member 2)

“We will stay with ghost towns where people do not have work. Crime is developing, domestic violence, gender-based violence.”

(Community Leader)

On migration, the Stakeholder Relations Manager indicated that *“The economic disadvantages or the consequences are that jobs will be lost and when jobs are lost, it means some families might have to move away from where they were staying so that they look for greener pastures.”*

The SMME Community Member 3 indicated that due to lack of accountability from stakeholders including mining companies, municipalities and the regulator, this has led to illegal mining, *“Remember for us to have illegal mining, it means people have access so they don’t do enough to make sure that when the mine leaves, they have completely close down.”*

Table 5 below highlights the themes on the communities’ and SMMEs’ perceptions of the socio-economic impacts of mine closure including the causes, drivers and the community members’ expectations of how communities could be supported in preparation for mining closure. The themes have been ranked and categorised in relation to frequency and number of respondents.

Table 5: What the community's perception of socio-economic impacts of mine closure

Rank	Theme	Frequency	Participant number
1	Loss of employment	11	P2, P3, P4, P5, P6, P7, P8, P9, P10, P11 and P12
2	Lack of economic activity	9	P1, P2, P3, P4, P5, P7, P8, P11 and P12
3	Migration	6	P1, P2, P7, P9, P10, P11
3	Crime	2	P7 and P9

It was evident from the various respondents that there are negative socio-economic impacts based on mine closures. The economic impacts of mine closure resulting in a chain reaction on the economic activity of the community which included mine employees, their families, SMMEs and its own employees.

5.4.2. Communities' perception on the cause of the impact

The drivers of these socio-economic impacts are illustrated below on Table 6 as the responses on what does the community think is causing the socio-economic impact of mine closures.

Table 6: What does the community think is causing this impact

Rank	Theme	Frequency	Participant Number
1	Dependency on mine for economic activity	4	P1, P8, P10 and P11,
1	Lack of transferable skills	4	P4, P8, P10 and P11
1	Lack of accountability by Municipalities	4	P1, P2, P3 and P4

The respondents outlined their views on the causes of the impacts driven by the dependency by the community including SMMEs on the mine for economic activity, the lack of transferable skills by employees that specialised in mining work, the desperation by the community to seek a livelihood and the lack of accountability by mining companies and municipalities at ensuring effective rehabilitation of mining operations.

SMME Community Member 1 indicated that *"People don't know anything besides the mine. The impact is big. When you close, people are going to be the ones that suffer the most because their businesses do not have the potential of growing beyond this one mine."*

Community Member 1 said *"The economy relies solely on the people who make an income who are able to spend in the communities whether you are a property owner, you are a tavern owner, whatever business that you have, the lifeline of that business is the mine. We have*

about 20 room accommodation that we do and probably 90% of those people work at the mine.”

The Environmental Social and Governance Consultant stated *“When the mine closes, you no longer have the same activity. When the mine starts it is a greenfield, people flock there. You have an influx of people from different areas.”*

Further they indicated that *“The infrastructure might actually be catering for 30,000 and now an additional 10,000 comes as a result of the mine.”*

SMME Community Member 3 supported this view indicating *“If the mine closes, there are a lot of projects, about 80% are mining.”*

On the lack of transferable skills, the respondents outlined how the skills of the employees of mines are limited to the mining operation.

Senior Community Liaison Officer stated, *“Portable skills are skills that the employees can use outside of the mining environment.”*

Community Member 1 stated *“Nature of businesses are set up with the aim of getting business from the mines because there’s not much choice. It’s very limited in terms of the skill sets that are relevant to the area.”*

SMME Community Member 3 confirmed that *“Mines do not do skills development. They only focus on their own industry.”*

SMME Community Member 2 shared their view, stating, *“Tomorrow when mines are closed, people will know how to fend for themselves. They must come up with different training skills not the mining training skills.”*

The Environmental Social and Governance Consultant indicated that there was a lack of accountability from municipalities *“I have never once heard them asking about the impact of their tailings dam. Those things can be dangerous if a dam breaks.”*

Service delivery was cited by the Stakeholder Relations Manager as an issue at mine closure as they indicated, *“When the mine leaves the municipality will be affected as services may not be paid, there may not be water that was provided by the mine, there may not be electricity.”*

This was further confirmed by the Senior Community Liaison Officer with regards to infrastructure, *“Mines should not be concerned about infrastructure projects. That’s a mandate of the municipality but due to the failure of municipalities, mines have stepped in.”*

The Community Liaison Officer highlighted the same, *“Local municipalities are the ones that hold the mandate to bring about development in terms of infrastructure, service delivery as a whole to the public.”*

Table 7: What can mining companies do to support communities in preparation for mine closure

Rank	Theme	Frequency	Participant Number
1	Skills Development	7	P1, P3, P4, P5, P8, P9 and P10
2	Engagement	5	P3, P5, P8, P11, P12
3	Implementation of SLP	4	P2, P3, P4 and P7
4	Selfless Investment	3	P1, P7, P11

The respondents which included mining company representatives and community members were aligned in relation to skills development being a critical aspect where mining companies and mining communities should collaborate prior to mine closure as this would foster independence from the mining operations. Additionally, the implementation of the SLP related projects provided the support to communities.

The Social Labour Plan stated, *“Skills development is the number one priority. Once you provide skills, they start creating jobs for themselves, creating jobs for other people.”*

The Stakeholder Relations Manager outlined that *“There must be portable skills that you give communities and employees of the mine.”*

The SMME Community Member 2 confirmed skills development as critical indicating *“Training is important.”*

Community Activist supported the view of mining companies’ providing sustainable skills development indicating *“They must develop a particular blueprint plan that will make the community to be sustainable after the minerals have depleted.”*

The implementation of SLP projects was mentioned by the Community Leader as the basis in which they would measure the social performance of the mining company, *“When you do social work for your mine, the Social Labour Plan is the promise as to what you are going to do. You said you would build a school, build a clinic, and employ the local community and provide skills. I am checking that.”*

The Community Liaison Officer indicated that the SLPs cover, *“a whole list of things can be done, but majority of it should be poverty alleviation projects, your SLP projects should focus mainly on that.”*

In terms of other aspects in which mining companies can aid in supporting mining communities in preparation for mine closure include investment in sustainable infrastructure projects. The Environmental Social and Governance Consultant indicated, *“A lot of mines do a lot of work fund businesses and not only businesses dependent on the mine.”*

The Community Member 1 stated that the mines should evade self-serving projects and stated that *“They should create an environment and develop infrastructure, basic necessities and importantly education. Maybe do a Technical College, because then it creates another economic cycle right?”*

Engagement was a concept that would enable the mining companies to support the communities to prepare for mine closure.

The Social Labour Plan Manager 1 indicated that *“rigorous consultation is actually key at the beginning of the mine so that they understand exactly what the mine is going to do however throughout the life of the mine, constant stakeholder engagement is also key to keep them in the loop.”*

The SMME Community Member 1 highlighted *“If word goes out that the mine is about to close, we would want to be consulted.”*

The Community Activist stated, *“The mining companies when they come to establish themselves with the community, they must have clear communication with the community, and they must know the needs and wants of the community.”*

The Community Liaison Officer confirmed this perspective indicating *“You need to do a lot of engagement, in the beginning, a lot of people have a fear of you as the mining company leaving. You need to be already presenting the rehabilitation programs of land and it sort of lifts that element of fear.”*

The Community Member 1 stated *“Mining companies must consult with communities and build relations.”*

5.5. Results for Research Question 2

Research Question 2: How do mining companies build social capital during the life cycle of a mine?

This research question sought to identify the tactics that could be adopted by mining companies in building sustainable social capital during the life cycle of a mine. These tactics

were provided by both mining company members and mining community members including SMME business owners. Four questions were posed to all respondents:

- How do mining companies contribute and collaborate with mining communities when the mine is operational?
- What more can be done by the mining companies?
- What can mining companies do to gain the trust and commitment from community members?
- How can collaboration, engagement and community inclusion be strengthened?

5.5.1 How do mining companies contribute and collaborate with mining communities when mine is operational?

Table 8 illustrates the view of the respondents and provides insight as to how mining communities including those of SMME owners and mining companies viewed potential tactics that would build social capital to offset the socio-economic impacts of mine closure.

Table 8: How do mining companies contribute and collaborate with mining communities when the mine is operational

Rank	Theme	Frequency	Participant Number
1	Implementation of SLP projects	3	P4, P7 and P11
2	Continuous engagement	2	P1 and P4
2	Transparency	2	P1 and P5
2	Upskill	2	P2 and P8

The respondents indicated that to foster the collaboration with mining communities to provide meaningful contribution when the mine was operational, required the successful implementation of SLP projects. The collaboration would be based on regular stakeholder engagement with the community and other stakeholders such as municipalities, as well as transparency of the various forums, Community, Business and Future would support its social capital.

The Community Leader said that currently, there was no tactic by the mining company to collaborate with mining communities stating, *“When it comes to implementing that Social and Labour Plan so the community can benefit, they do not do that.”*

Community Member 1 supported the view that mining companies currently collaborate out of self-interest, *“I don’t think mines do enough. Everything is with a selfish attempt. They take and they go. The key contribution to the lack of access to education opportunity is because*

the only sponsorship that comes out is for maths and science kids, the engineering kids. What about the music students? What about the kids who are rich in literature.”

