COMPARING SUSTAINABILITY REPORTING IN SOUTH AFRICA'S COAL MINING SECTOR: JSE-LISTED VS. NON-LISTED MINES

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ABSTRACT

Sustainability reporting is essential for corporate accountability and transparency, particularly in the coal mining sector, due to its environmental and societal impacts. This study examines the differences in sustainability reporting between JSE-listed and non-listed coal mining companies, focusing on the Mpumalanga region. It explores whether reporting is genuinely driving sustainability for local stakeholders or merely serving as a tool to attract investors. Additionally, the study investigates the driving factors behind reporting, the frameworks used, and how it has evolved over time. Using qualitative content analysis, the study compares the environmental and social topics reported by each selected mining company against the Global Reporting Index (GRI) standard. The findings reveal significant disparities in reporting transparency and accountability between selected listed and non-listed firms. JSE-listed companies produce formal, detailed sustainability reports that exceed regulatory requirements, often incorporating frameworks and standards such as GRI, Task Force on Climate-related Financial Disclosures (TCFD) and The Sustainability Accounting Standards Board (SASB). In contrast, non-listed companies provide less formal and inconsistent reporting, focusing mainly on regulatory compliance. The study highlights the need for stronger regulatory enforcement and the integration of sustainability reporting with financial reporting, particularly in the non-listed entities, to enhance corporate accountability and address social and environmental challenges in the coal mining sector.

KEY WORDS: Corporate Social Responsibility theory (CSR), Environmental Social and Governance (ESG), Global Reporting Index (GRI), Climate Change, Johannesburg Stock Exchange (JSE), Sustainability reporting, Triple Bottom Line (TBL).

DECLARATION

I, _____Luyanda Mthethwa_____, declare that this research report is my own work except as indicated in the references and acknowledgements. It is submitted in partial fulfilment of the requirements for the degree of Master of Management in Energy Leadership at the University of the Witwatersrand, Johannesburg. It has not been submitted before for any degree or examination in this or any other university.

Name: Luyanda Mthethwa Signature: 

Signed at …….Johannesburg……

On the ……26…….... day of ……February……2025….

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To my mom, dad, sister, brother, and my extended family: thank you for your unwavering love, prayers, and constant support throughout this journey.

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LIST OF ACRONYMS AND ABBREVIATIONS

GRI - Global Reporting Initiative

SASB - Sustainability Accounting Standards Board

TCFD - Task Force on Climate-related Financial Disclosures

JSE - Johannesburg Stock Exchange

ICMM - International Council on Mining and Metals

SDGs - Sustainable Development Goals

IFC - International Finance Corporation

ESG - Environmental, Social, and Governance

GAAP - Generally Accepted Accounting Principles

IFRS - International Financial Reporting Standards

IIRC - International Integrated Reporting Council

PCC - Presidential Climate Commission

NEMA - National Environmental Management Act

MHSA - Mine Health and Safety Act

MPRDA - Mineral and Petroleum Resources Development Act

BBE - Broad-Based Economic

CDP - Carbon Disclosure Project

ISSB - International Sustainability Standards Board

SLP - Social Labour Plan

ESD - Enterprise and Supplier Development

DFFE - Department of Forestry, Fisheries and the Environment

BUSA - Business Unity South Africa

NWA - National Water Act

CHAPTER 1: INTRODUCTION

1.1 Purpose of the study

The main purpose of this study is to assess the differences in sustainability reporting between the Johannesburg Stock Exchange (JSE) listed and non-listed coal mining companies in South Africa, focusing in the Mpumalanga region. This was done by reviewing the different sustainability reporting practices utilised by selected mining companies to determine the driving force behind sustainable reporting, framework used in reporting, as well as assessing the evolution of sustainable reporting.