The Environmental Social and Governance Consultant indicated that *“There are still these huge gaps between where mines are, and communities are. The mine is here, and they have all the processes and all the standards and based on those complexities, I don’t think that there are platforms within the communities where those conversations are had, let alone preparing for mine closures.”*

The Senior Community Liaison Officer stated the support *“Needs to start happening even prior to the actual end of life of mine. The projects that these mining companies do under the SLP programs should be projects that are sustainable, that are not necessarily dependent on mining activities.”*

The Stakeholder Relations Manager indicated that *“Mining companies need to fully implement the Social and Labour Plan that is number one and number two communicate.”*

The Social and Labour Plan Manager indicated that *“The Social and Labour Plan, you consult that every year to ensure that you are still in sync with what was actually proposed. That consultation is very key so that people do not all of a sudden get surprised and the mine is no longer there. The more that we share, the more I get to understand what you want from me, the more you get to share in order to survive this.”*

The Stakeholder Relations Manager outlined that a Future Forum should be established, *“Where they will discuss the strategies during the life of the mine. How do they make sure people get bursaries, employees get skills training and also that the mining company does not do the job of the municipality.”*

While SMME Community Member 2 stated the mining companies should, *“Go straight to the community and must engage with the community. We as the community must start a forum where we can elect a representative who can speak on behalf of the communities and mines.”*

Community Activist indicates that the self-interests of the individuals tasked with heading and running the Forums has diluted the impact of meaningful collaboration, *“Community Forums ... stand for the interest of the community, Business Forums are going to advocate for the businesses and you get people who are going to be neutral who will communicate with mine.”*

On transparency, a tactic that would be complimentary to engagement to elicit collaboration with mining communities, the Social Labour Plan Manager 1 indicated, *“The first thing to be is to be open and transparent. Once you do that you will actually find it easy to work with your communities.”*

The Environmental Social and Governance Consultant outlined their view on transparency, *“Mines are not the same, companies are not the same, there are others that are transparent about what’s happening, and others are not.”*

On the aspect of upskilling the community, the Stakeholder Relations Manager indicated that *“If we had addressed all these things, training, portable skills during the Future Forum, then when the mine closes, people will be better off because they will have skills.”*

SMME Community Member 1 stated *“I think it is one of the requirements that when you’re closing. You must give them alternative skills.”*

5.5.2 What more can be done by mining companies

Following from how mining companies contribute and collaborate with mining communities when the mine is operational, it was important to obtain an exhaustive view of additional activities that were identified by the respondents. The respondents gave diverse initiatives that the mining companies could contribute to the mining community which are either supported by the SLP or instances where the mining company provides additional support. The creation of educational opportunities by mining companies including school infrastructure were mentioned.

Table 9 illustrates the constructs and themes on what more can be done by mining companies

Table 9: What more can be done by mining companies

Rank	Theme	Frequency	Participant Number
1	Education support	3	P6, P7 and P10
1	Upskill	3	P4, P5 and p8
3	Support municipalities	1	P2
3	Going beyond SLPs	1	P1

Social and Labour Manager 2 indicated that *“Building a school or a community hall ... sponsor kids from local communities ... mining learnerships as well.”*

SMME Community Member 3 stated, *“They need to have different programs from mining, maybe try to build another kind of business maybe a retail or a small business, and develop them so that when they leave, they can leave something that benefits the communities. Skill our kids differently, not have our kids focused mainly on mining. From experience most of our kids are not working. They went to school...and it’s very difficult for your kids to actually work.”*

The Community Leader outlined *“You can also have something called Corporate Social Responsibility where your mine can contribute to the community like brining food, take children to university and other things.”*

Senior Community Liaison Officer stated *“Mines need to invest more in the societies that they operate on. The mine needs to do a social survey at all phases of the mine life cycle of where the community is and then from that study, identify and verify the interventions, if they were successful and identify where they can assist.”*

Social and Labour Plan Manager 1 stated *“I need to first start by engaging our local communities ... I would need to start investing in their skills.”*

SMME Community Member 1 supported the notion that mines could do more in relation to skills development stating that mines should *“Give us skills, business skills when operating. I think it is one of the things that I think if they were to be done, you could have real change.”*

The Stakeholder Relations Manager gave their view that *“Mines need to ensure that they support municipalities and provide training. So, at the end of the day, the IDP that they produce will serve the needs of the community.”*

The Environmental Social and Governance Consultant stated that, *“Nobody is talking just SLPs compliance now, most of the mines are going beyond the SLP. They know and understand that for them to operate in peace, they need to contribute to the economic development of the area.”*

5.5.3 What can mining companies do to gain the trust and commitment from community members?

The mining companies need to build social capital with the communities in which they operate and trust and commitment from community members is important to foster collaboration.

Table 10 outlines the themes based on responses on what mining companies can do to gain the trust and commitment of community members.

Table 10: What mining companies can do to gain the trust and commitment from community members

Rank	Theme	Frequency	Participant Number
1	Commitment to execute on promises	5	P3, P6, P7, P9 and P10
2	Active engagement	4	P1, P2, P3 and P10
2	Transparency	3	P1, P4 and P5

The SMME Community Member 3 indicated that for mining companies to be able to earn trust from the community *“Communication would be best, and they must stick to their words and make their promises happen.”*

The Community Leader responded, *“You gain my trust when you implement what you have promised in the Social and Labour Plan which gives you the mining right.”*

The Community Liaison Officer has stated, *“Implementation of the SLPs should be effective, if not, then it is like you have promised...but you are not delivering. It hinders the trust element.”*

The Stakeholder Relations Manager has cited engagement as being a contributor to trust, *“Stakeholder engagement is very important in mining companies, so that you gain trust of communities and then you get buy-in.”*

Community Member 1 has indicated that mining companies *“Would have to consult, get buy-in and present opportunities that the mine would have to offer.”*

The Environment Social and Governance Consultant stated, *“The mining industry has a very bad history in South Africa. Some mines were supporting the apartheid government...few mines take that ownership. Because you engage with communities understanding their pain, and where they are coming from. Mines want to collaborate...they are looking to working with government and with communities.”*

The Social and Labour Plan Manager 1 confirms on the tactic to gain trust and commitment from the mining communities, *“The first thing to be is to be open and transparent. Once you do that, you will actually find it easy to work with your communities.”*

5.5.4 How can collaboration, engagement and community inclusion be strengthened?

Table 11 highlights the themes on the respondents’ views on how collaboration, engagement and community inclusion can be strengthened.

Table 11: How collaboration, engagement and community inclusion can be strengthened

Rank	Theme	Frequency	Participant Number
1	Enhanced communication with Government	3	P1, P2 and P10
2	Continuous social audit	1	P4
2	Appointment of effective community representatives	1	P9

Collaboration, engagement, and the inclusion of the mining community can be strengthened to build social capital for the mining company during the lifecycle of the mine. Respondents' views indicated that there were three main themes in which this could be facilitated. The Environmental Social and Governance Consultant indicated *"There is a lack of direction for the mines by our government. So, are the municipalities ready to direct the mines to do the things that will mitigate the impact of mine closure like you are asking? They are not."*

The Stakeholder Relations Manager stated that *"More can be done, I think getting the counsellors, the municipalities, and the mayor on the board. When you look at the IDP of a municipality, in most cases, they get a consultant to do this job which is supposed to be done by the counsellors themselves. You are supposed to get these inputs from the community themselves. In most cases...you look at the contents of the IDP and you see that it is a cut and paste, they might have taken an IDP of a community where there is no mine."*

The SMME Community Member 3 indicated that enhanced communication could strengthen engagement, *"I think they need to pull out the middleman. There is a middleman between the community and the mine. The information that is brought across the community might be different from what the mine sends through...the third person always gives you the bare minimum information. Ward counsellors attend the meetings with the mines and then they bring us information."*

The Senior Community Liaison Officer highlighted that continuous assessment by the both stakeholders, mining community and the mining companies would strengthen collaboration and engagement, *"Mines must start looking at when they break ground and then also conduct these social audits to identify where they can assist and also verify their intervention is actually giving the desired effect....sit down with the community and then look how they can make the community independent of the mine."*

To foster the collaboration, engagement, and inclusion of the community, the SMME Community Member 2 highlighted transparency in engagement and collaboration would be beneficial for the community, *"The community must also elect the people who are diligent to their work. When we elect the people, we need to know what is happening in the table of negotiations. I think transparency is what is important."*

5.6. Results for Research Question 3

Research Question 3: How can mining companies build social capital at the end of the mine life cycle towards benefiting local communities post mine closure?

This research question sought to identify the initiatives that mining companies could adopt that would benefit the mining community at the end of mine life cycle. Respondents on the research question included all respondents and are indicated in the two questions below:

- What can mining companies do when the mines close that will benefit the community?
- What are the sustainable initiatives that the mining companies can undertake during the life of the mine that will still benefit the community after the mine closes?

5.6.1 What can mining companies do when the mines close that will benefit the community?

Table 12 highlights the themes on the respondents' views on the initiatives that can be adopted by mining companies that will benefit the community when the mines close.

Table 12: What mining can companies do when the mines closes that will benefit the community

Rank	Theme	Frequency	Participant Number
1	Skills Development	7	P1, P2, P6, P8, P9, P10 and P11
2	Education Investment	4	P1, P2, P6 and P11
3	Diversified industries	2	P1 and P10

Based on the responses of four respondents representing mining industry experts and mining companies, skills development is important to ensuring that communities benefit when the mines close. This view was also supported by the SMME community members interviewed.

The Environmental Social and Governance Consultant indicated that *“There is effort to reduce dependency on the mines and supporting businesses that are outside of mining. There is an opportunity even within the SLP, mines are expected to provide skills that are outside mining. So, there’s lots of investments in the alternative programs for the mine not just for mine closure but also for those that are still operational.”*

The SMME Community Member 1 stated, *“We can’t all be working at the mine. When they come here, give us business skills when you are operating. Teach us. Now you are giving us motors and pumps when the mine is not there. What are we going to do?”*

The Senior Community Liaison Officer outlined three pillars associated with SLPs, *“One is human resource development, two is the procurement from locals and third is the local economic development projects. The human resource development speaks to employees. So, you upskill employees. It is something that they can generate income independently.”*

The SMME Community Member 3 indicated, *“For me, the mine needs to support the community knowing that they are closing, teaching a different skill or come up with ideas as to how people will get income from that. If you give people a different skill from being a rock drill operator to maybe giving them one of being a carpenter, with that you get start your own business.”*

The Social and Labour Plan Manager 2 stated that *“Building a local school that specializes in artisan trades... and one that is self-sustaining.”*

The Stakeholder Relations Manager Investment mentioned skills development and educational initiatives, *“We are already thinking of the future by giving proper bursaries, proper mentorship, portable skills training. Your talent pool will tell you that these are the type of bursaries you must give but the benefits are not coming in a year, they will come in three, five, 10 years when people have qualified and have experience.”*

Community Member 1 highlighted diversity of industry as a potential avenue, *“They can do incubation hubs and encourage and teach people to think independently. Teach them how to do business...expose them to another industry.”*

5.6.2 What are the sustainable initiatives that the mining companies can undertake during the life of the mine that will still benefit the community after the mine closes

Table 13 highlights the responses on sustainable initiatives that mining companies can undertake during the life of the mine that will be beneficial to the mining community after the mines close.

Table 13: What are the sustainable initiatives that the mining companies can undertake during the life of the mine that will still benefit the community after the mine closes

Rank	Theme	Frequency	Participant Number
1	Renewable energy initiatives	1	P11
1	Agricultural endeavours	1	P1

effects as a result of the mine closure. Their perspective also indicated that there was a wider impact on the community as SMME entities rely on the mines for income also experience job losses within community households. The loss of employment and migration would then result in minimal to no economic activity leading to desperation. On the back of this desperation, the community respondents indicated this scenario would result in social impacts to the towns and villages based on increased crime activities including domestic violence. On this basis, the perception of the impact of mine closure is negative based on the resultant socio-economic factors. Another respondent indicated that it is also important to consider that at inception the existence of the mine brought an influx of people into the mining area, and this already had economic and social impacts on the community. These impacts had a bearing on level of infrastructure required to accommodate the incoming people and also the social dynamics that would transpire.

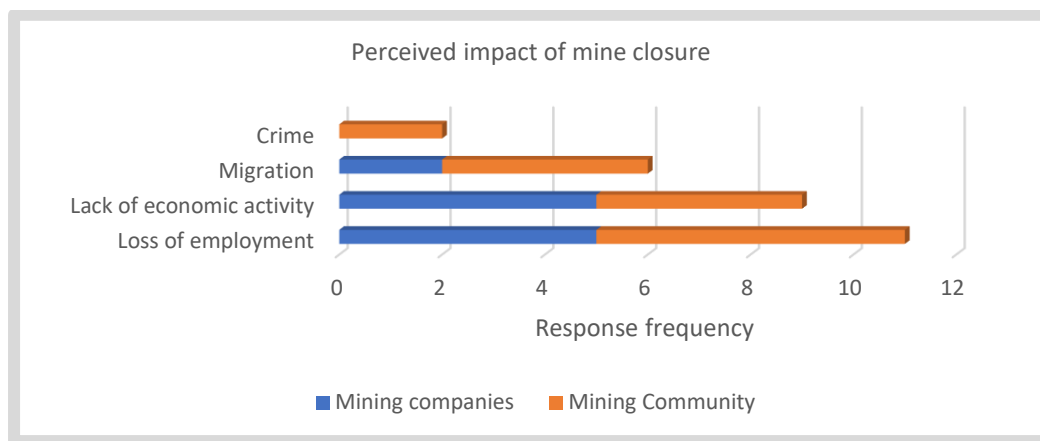


Figure 3: Comparison of perceived impacts of mine closure by mining companies and mining communities

Research Question: What does the community think is causing this impact?

The responses from the mining companies and mining communities on the causes of the impact reflected the sentiment that the dependency on the mine put the communities affected in a vulnerable position when the mines closed. Furthermore, while only one mining company respondent commented on this aspect, mining communities including SMME community members indicated that the limited transferability of skills for employees working in the mines resulted in minimal alternatives. Four of respondents from the mining companies outlined that the lack of accountability by the municipalities resulting in the loss of transparency in roles and responsibilities of the mine and the government. While the mining communities were not inclined to attribute the causes of the impact on the lack of accountability by municipalities, they indicated the inability to successfully transfer skills would be a cause of the impact.

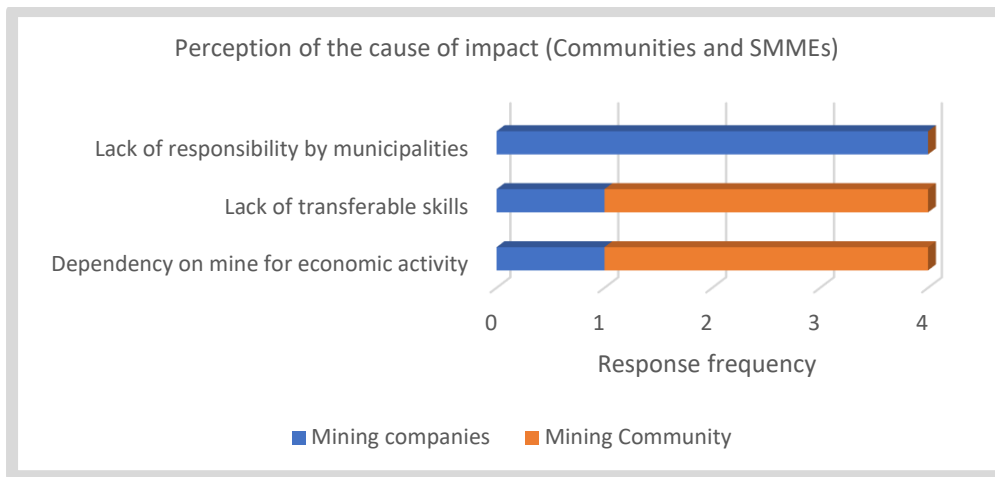


Figure 4: Comparison of perception of cause of socio-economic impacts by mining companies and mining communities

Research Question: What can mining companies do to support communities in preparation for mine closure?

Both the mining companies and mining communities aligned in responses relating to skills development being a critical aspect that mining companies could adopt and initiative in collaboration with mining communities. Both groups of respondents cited skills development as being important to create independence from the mining operations and mitigate the impact of mine closure. Stakeholder engagement was indicated by the respondents as being an important aspect to foster transparency in relation to the mine closure. Continuous engagement throughout the mine life cycle would ensure that mining communities would be aware of the potential impacts. The implementation of SLP related projects was relayed as an indicator of support of mining communities by the mining companies. A mining community respondent indicated that the implementation of SLPs should not be self-serving to the mining companies but should rather be reflective of a sustainable initiative that would be able to create an economical cycle. This contrasted with a view from a mining company respondent that the mines were implementing several projects that were not borne from self-interest. While the combined view from the mining companies' respondents and another from the community was that the SLP projects should aim to alleviate poverty and the mining companies should invest in projects not directly related to the mine. The existence of SLPs alone would not mitigate against post mine closure impacts but rather it would need to be focused on specific areas that supported the socio-economic independence of communities.

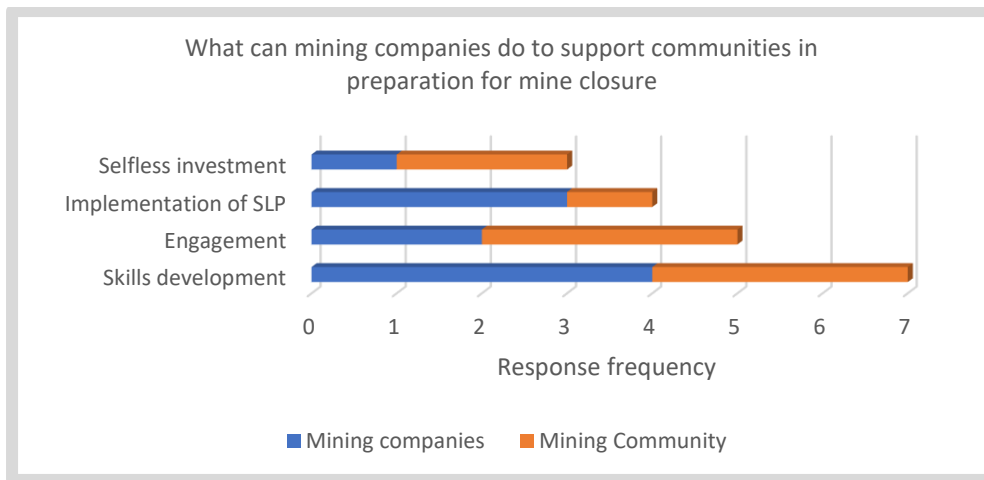


Figure 5: Comparison of mining companies and mining communities' responses to activities that would support communities in preparation for mine closure

5.7.2 Results for Research Question 2

Research Question: How do mining companies contribute and collaborate with mining communities when the mine is operational?