1.2 Context of the study

The “Business as Usual” concept is being fundamentally challenged as sustainability reporting becomes an increasingly critical aspect of corporate accountability and transparency. Sustainability reporting plays a crucial role in fostering the long-term resilience and viability of economies, society, and the environment (Maubane et al., 2014). To ensure harmony between these dimensions, the Paris Agreement, the millennium development goals (MDGs), and the sustainable development goals (SDGs) were developed (United Nations, 2023). Ahmad et al. (2024) asserts that the adoption of these goals has led to changes in sustainability reporting practices, particularly concerning the environmental, social, and governance (ESG) factors across several industries. Consequently, countries have begun to enact stricter environmental regulations upon corporations, leading to a shift in ESG reporting practices (Ahmad et al., 2024)

Coal mining and beneficiation industries are no exception. These industries have also increased their focus on sustainability reporting in response to global developments. This shift is driven by the sector's extensive environmental impact, high carbon output, and increasing pressure from domestic and international communities advocating for a transition to low-carbon technologies (Shilongo, 2023). As a result, Memela (2020) argues that these mining companies have

significantly contributed to the local and international development of the sustainability reporting movement, thus leading to its widespread adoption and evolution over time.

In South Africa particularly, these developments in the ESG reporting systems are further influenced by the JSE requirements for listed companies. As noted by Shilongo (2023), the JSE mandates listed companies to publish sustainability reports as a standalone or part of integrated financial documents. These reports ought to be accessible to all interested parties such as current and potential investors and local communities. The rise in investor expectations for organisations to disclose their ESG policies contributes to this phenomenon (Shilongo, 2023). However, it is observed that similar reporting requirements for non-listed companies are limited. For example, non-listed companies may choose to voluntarily adopt sustainability reporting approaches to demonstrate their commitment to environmental, social, and governance responsibility. However, this is not always the case. Agag and Alghamdi (2023) noted that stakeholder expectations, regulatory frameworks, and the voluntary nature of sustainability reporting contribute to the discrepancies in reporting practices between JSE-listed and non-listed coal mining businesses.

Furthermore, in South Africa, reporting in the mining industry is mandated by various legislations such as the National Environmental Management Act (NEMA, Act 107 of 1998), the National Water Act (NWA, Act 36 of 1998), Mine Health and Safety Act (MHSA, Act 29 of 1996) and municipal by-laws in areas where these activities are being undertaken. The “licences to mine” obtained from these legislations detail the frequency of reporting, what to report, and to which stakeholders (South African Government, 2002; South African Government, 2024). These regulations typically underpin reporting for non-listed companies, which is also applicable to listed companies.

1.3 Research problem

Despite its significant contribution towards addressing the country's socio-economic disparities, South Africa's coal mining industry is facing increased scrutiny due to various issues, including environmental concerns such as air quality, climate change, water pollution, biodiversity degradation, etc. This has resulted in reduced investment from both domestic and global banking sectors (Erasmus, 2022). Moreover, Gorman (2024) states that 80% of international investors consider a company's carbon footprint reporting and commitment to reducing greenhouse gases (GHGs) when making new investments. It is as such that transparency in a company's plans to reduce emissions may attract more investments, making sustainability reporting practices in the coal industry a strategic necessity for securing financial support. The JSE listing further plays a crucial role in facilitating private investment in coal mining in South Africa. While this facilitation can be beneficial, it can also lead to companies using sustainability reporting to boost profits and investor confidence rather than to address genuine sustainability concerns.

Secondly, as sustainability reporting is currently highly voluntary, non-listed mining entities may conceal their environmental and social impacts from interested and affected parties. This makes it harder for the government, non-governmental organisations (NGOs), or local communities to hold these companies accountable. Furthermore, mining corporations face challenges with sustainability reporting due to diverse frameworks, standards, and listing techniques that cater to different stakeholders. This can make sustainability reporting difficult and expensive to execute, especially for smaller mining companies (Maubane et al., 2014).