A respondent from the mining community indicated that the implementation of SLPs to benefit the mining communities was ineffective while another mining community respondent indicated that while SLPs were being used, their effectiveness was limited, as the interests of the community was not entirely considered due to corrupt practices by those purporting to represent the community. In addition the sentiment was that some of the mining companies used SLPs as a public relations exercise. This would then erode the social capital that the mining companies would have built with the community during the mine life cycle. One of the respondents from the mining companies supported this assertion as they indicated that there is a misalignment between mining companies and mining communities in relation to mine closure and SLP implementation. Regular stakeholder engagement was cited as a tactic for mining companies to contribute and collaborate with mining communities when the mine is operational. This engagement extended to municipalities and the forums that would be representing the interests of the community. There was however a conflict cited by a mining community member as to the effectiveness and legitimacy of the latter in relation to representing the interests of the community. One of the respondents representing a mining company indicated that the municipality involvement was important as some of the initiatives required its support beyond the life cycle of the mine. In terms of transparency, the mining company respondent indicated that mining companies' policies differed, and as such some were transparent in relation to seeking to collaborate with communities while some did not

disclose all information. This extended to the rationale for mine closure where this could be related to financial performance of the mine and economics of further mining or depletion of minerals extracted. Skills development was mentioned by respondents from both mining companies and communities as a tactic in which mining companies could ensure that the community is equipped through training and alternative skills that would be sustainable post mine closure.

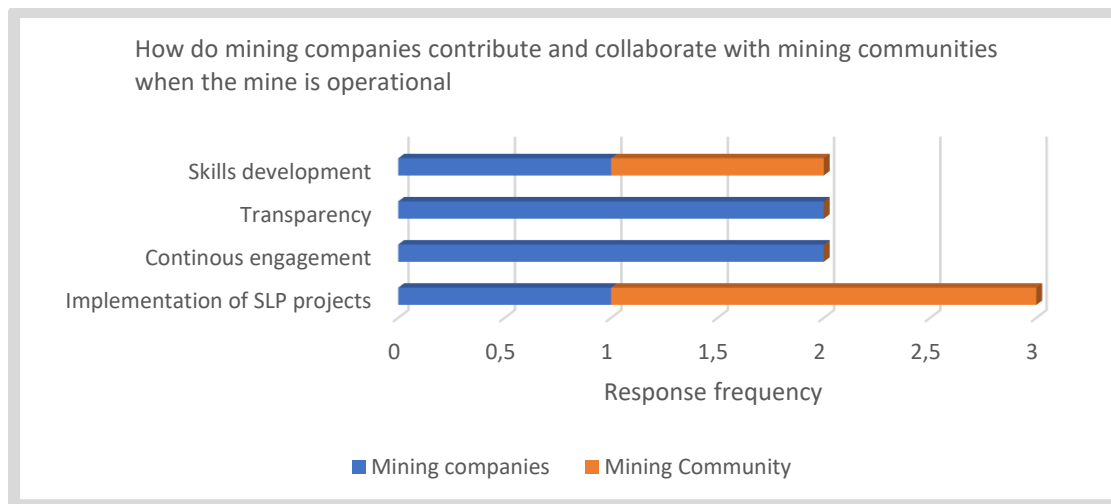


Figure 6: Comparison of mining companies and mining communities on how mining companies can contribute and collaborate with mining communities when the mine is operational

Research Question: What more can be done by mining companies?

Diverse responses were obtained from the mining company and mining community respondents relating to what more could be done by the mining companies. There was a balanced view on educational support as an initiative from both mining companies and mining communities. A mining company respondent indicated that construction of educational institutions and bursaries would support the community. The mining community indicated that there is a need for diversification in the education set-up where programs could be put in place that would allow for alternative skills beyond mining. This would support the recipients of the education to have multiple options beyond the mine. Aligned to this, were responses from two mining company respondents on skills development. The respondents highlighted the importance of supporting their employees and the wider community through supporting human resource development programs. One of the mining company respondents outlined a methodical approach through social surveys during the life cycle of the mine to ascertain the mining communities' requirements. Municipalities were mentioned by a mining company respondent, as they indicated that mining companies should support municipalities through the provision of training, specifically on the IDP and its contents. This was supported by their

assertion that the IDPs were not effectively aligned to SLPs. An additional response from a mining company respondent indicated that mining companies would need to support communities above the standard SLP compliance as this would build social capital.

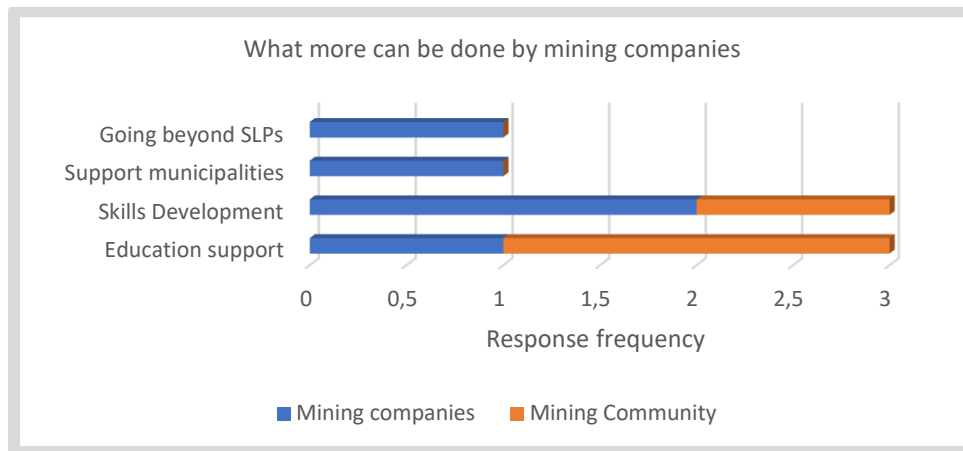


Figure 7: Comparison of mining companies and mining communities responses on what more can be done by mining companies

Research Question: What can mining companies do to gain trust and commitment from community members?

The respondents for the mining communities indicated that the execution of undertakings made by mining companies under SLPs and other stakeholder engagements would foster a relationship of trust. Respondents from a mining company acknowledged that in order to build social capital with the community, delivering on projects and undertakings made was important. Transparent communication was also mentioned by several of the mining companies' respondents to facilitate alignment with the communities. One respondent from the mining companies indicated that South Africa's history needed to be acknowledged and managed in conjunction with mining communities in order to build and maintain social capital.



Figure 8: Comparison of mining companies and mining communities on what can mining companies do to gain the trust and commitment from community members

Research Question: How can collaboration, engagement and community inclusion be strengthened?

Two mining company respondents and one from the mining community aligned that it was important to improve the relationship and engagement model with municipalities. The view from one of the mining company’s respondents was direction and guidance was required from the municipality in relation to the impacts of mine closure. There was an acknowledgement from another mining company respondent that alignment in the IDP was a collaborative effort that would include Counsellors, municipalities and mining companies. One of the mining community respondents indicated that collaboration and engagement with the mining community could be enhanced through direct communication and transparency. Another mining company respondent highlighted that ongoing reviews on the success of the initiatives undertaken would ensure that misalignments in expectations of project outcomes would be managed. As communication was cited by the mining companies and mining communities as important, a mining company respondent indicated that the inclusion of the mandated personnel from the community would ensure transparency.

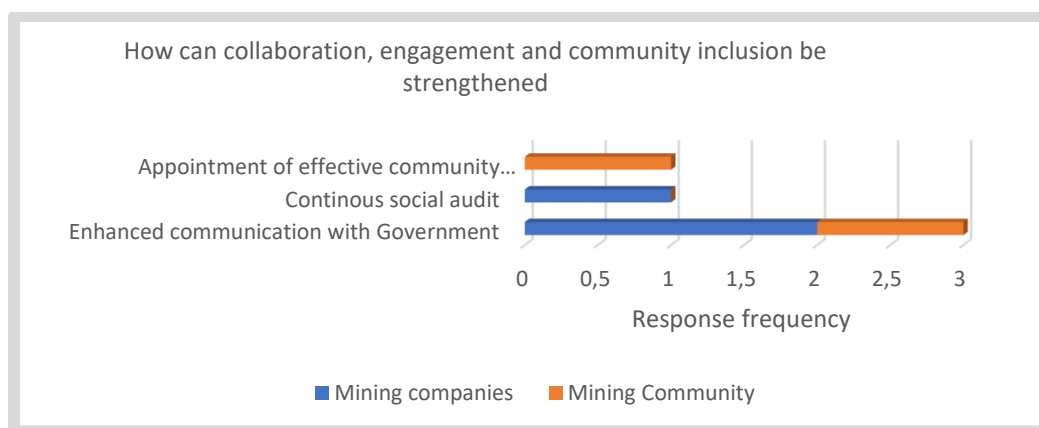


Figure 9: Comparison of mining companies and mining communities on how collaboration, engagement and community inclusion can be strengthened

5.7.3 Results for Research Question 3

Research Question: What can mining companies do when the mines close that will benefit the community?

Multiple respondents from mining companies and mining communities outlined skills development as being critical to additional activities that the mining companies could undertake for the benefit of the mining community. This alignment in responses was based on

the general view across respondents on the necessity to develop skills that were beyond the mine life cycle. This would then benefit the community members that would be positioned to explore alternative industries. One respondent confirmed that mining companies should align this initiative into the existing SLP framework. A mining community respondent outlined that the mining companies should embark on developmental training for the wider community to broaden the economic activity taking place in the mining community. A respondent indicated that there were three pillars associated to SLPs which include, human resources development, procurement from local community enterprises and local economic development which would facilitate the environment in which mining community members could generate income beyond the life cycle of the mine. Investment in education infrastructure and focused training programs would foster transferable skills training and augment the bursaries that are being provided by the mining companies. One community respondent indicated that encouraging and embarking on diversified industries would support the tactics adopted by mining companies to minimise the impact of mine closures on mining communities. This would enable the economic independence of the mining community from the mine.

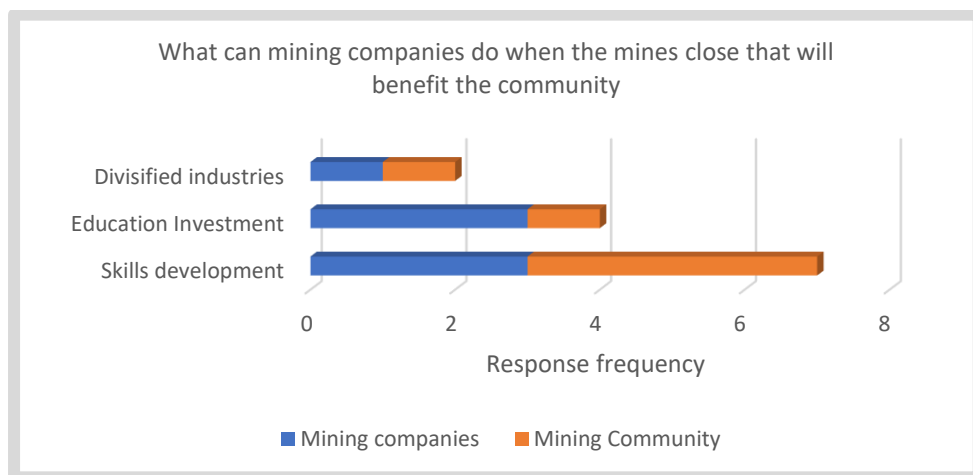


Figure 10: Comparison of mining companies and mining communities on what can mining companies do when the mines close that will benefit the community

Research Question: What are the sustainable initiatives that the mining companies can undertake during the life of the mine that will benefit the community after the mine closes?

One respondent from the mining community suggested renewable energy through solar and wind farms as well as biomass farms would enable an ecosystem that would impact the environment and community positively. The respondent from the mining company indicated that the properties that would be suitable for commercial farming activities could be redistributed to the community as an initiative that would be sustainable post mine closure.

Further to aspects that would create a level of independence from mine operations, this initiative would be able to support alternative industries.

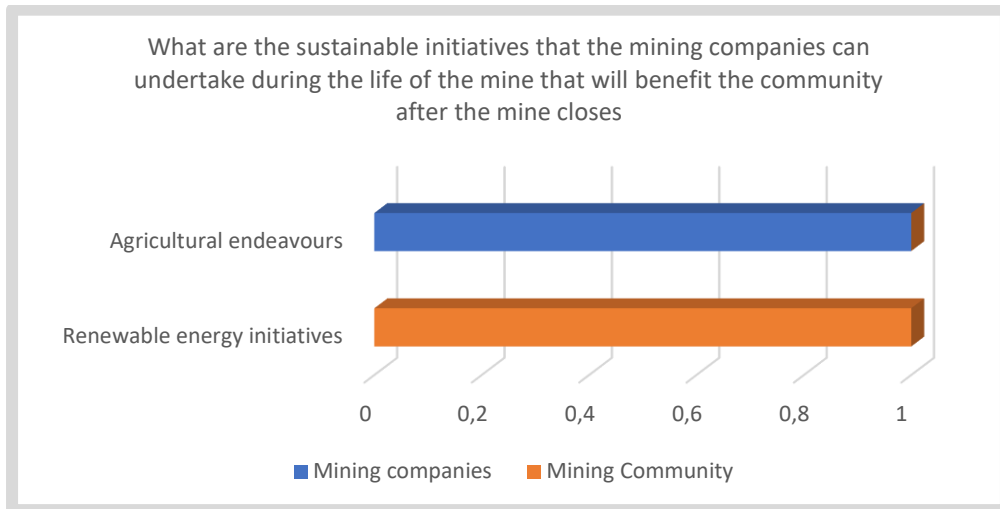


Figure 11: Comparison of mining companies and mining communities on how collaboration, engagement and community inclusion can be strengthened

5.8 Conclusion

Chapter 5 reviewed various themes resulting from the semi-structured interviews conducted with the various respondents from mining companies and mining communities including SMME mining communities. The themes were developed on the basis of the research questions covered in Chapter 3. The findings of the interviews and data collected mostly supported the literature review in Chapter 2 but also provided some further insights in relation to mining community members perception of tactics and initiatives that would be suitable within the South Africa context. The results of the study will be discussed in Chapter 6 with reference to Stakeholder Theory and Social Licence to Operate theory as described in Chapter 2.

CHAPTER 6: DISCUSSION OF RESULTS

6.1 Introduction

The research study sought to explore the socio-economic impacts of mine closure on mining communities. Chapter 5 outlined the findings obtained from mining companies and mining community members including SMME community members. The insights provided through the data collection and the findings of the study are compared to the existing literature in Chapter 2, in order to answer the research questions outlined in Chapter 3.

6.2 Discussion of results for Research Question 1

Research Question 1: How do mines and mining communities perceive the impact of mining closures?

The aim of the question was to explore the understanding of the socio-economic impacts of mine closures on mining communities from the respondent's perspectives. The research question covered aspects on the mining communities' perceptions on the impact of mine closures, the causes of the impact and what could be done by mining companies to support communities.

The data collection indicated that the community's perception of socio-economic impacts of mine closure included the loss of employment, lack of economic activity, migration and crime.

Loss of employment

The existence of mines lead to a dependency by local communities on its operations and subsequent economy. The cessation of mining operations leads to social economic challenges reflected through a loss of income that has extended consequences to mining company employees and those that depend on the operations of the mining company for survival (Bainton & Holcombe, 2018). This was supported by literature which indicated that the closure of mining operations has a negative effect on the well-being of the local community in which it operates including small businesses (Dikgwatlhe & Mulenga, 2023).

Lack of economic activity

The closure of mining operations affects the economic activity taking place in the vicinity. The economic impacts of an operational mine include upward trajectory of positive economic

metrics, the construction of educational and healthcare facilities and the opportunity for training and skills development (Worlanyo & Jianfeng, 2021). Mining closure exposes mining communities' vulnerability in relation to the reduced economic activity (Sesele et al., 2021).

Migration

The introduction of mining activities has a bearing on social factors such as migration, crime and population growth as indicated in literature by Worlanyo and Jiangfeng (2021). While mining closures result in negative socio-economic factors such as migration from the town or areas where mining operations take place (Bainton & Holcombe, 2018).

Crime

While crime was mentioned by a respondent to be a factor as a result of the introduction of mining operations, it also occurs at the end of the mine cycle. The literature was congruent with the assertion that mine closure social impacts resulting from migration included crime and conflict (Venekateswarlu et al., 2016; Worlanyo & Jiangfeng, 2021). Gender based violence was mentioned as occurring due to mine closure which is confirmed through literature indicating that women were affected by domestic violence and abuse (Sesele et al., 2021). In addition, another social issue outlined by a SMME community member respondent indicated that illegal mining also posed a risk to the community as a result of inadequate closure procedures by mines (Bester & Groenewald, 2021).

On the question of the causes of the socio-economic impact, the responses indicated three themes being, dependency on the mine for economic activity, lack of transferable skills and lack of accountability by municipalities. There was an alignment between responses and literature on the impacts on mining communities in relation to the dependency of that local economy on the mining activities (Bainton & Holcombe, 2018).

Dependency on mine for economic activity

Mine companies and mining communities both indicated that the community including SMME's dependence on the mine for economic activity put it in a vulnerable position based off mine closure. The severity of the impact is based on the degree of dependency the community has on the mine and mine's performance which would facilitate the level of support it could provide (Bainton & Holcombe, 2018).

Lack of transferable skills

Another cause identified by the respondents included the lack of transferable skills which were limited to roles within the mining operation. This would hinder the ability of SMME community

members to transfer their skills to another industry, leading to detrimental effects in the event of mine closure. The literature corresponds with the lack of transferable skills being a cause of the impact as it indicates that preparation for mine closure is rare and mining communities should be equipped with training which is interchangeable with other industries and not limited to mining (Measham et al., 2024). Some of the respondents indicated that mining companies typically focus on providing training and upskilling for areas which would be beneficial to the mine while it is still operating, and shared views that the training should be varied.

Lack of accountability by municipalities

The lack of accountability by municipalities theme was based on the responses from mining companies regarding the cause of the socio-economic impact of mine closure due to the view that municipalities hold the mandate to be able to develop the mining community in terms of infrastructure and other aspects. It is however note that there are challenges that inhibit the municipalities from performing its duties. While literature indicates that the legislation does not make provision for the role that a mining company would need to assume in relation to mining closure support (Marais & de Lange, 2021). Critically it must be noted that there seems to be a misalignment between the mining communities' expectations on mining companies and what the mining companies regard as its role in relation to maintenance and development of infrastructure. Literature highlights an aspect that was not mentioned by respondents being that the municipalities face financial challenges to be able to execute on its mandate due to disrupted collection of rates exacerbated by factors such as migration due to mine closure (Marais & de Lange, 2021). So inadvertently, while the mining companies expect that municipalities would need to support the mining community at the end of mine life cycle, the closure of mine itself could be a contributor to the municipality failure to intervene and provide support.

Skills development for preparation of mine closure

In terms of support mining companies can provide to mining communities in preparation of mine closure, respondents indicated that skills development, engagement, and implementation of SLPs as themes. In terms of skills development, there was congruence between mining companies and mining communities in terms of the importance of providing training and upskilling employees to empower them to be able to mitigate against the effects of mine closure on their employment. The literature refers to the Mining Charter and how it outlines how mining companies should invest and develop the skills of the community members (Bester & Groenewald, 2021). While this is in legislation, the literature also indicates that larger mining companies are usually in a position to facilitate training and resource development workshops (Worlanyo & Jiangfeng, 2021).