Lastly, as mentioned above, only legislation guides reporting of non-listed coal companies, particularly on environmental and social issues. As a result, non-listed companies may align their sustainability reporting efforts with their licences and permits to ensure they retain their environmental and social rights to operate (Asnani, 2022; Ahmad et al., 2024). These dissimilarities raise the need to investigate whether legislation is indeed sufficient to regulate non-listed coal mining

companies to report their ESG standings. Several studies have evaluated sustainability practices among listed companies (Nelson, 2017; Maubane et al., 2014; Gorman, 2024; Ahmad et al., 2024). However, limited research has contrasted the differences between listed and non-listed company reports. This is despite non-listed companies accounting for a significant portion of economic activity in most countries. They differ from listed companies in terms of stakeholder groups, ownership structure, financial strategies, and utility functions, which may lead to different motivations and practices regarding sustainability reporting (Chi et al., 2020). This observation necessitates the need for further studies to understand the existing differences between the requirements for listed versus non-listed industries in coal mining.

1.4 Research aim and objectives

The aim of this study is to investigate the differences in sustainability reporting between JSE-listed and non-listed coal mining companies, as well as the effectiveness of this reporting. To achieve this aim, the following objectives have been developed:

1. To investigate the types of reporting conducted by JSE-listed versus non-listed coal mining companies in South Africa
2. To identify the driving factors for sustainability reporting.
3. To assess the evolution of sustainability reporting in coal mining.

1.5 Significance of the study

The mining sector in Witbank, Mpumalanga Province, has significantly contributed to the country's socio-economic growth. However, it has also led to adverse effects such as environmental degradation and social unrest driven by mining activities (Younger, 2004; Weiersbye and Witkowski, 2007; Winker, 2023). The environmental and social issues caused by mining activities in Mpumalanga are not unique, thus driving the need for transparency and openness in addressing these challenges. Globally, there is a rise in demand for sustainability reporting and

climate disclosure. A multitude of frameworks and standards are being formulated and perpetually refined to tackle these issues, rendering this research exceptionally pertinent to contemporary developments and a swiftly evolving industry. Additionally, this research sheds light on whether South African legal frameworks are sufficient to ensure companies, especially those not listed on the JSE, to report on their sustainability impacts.

The research can yield benefits for a variety of stakeholders, including the following:

- The investment community: those who are using sustainability reports as a way of making financial decisions.
- The mining industry: those responsible for decision-making and those responsible for sustainability reporting practices in organisations.
- Wider society: interested and affected parties such as NGOs, government organisations, mining communities, and civil societies.
- Policymakers: to ensure that sustainability policies drive reporting that is fair and accurate, with the right intentions.
- The academic society: researchers, academics, and practitioners with an interest in the field and scholarly study of sustainability and its associated activities.

1.6 Delimitations of the study

This research study compares the sustainability reporting of six coal mining-related companies operating in the Highveld area of Mpumalanga, which is declared a high-priority area in terms of air quality management regulatory frameworks in South Africa. For comparability and to assess the evolution of reporting over time, reports from 2021–2023 found on companies' websites were evaluated. The study focused only on coal mining-related companies due to the intense scrutiny surrounding their environmental impacts and negative contribution towards climate change. A total of six mining companies were selected, three of which are JSE-listed, while the other three are non-listed. The research examined the content of sustainability reports,

focusing on key environmental and social elements only, as these elements can be argued to have the biggest impacts on communities.

1.7 Definition of terms

- Disclosure and Transparency: The act of making important company information available and understandable to stakeholders, enhancing accountability and trust.
- Environmental, Social, and Governance (ESG): Criteria used to evaluate a company's operations and potential sustainability impact, including environmental stewardship, social responsibility, and governance practices.
- Johannesburg Stock Exchange (JSE): South African stock exchange that facilitates the listing and trading of securities.
- Materiality: The threshold at which certain sustainability issues are significant enough to influence the decisions of stakeholders and warrant inclusion in sustainability reporting.
- Stakeholders: Individuals or groups impacted by or having an interest in a company’s activities, including employees, investors, customers, and communities.
- Sustainability: The practice of managing resources to meet current needs without compromising future generations' ability to meet their own needs.
- Sustainability frameworks: A comprehensive approach that guides organisations, communities, and individuals in achieving sustainable development. It typically includes a set of principles, goals, and indicators that help assess and monitor progress towards sustainability.
- Sustainability reporting: The process of communicating an organisation's environmental, social, and governance (ESG) performance to stakeholders.