Engagement

Engagement with stakeholders would enable mining companies to support mining communities to prepare for mine closure (Fraser, 2021). Respondents indicated that the timing of this continuous engagement and consultations would be important to build relations with the mining community. The literature indicates that ongoing engagement is important for mining companies to build social capital with mining communities in preparation for mine closure (Rodriguez- Plesa et al., 2022). The mining company respondents had indicated that the inclusion of mandated personnel is key, which contrasted with the respondents that stated that there should be no liaison involved to avoid misrepresentations and misinterpretations of the wider community. Stakeholder engagement theory is premised on seeking to create value for both stakeholders and shareholders (Fraser, 2021) as well as transparency (Bainton & Holcombe, 2021). Through having multiple stakeholders engage, social capital is built which in turn fosters acceptance of the mining companies by the communities (Chipangamate et al., 2023).

Implementation of Social and Labour Plans

The implementation of SLPs was cited by mining companies and communities as being critical to mitigating the effects of mine closure (Van der Watt & Marais, 2021). The literature aligns with this assertion as the mining companies and stakeholders including the mining communities and municipalities need to collaborate to identify projects that are suitable through the SLP at an early stage (Republic of South Africa, 2018). The respondents however inferred that the essence in which mining companies approached SLPs were unaltruistic. Mining companies need to comply with obtaining mining rights by presenting an SLP (Bainton & Holcombe, 2018; Van der Watt & Marais, 2021).

Selfless investment

The respondents indicated that the investment into SLP projects by mining companies should have the essence of assisting the community beyond its own interests and tackle social issues such as poverty alleviation. Literature notes that the mining industry has been viewed as self-serving based on its own requirements (Marais & de Lange, 2021). A long-term approach needs to be adopted to support mining communities in relation to mine closure and environmental safety (Monosky & Keeling, 2021). In addition, CSR projects implemented have been identified as being ineffective in relation to sustainability due to the focus on SLO and public relations with the mining communities (Selmier & Newenham-Kahindi, 2020).

6.3 Discussion of results for Research Question 2

Research Question 2: How can mining companies build social capital during the life cycle of a mine?

The research question sought to explore the tactics that could be adopted by mining companies in order to build social capital during the life cycle of the mine. This research question would extend to the approaches in which mining companies and mining communities could collaborate and contribute during the mining operational life cycle, what additional initiatives could be implemented by mining companies, how trust could be earned, and commitment attained and finally how collaboration, engagement and inclusion be further strengthened.

Implementation of Social and Labour Plan Projects

Respondents indicated that mining companies needed to work on their social capital by engaging with communities on SLP projects that are sustainable post closure of the mine. Literature indicates that it is important for mining companies to map the process of closure out to communities at an early stage to obtain the communities views (Measham et al., 2024) and ensure communication and alignment take place with mining communities (Cole & Broadhurst, 2021). Respondents from the mining companies are of the opinion that the implementation of SLPs is not merely for public relations purposes and instead take an apprehensive view due to the level of scrutiny from the community and are then inclined to meet the minimum requirements of implementation.

Continuous engagement

Respondents were aligned on the importance of continuous engagements with both mining companies and communities. Literature also supports this view, that repetitive consultation with communities is imperative for mine closure (Sesele et al., 2021) and leads to attainment of social capital from the community (Rodriguez-Plesa et al., 2022). Respondents added that while engagement was crucial, it required representatives that would selflessly communicate the requirements of the community and there was uncertainty on whether that was taking place with community members that were engaging the mining companies representing the local community. In addition, there were concerns on whether there was any prioritisation of endeavours that that sought to promote collaboration and inclusion as this initiative was impaired by bribery and corruption.

Transparency

Transparency aligned with the engagement model where respondents indicated that to build the social capital, this trait was important. One of the respondents did indicate that mining companies differ and as such their respective approaches will be bound by policy. Literature indicates that the ideal engagement on mine closure should be centred on transparency and inclusion of local communities (Monosky & Keeling, 2021).

Upskill when mine is operational

Skills development was cited by the respondents as a tactic that mining companies could employ that would aid sustainability of the community post mine closure. Training provided to communities during the life cycle of the mine needs to be transferable and not limited to the operations of the mine in order to promote sustainability (Measham et al., 2024). The respondents did not indicate that the size of the mining operations is an important factor on the support, training and workshops that mining companies are able to provide. The literature indicates that larger mining companies are able to facilitate workshops to upskill its employees as well as agricultural farmers (Worlanyo & Jiangfeng, 2021). The respondents also indicated that it is important that the forums that represent the community in aspects of business and social aspects communicate to the mining companies this during the life cycle of the mine to ensure it is a feature on the initiatives that mining companies implement.

Education support

The respondents indicated that mining companies could do more by providing educational support that would be in synergy with skills development initiatives. Literature covers educational support during the mine life cycle prior to closure of operations (Dikgwatlhe & Mulenga, 2023) however does not make reference to the educational support that takes place post mine closure. The provision of educational infrastructure and learnerships that are diverse and not limited to only skills required for mining operations was highlighted by respondents from mining companies and communities.

More upskilling by mines

Related to educational support, respondents indicated skills development that would be supported by human resources development programs that would empower the mining companies' employees as well as community members. As preparation for mine closure is usually not in place, the provision of transferable skills by mining companies becomes important to ensure survival beyond mining operations (Measham et al., 2024).

Support municipalities

A respondent representing a mining company indicated that mining companies could support the municipalities through training on IDPs and its contents related to supporting a mining community. Legislation indicates that mines should collaborate with municipalities and communities on matters relating to mine closure and align on SLP projects to be implemented (Republic of South Africa, 2018) while literature indicates that there should be alignment between the mining company and the municipality on SLPs (Van der Watt & Marais, 2021).

Going beyond Social and Labour Plan

A respondent indicated that the compliance factor of only adhering to the implementation of SLPs would not be deemed to be sufficient but rather the mining company would need to embark on initiatives that were purposeful for the community. This sentiment is supported by literature through stakeholder engagement theory where it is assumed that corporations consider the interests of its stakeholders comprehensively and not based off legal, economic, and ethical lens (Tang et al., 2020).

Commitment to execute on promises

The respondents indicated that communication and execution was important in building trust between mining companies and communities. This perception centres on building social capital which is premised on building trust and providing beneficial support to the community that is sustainable within a mining closure environment (Rodriguez-Plesa et al., 2022). The ability of the mining companies to collaborate, cooperate and have a mutually beneficial relationship with communities while delivering on its undertakings would bode well for building social capital (Andriani & Christoforau, 2016).

Active engagement

Active engagement was a theme from the responses from both mining companies and communities as being a contributor to trust. This is supported by the literature which indicates that stakeholder engagement results in benefits such as trust from stakeholders and other intangible ones such as social licence to operate specifically where there is mine closure (Bainton & Holcombe, 2021; Chipangamate et al., 2023).

Transparency to gain trust and commitment

Transparency was aligned with the engagement model where respondents indicated that in order to build the social capital, this trait was important. One of the respondents from the mining company indicated that South Africa has a complicated history of apartheid and in

order to obtain a social licence to operate within a community, it was important that the mining company takes ownership of its historic role. While literature does not make reference to this specific engagement model, it does indicate that due to the complex nature of the country's history and the segregation that transpired, including exclusion from mining industry benefits, it would be important to prioritise initiatives that would foster collaboration and inclusion between mining companies, government and communities (Van der Watt & Marais, 2021).

Enhanced communication with government

The respondents indicated there was a need to support government in align strategies on mine closure that would contribute towards strengthening collaboration, engagement, and community inclusion. This was supported by further views that the successful implementation of IDPs required collaboration with mining companies while one of respondents indicated that enhanced communication and transparency would be critical. The legislation through the Mine Charter confirms the same regarding collaboration and inclusion for community projects to be adopted onto the SLP and IDPs (Republic of South Africa, 2018). Literature leans into collaboration and alignment between mining companies and government on SLPs with the existing IDP drawn up by municipalities (Van der Watt & Marais, 2021).

Continuous social audit

One of the respondents indicated that mining companies should adopt self-monitoring concurrently with community engagement to apply to social audits to assess performance against the community's expectations. The literature indicates that there are several social impact frameworks that can be used to mitigate against the negative impacts of mine closure (Andriani & Christoforau, 2016), however it does not explicitly reference social audits which is within the concept of assessment and monitoring to ensure that mining company are keeping abreast of their undertakings. The transparency and engagement of communities are an approach which is typically adopted to build social capital (Monosky & Keeling, 2021).

Appointment of effective community representatives

A community member respondent indicated that the engagement and collaboration efforts benefit the community where its representatives are solely focused on the interests of the community. Inclusivity is important in the mine closure process including the planning around the environmental and social impact (Sesele et al., 2021). The literature does not specifically reference the criteria in which representatives of the community would be engaging the mining companies and other stakeholders. It is worth noting that it is assumed that the engagement with the community is inclusive and transparent.

6.4 Discussion of results for Research Question 3

Research Question 3: How can mining companies build social capital at the end of the mine life cycle towards benefitting local communities post mine closure?

The research question sought to explore the initiatives that mining companies could adopt that would build social capital at the end of the mine life cycle. The responses provided insights into what mining companies could undertake as initiatives when the mine closes that would benefit the community as well as sustainable initiatives that could be adopted during the life of the mine that would still benefit the community after the mine closes.

Skills development at mine closure

Multiple respondents indicated that skills development was a crucial aspect where mining companies could support alternative skills that went beyond mining and independent of the mining operations. This initiative as confirmed by one respondent would relate to mining company's employees as well as community members where it would facilitate future earning opportunities when the mine life cycle ended. Worlanyo and Jiangfeng (2021) supports the assertion that the presence of mining companies has economical consequences that include training and skills that can support mining communities after mine closure.

Education investment

A respondent indicated that mining companies should invest in a specialised artisanal school that would equip its attendees with skills that could be used post mine closure. Furthermore, they indicated that the bursaries that were being offered by mining companies could be augmented with transferable skills that would ensure sustainability for the community from a human resource development perspective. While there is no specific literature to educational infrastructure in the study, it is important to note that mine closure could potentially have an adverse impact on the education infrastructure post mine closure in the event that municipalities are unable to also play a role in its maintenance.

Diversified industries

One respondent indicated that mining companies could support the community to embrace diversified industries through incubation hubs that assist the community members to shift from the mining industry. While this suggestion by the respondent was not directly in the literature for the study and would require a multistakeholder collaboration as government support would also be required and an assessment on the viability as each mining community and area would

be distinct and possibly dissimilar from each other. Literature does suggest that the mineral extraction from mining contributes to the inputs of clean energy, including solar panels, wind turbines and should have ideally contributed to the development of communities (Buhmann, 2023).

Renewable energy initiatives

One respondent indicated that a sustainable initiative that could be undertaken by mining companies could be utilising the existing land owned by mining companies to build an economical ecosystem through investment in wind, solar and biomass farms that would drive economic activity for the community.

Agricultural endeavours

Another respondent stated that this existing land could be repurposed for agriculture. This initiative would support the community in the absence of the mining activities post closure. Literature indicates that larger mining organisations can provide additional support to communities through workshops and training for agricultural farmers (Worlanyo & Jiangfeng, 2021).

CHAPTER 7: CONCLUSIONS AND RECOMMENDATIONS

7.1 Introduction

This chapter seeks to consolidate the findings identified in Chapter 5 and explored in Chapter 6 to align the purpose of the study as outlined in Chapter 1. The insights into the perception of the impact of mining closure and tactics that can be adopted by mining companies to build social capital during and end of the mine life cycle. Recommendations are made to the mining industry, topics for future research are proposed and the limitations of the study are discussed.

7.2 Principal findings

7.2.1 The perceived impact of mine closure

This study found that while mining typically contributed positively to a country's economy, both mining companies and mining communities had negative perceptions of the impact of mine closure on communities.

The closure of mining operations had an adverse socio-economic impact on communities through the loss of employment of mine workers and by extension the community (Dikgwatlhe & Mulenga, 2023), resulting in an increased migrations from the mining community, increased cases of crime and a reduced employment prospect (Worlanyo & Jiangfeng, 2021). There are socio-economic challenges that transpire when there is mine closure primarily the loss of income contributes to the unemployment in the community (Worlanyo & Jiangfeng, 2021). This further results in migration from the community as mine employees, their families and other community members impacted seek alternatives to supplement the loss of income which in turn has further consequences such as the abandonment of the community infrastructure (Bester & Groenewald, 2021).

The closure of mines where a community is already vulnerable based on its dependence on the mine for economic activity, exacerbates the impact (Sesele et al., 2021). Crime including domestic violence where women are victims was identified as an impact of mine closure (Venkateswarlu et al., 2016; Worlanyo & Jiangfeng, 2021; Sesele et al., 2021).

While there are several social economic factors in the country that impact communities such as corruption, crime, poor service delivery, the study focused on those attributable to mine closure.

7.2.2 The perceived cause of the impact

The study found that the perceived causes of the impact were the community's dependence on the mine for economic activity, the lack of transferable skills within the community and a lack of accountability by local municipalities.

The existence of mines leads to an economic dependency by the local community which upon mine closure causes a severe impact on communities (Bainton & Holcombe, 2018). The absence of alternative skills beyond those of the mine increases this compromised position of the community as mine closure has a negative impact on transferability of skills (Measham et al., 2024).

The perceived lack of accountability by municipalities is possibly caused by the limited understanding of the challenges faced by municipalities in relation to collection of rates and migration (Marais & de Lange, 2021).

The study found that to be able to empower mining communities prior to mine closure, skills development was critical. The Mining Charter as legislation covers this aspect as it outlines the mining companies' participation and role in the investment and development of skills for community members (Worlanyo & Jiangfeng, 2021).

Continuous stakeholder engagement was identified as important to the preparations of mine closure as well as being a key factor in building relations with mining communities (Fraser, 2021, Rodriguez-Plesa et al., 2022). The framework of SLPs in essence are a collaborative effort between mining companies and mining communities and the study found that while they also played an important aspect on building relations (Bainton & Holcombe, 2018), the mining communities' perception was that mining companies were not altruistic in their approach. The expectation from mining communities was that mining companies should provide investments into the community beyond its own interests, and this would align with SLO principles.

7.2.3 Social capital during the life cycle of a mine

The study found that some of the fundamentals in seeking to address the impacts of post mine closure include the engagement with mining communities on the implementation of SLPs. The study found that in certain cases the mining companies sought to implement the bare minimum within the SLPs based on the level of scrutiny. Mining companies should ideally engage communities at an early stage on SLPs to garner the communities' views (Measham et al., 2024). The ability to build social capital also hinged on the mining companies' ability to demonstrate their commitment beyond self-interest and compliance to an SLP. This forms the

basis of stakeholder theory where the interests of all other stakeholder are considered in an altruistic manner (Tang et al., 2020).

The study found that aligned to stakeholder engagement was transparency which fosters the social capital required, as inclusion of local communities was important (Monosky & Keeling, 2021).

The results from the study indicated that there was a need for skills development to be a tactic utilised by mining companies looking at sustainable human resources development of the community post mine closure (Measham et al., 2024). Transferable skills were dominate as suggested solution to empower mining communities post mine closure and should be initiated during the operational life cycle of the mine.

Educational support was identified as an area in which mining companies could support the skill development initiative that would enable communities to have employment opportunities outside mining operations. Currently the study outlined that educational support was prevalent during the life cycle of the mines prior to closure (Dikgwatlhe & Mulenga, 2023), and there is scope to explore educational support that takes place post mine closure.

The study found that there was a need to provide support to municipalities through training and engagement on IDPs and SLPs to ensure alignment on the support required by mining communities (Van der Watt & Marais, 2021). Additionally, it also found that the ability to build social capital through collaboration and cooperation should be mutually beneficial (Andriani & Christoforau, 2016). Supporting this relationship with government and strategising on the tactics on mine closure would be beneficial in strengthening community inclusion (Van der Watt & Marais, 2021).

Embedded into social capital was the need to build trust and commitment from mining communities and the study found that that transparency was a critical factor for both mining companies and mining communities where the country experienced a complicated history.

The study found that social audits conducted by both mining companies and communities would foster transparency and alignment and further studies can be explored on their construct and impact as a preemptive measure on the success of SLPs.

Effective community representation was cited as a tactic that mining companies could adopt to strengthen collaboration, engagement, and inclusion of community. While inclusion is also an important aspect to planning around mine closure (Sesele, et al., 2021), the literature did not infer that representation of the community needs to independent of self-interest during engagements with mining industry stakeholders.

7.2.4 Social capital at the end of mine life cycle that benefits communities post closure

The study found that skills development was a reoccurring aspect in relation to additional support that mining companies could provide as well as building social capital during life cycle of mine and post closure.

The provision of training and skills development by mining companies to communities would ensure that the community is able to leverage alternative industries for survival (Measham et al., 2024).

The study revealed that educational investment in institutions that provided an array of skills beyond mining would support the skill development initiative that mining companies could adopt. This could be supported with the existing initiatives where mining companies were already providing bursaries (Dikgwatlhe & Mulenga, 2023).

The study also revealed that incubation hubs could be an alternative initiative that would support educational support and skills development and could be further explored as an initiative that could mitigate the effects of mine closure on communities.

Figure 12 below illustrates the framework of socio-economic impacts of mine closure.

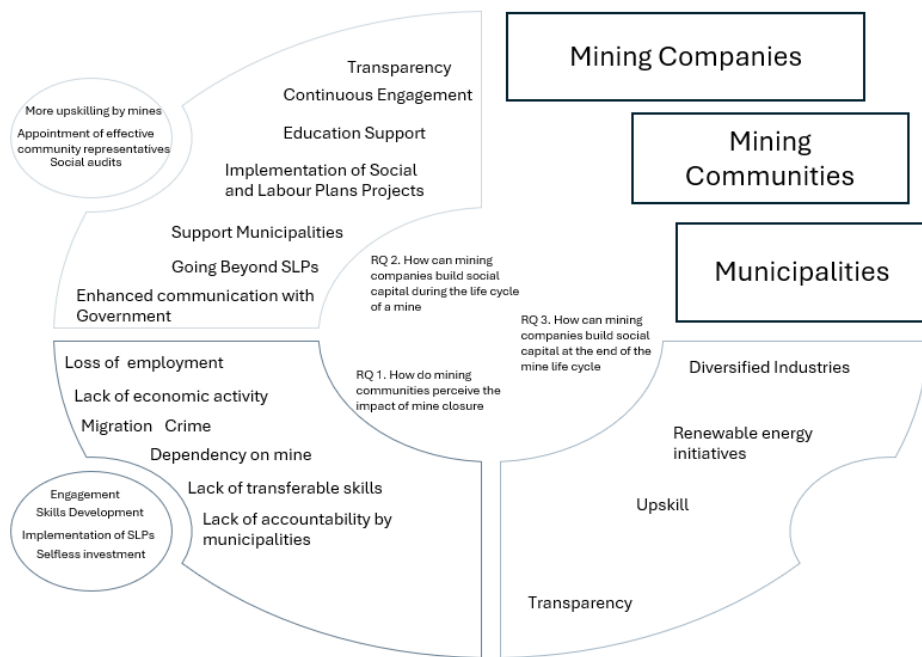


Figure 11: Socio-economic impact of mine closure framework

7.3 Recommendations

It is important to foster an inclusive, collaborative, and transparent environment for mining companies to minimise the impact of mine closure on mining communities. It is important from a South African perspective for mining companies to acknowledge the inherent challenges that exist within communities and ensure the continuous engagement with the community takes place that will increase awareness of mine closure, the drivers and initiatives that the mines can undertake to support the community. Furthermore, regular multistakeholder engagements with DMRE, the municipalities and the communities can create an environment where each stakeholder's challenges are discussed and concessions on the way forward can be made. To foster human resources development initiatives, skills development is crucial prior to mine closure and should be supported by educational infrastructure that extends to incubation hubs that promote alternative industries from mining.