1.8 Assumptions

- Materiality: Assumes that mining companies report on sustainability issues that are most significant to their operations and stakeholders.
- Comparability: Assumes that sustainability reports from different mining companies can be compared. This is critical for benchmarking and assessing performance across the industry, but in practice, varying reporting standards and frameworks can challenge comparability.
- Continuity and Consistency: Assumes that mining companies maintain consistent methodologies in their sustainability reporting over time, which is crucial for tracking progress and trends.
- Transparency and Disclosure: Assumes that companies aim to be transparent in their sustainability reporting.
- Impact of Reporting: Assumes that sustainability reporting has an impact on corporate behaviour and performance, as well as on external perceptions and actions by stakeholders.

1.9 Structure of the report

The research study contains five chapters. *Chapter 1* introduces the research context, problem statement, objectives, scope, and assumptions. *Chapter 2* contains a literature appraisal which explores the global landscape of sustainability reporting, with a specific focus on the local and international mining industry. The chapter also covers the evolution of reporting practices, motivations behind reporting, various reporting formats, JSE listing requirements, and introduces the theoretical frameworks that support sustainability reporting. *Chapter 3* outlines the research methodology, which details data collection methods, analysis techniques, sampling procedures, and study limitations. *Chapter 4* presents the research findings, divided into Part A, which examines environmental reporting for both listed and non-listed companies, and Part B, which addresses social topics. Lastly, *chapter 5* provides a discussion of the results, while *Chapter 6* concludes the report with recommendations.

CHAPTER 2: LITERATURE REVIEW

This chapter provides an appraisal of the literature related to sustainability reporting. It discusses the origins and types of sustainability reporting as well as their respective frameworks. Additionally, it offers an overview of the JSE's few listing requirements related to sustainability. The chapter also examines global drivers of sustainability reporting in the mining sector and traces the evolution of reporting practices over time. Finally, it delves into key sustainability theories relevant to this study, including stakeholder theory, the triple bottom line theory, and corporate social responsibility theory.

2.1 Sustainability reporting

A sustainability report is a document compiled by corporate companies to disclose the environmental, social, and governance (ESG) performance of their operations (KPMG, 2023). According to Kiesel et al. (2020), a sustainability report aims to facilitate a clearer understanding for recipients such as customers, regulators, supply chain partners, employees, and investors regarding the effects of a company's business operations on the environment and society. In this study, the words "sustainability reporting" and "sustainability disclosure" are used synonymously to denote the publication of sustainability information by corporations through any means.

In the mining sector, sustainable practices are essential for resource protection and future growth, as irresponsible mining can negatively impact society, the environment, and the economy. Sustainability reporting promotes responsible mining by highlighting the effects of certain negative mining activities and raising awareness on these issues. Veale (2008) emphasises that understanding these effects can help management improve operational practices, thus reducing the impact on the environment. For example, Eagleton (2014) asserts that effective reporting enhances risk management and identifies opportunities for improvements

such as water treatment initiatives and hybrid electricity generation projects, leading to better resource management and reduced consumption. The JSE (2022) alludes to the fact that the efficiency of the organisation's reporting procedures and the level of detail in disclosures significantly impact the realisation of these benefits. However, critics argue that sustainability reports can be superficial, serving more as public relations strategy than genuinely addressing underlying issues (Boiral, 2013). Boiral (2013) further highlights that these reports often lack transparency and accountability, making it difficult to assess their true impact. For example, without rigorous standards, reports might fail to drive meaningful changes, allowing harmful practices to continue under the guise of sustainability.

Non-listed companies usually embark on what are called “voluntary disclosures,” which generally refer to the optional release of financial and non-financial information that goes beyond the requirements set by regulatory bodies, laws, or contractual obligations. These disclosures are considered "excess of requirements" and reflect "free choices" made by a company's management to provide accounting and other pertinent information that they believe will meet the decision-making needs of the users of their annual reports. From an economic point of view, Carmo et al. (2022) suggests that companies choose to disclose information voluntarily only when they anticipate that the benefits will outweigh the direct and indirect costs involved.