7.4 Limitations

The research study is qualitative and is primarily subjective. As such the research is prone to bias from the researcher and the respondents (Gibbs, 2012). The limitations of the research study include the following:

- Despite reaching saturation, the sample size could be considered small in the context that there are several mining communities, and each could potentially have nuanced experiences.
- The semi-structured interviews contained elements of response bias as some of the mining company respondents exhibited apprehension towards the mining communities' expectations and their responses would gravitate towards providing responses that positively reflect efforts made by the mining companies.
- The researcher's lack of formal training in conducting semi-structured interviews and techniques could have impacted the data collection approach.
- Due to limited experience in thematic analysis, there may be an impact on the resultant quality of the codes and themes developed.
- The DMRE was unable to respond timeously for the researcher to conduct interviews with subject matter representatives who would provide insights to the study on the regulator's perception of socio-economic impacts on mine closures as well as how

mining companies collaborate with mining communities. This limitation affected the ability to obtain triangulation for the study.

- The study was cross sectional based on the constraints of time and as such the analysis was restricted to a specific time frame whereas a longitudinal study would provide insights over a longer period of time to assess the impacts of mine closure and contrast different responses from respondents associated with mining companies during the life cycle of the mine.

7.5 Recommendations for future research

The following suggestions for future research would add value to existing literature:

- The current study provides an opportunity for a future longitudinal study that assess sustainable initiatives adopted across various geographies to support mining communities for mine closure.
- Based on the limitations of obtaining the DMRE's insights, these would be useful to have a triangulated study that includes the regulator's views based on current legislation.
- Further research can be explored on the feasibility of incubation hubs sponsored by mining companies in supporting mining communities' survival beyond mine closure.
- The relationship between artisanal mining and mine closures

7.6 Conclusion

The literature indicated that there are negative impacts of mine closure on mining communities. Considering the challenges the country faces in relation to unemployment, poverty and inequality, the study was able to provide insights on the issues that influence mine closure and the local mining communities' perception of those impacts. Furthermore it explored the tactics that mining companies could adopt to ensure they build social capital with the local mining communities including SMMEs during the life cycle of the mine as well as at closure. The mining companies' relationships and collaboration with its stakeholders was identified as an important factor that would ensure that communities would be able to sustain themselves post mine closure.

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9. APPENDICES

Appendix A: Consistency matrix

TITLE: Socio-economic impacts of mine closure on communities

RESEARCH QUESTIONS	SECTIONS IN LITERATURE REVIEW	DATA COLLECTION TOOLS	ANALYSIS TECHNIQUE
Question 1. What is the regulator's perception of socio-economic impacts of mine closures in South Africa?	Monosky & Keeling, 2021	Interview question 1.1-1.4	Content analysis on open ended questions to determine range of options and how they are used
Question 2. How do mines and mining communities perceive the impact of mine closures?	Cesar & Jhony, 2020	Interview questions 2.1-2.2	Content analysis on open ended questions to determine range of options and how they are used
Question 3. How can mining companies build social capital during the life cycle of a mine?	Cesar & Jhony, 2020	Interview questions 3.1-3.3	Content analysis on open ended questions to determine range of options and how they are used
Question 4. How can mining companies build social capital at the end of the mine life cycle towards benefiting the local communities post mine closure?	Cesar & Jhony, 2020	Interview questions 4.1-4.2	Content analysis on open ended questions to determine range of options and how they are used

Appendix B: Interview Guide

Participant Number:

Start time:

Date:

End time:

Representative:

Department/ Community area:

Thank you for agreeing to participate in the interview. I appreciate your input into my MBA research study.

My research is on the socio-economic impacts of mine closure on communities. The aim is to understand the regulators perception of these impacts in South African mining communities, communities' perceptions of impact of mine closures, mining companies' approach and tactics to building social capital during the life cycle of a mine and the end of the mine life cycle towards benefitting local communities post mine closure.

The information from this interview will be kept confidential and I would encourage you to speak freely. Your identity and your company will not be recorded. There are 14 questions, and the interview will take 30-45 minutes.

Please sign the consent form and confirm that I can proceed with recording the interview.

1. HOW DO MINES AND MINING COMMUNITIES PERCEIVE THE IMPACT OF MINING CLOSURE?	
1.1	What do the communities perceive to be the impact of mine closure?
1.2	What does the community think is causing this impact?
1.3	What are the drivers of the socio-economic impact of mine closures?
1.4	What can mining companies do to support communities in preparation for mine closure?
2. HOW CAN MINING COMPANIES BUILD SOCIAL CAPITAL DURING THE LIFE CYCLE OF A MINE	
2.1	How do mining companies contribute and collaborate with mining communities when the mine is operational
2.2	What more can be done by the mining companies to minimize the risk to communities regarding mine closure?
2.3	What can mining companies do to gain the trust and commitment from community members?
2.4	How can collaboration, engagement and community inclusion be strengthened?
3. HOW CAN MINING COMPANIES BUILD SOCIAL CAPITAL AT THE END OF THE MINE LIFE CYCLE TOWARDS BENEFITTING LOCAL COMMUNITIES POST MINE CLOSURE	
3.1	What can mining companies do when the mines close that will benefit the community for their sustainability?
3.2	What are the sustainable initiatives that the mining companies can undertake during the life of the mine that will still benefit the community after the mine closes?

Appendix C: Consent Letter

Researcher's name: Donald Gaetsewe

Student Number: 23991977

Dear Participant,

I am a final year candidate in the Master of Business Administration (MBA) programme at GIBS, Department of Business Management, University of Pretoria. You are herewith invited to volunteer to participate in my research project, through an interview process, on **the socio-economic impacts of mine closure.**

The purpose of the study is to explore the socio-economic impacts on a mining community and understand the social effects of mine closure and how mining companies can reduce social conflict and build social capital.

The interview involves answering questions to get your inputs. Please feel free to use your knowledge, experiences and opinions to shed light on the topic under investigation. I would appreciate your participation in this study.

Your participation is voluntary and you can withdraw at any time without penalty.

There are 11 questions. Completing the interview should take 35-45 minutes to an hour. Our interview can be via Zoom meeting/ Google meet/ MSTeams meeting or face-to-face, depending on the approach that suits you best.

Please note, that all information shared by yourself, as a respondent, will be protected, and only aggregated information, per stakeholder grouping, will be provided in this study. The data will be collated from a number of individuals, for the purposes of identifying patterns. Your anonymity will be maintained.

By signing below, you consent to participation.

If you have any concerns, please contact my supervisor or me. Our details are provided below.

Researcher name Donald Gaetsewe
Email 23991977@mygibs.co.za
Phone 0845859144

Research Supervision name Dr Sherin Ramparsad
Email sherin.ramparsad@gmail.com
Phone 0649080043

Signature of participant _____

Date _____

Signature of researcher _____

Date _____

We sincerely appreciate your participation.

Appendix D: List of codes

Research Question 1 – Codes

Themes	Codes
Lack of employment	Employment implications Vulnerability
Lack of economic activity	Economic impacts Knowledge gap between mines and community
Migration	Social impact Migration
Crime	Social ills
Dependency on mine for economic activity	Dependency
Lack of transferable skills	Lack of benefits from mine Skills development Independence from mine
Lack of accountability by municipalities	Roles and responsibilities Evasion of responsibilities
Skills development	Benefits from mine Independence from mine
Engagement	Stakeholder engagement Engagement
Implementation of SLPs	Social and Labour Plans Compliance considerations
Selfless Investment	Altruistic Independence from mine Social capital Social licence to operate Will to aid

Research Question 2 – Codes

Themes	Codes
Implementation of SLPs	Social and Labour Plans Compliance considerations
Continuous engagement	Engagement Stakeholder engagement
Transparency	Transparency Self-serving Awareness
Upskill	Skills development
Education support	Independence from mine Benefits from mine
Support municipalities	Stakeholder engagement Inclusion
Going beyond SLPs	Independence from mine Social and Labour Plan Stakeholder engagement
Commitment to execute on promises	Trust

Active engagement	Stakeholder engagement Engagement
Enhanced communication with Government	Roles and responsibilities Trust Dealing with mine closure
Continuous social audit	Social audit Social capital Transparency Engagement
Appointment of effective community representatives	Trust Empowerment Extortion

Research Question 3 – Codes

Themes	Codes
Skills development	Skills development Dealing with mine closure
Education investment	Independence from mine Benefits from mine
Diversified industries	Diversify Benefits with mine Dealing with mine closure Independence from mine
Renewable energy initiatives	Will to aid
Agricultural endeavours	Diversify Independence from mine