2.2 Sustainability reporting frameworks and reports

2.2.1 Reporting frameworks

To aid companies with generating and publishing sustainability reports, several reporting frameworks have been developed both locally and internationally. It is worth mentioning that the reporting standards outlined below are not solely applicable to the mining industry but rather extend to encompass a wider range of industries, including large corporations, public entities, and state-owned enterprises. Mining companies are generally classified within these groups and are therefore subject to the following regulatory measures:

i) National regulation: National regulations are the primary catalyst for corporate sustainability reporting, with financial market authorities subsequently establishing rules to support this practice (Maubane, *et al*., 2014).

ii) Global Reporting Initiative (GRI): The GRI provides a framework for organisations to report on their ESG impacts. It enhances transparency by guiding organisations to communicate their sustainability efforts to stakeholders like investors and customers. The GRI covers topics such as emissions, labour practices, and human rights, while also emphasising comprehensive and inclusive reporting. According to KPMG (2017), the GRI guidelines remain the most used protocol by organisations to report their actions towards sustainability.

iii) Sustainability Accounting Standards Board (SASB): SASB focuses on the financial materiality of sustainability issues and provides investors with industry-specific standards. It identifies key sustainability topics that impact financial performance and links them to financial outcomes (KPMG, 2023).

iv) Task Force on Climate-related Financial Disclosures (TCFD): Established by the Financial Stability Board (FSB) in 2015, the TCFD aims to standardise climate-related disclosures to assist businesses in integrating climate risks and opportunities into their strategies (Deloitte, 2024).

Despite these frameworks, Asnani (2022) argued that comparability of ESG performance remains challenging due to diverse reporting regulations and a lack of thorough understanding of the standards and frameworks.

2.2.2 Types of sustainable reports

A clear and relevant sustainability report must promote addressing stakeholders' needs and concerns. In order to derive the long-term advantages of sustainable reporting, businesses must consistently improve their sustainability performance and reports (Veale, 2008; De Beers, 2011). The different types of sustainability reports companies typically produce are differentiated below:

i) Integrated reporting: Focuses on the interdependencies between financial, environmental, social, and governance factors. The report incorporates both financial and non-financial information to provide a comprehensive and concise overview (JSE, 2022).

ii) Sustainability reporting: Focuses specifically on an organisation's ESG performance. It outlines the organisation's efforts and initiatives to operate in a sustainable and responsible manner. The document provides tangible metrics and targets that the organisation has set for ESG (JSE, 2022).

iii) Annual reports: Annual reports contain financial statements, which provide a comprehensive analysis of an organisation's financial results, typically audited in accordance with accounting practices. They reflect the effects on organisational value at the reporting date or future cash flow projections, including sustainability issues (JSE, 2022). A company's annual report serves as its main means of informing shareholders and other stakeholders about the specifics of its operations, financial performance, and business plans (CPA Australia Ltd, 2019); and

iv) Combined report: Companies often merge their annual financial report with a detailed sustainability/ESG performance review into a single 'combined report,' adopting a double materiality perspective, combining both financial and impact materiality (JSE, 2022).

Not all disclosures need to be included in these reports, as some sustainability information may be better communicated directly to specific stakeholders through different forms than in an annual or sustainability report. For example, some mining companies communicate their impacts to local communities through online or community meetings, while their annual report may include the impact of the entire site on various stakeholders (Murguia et al., 2017; JSE, 2022).

2.3 JSE sustainability reporting requirements

The JSE is the largest stock market in Africa, and it ranks as the 16th largest stock market globally. Established 132 years ago, the JSE is a self-regulating exchange headquartered in South Africa (Tjaart, 2021). It offers a wide range of services, including trading in stocks and bonds, as well as financial, commodities, and interest rate derivatives. The JSE plays a significant role in promoting sustainability reporting through its comprehensive ESG disclosure requirements (JSE, 2020; JSE, 2022; Masehela, 2024). The JSE mandates listed companies to report annually on their compliance in line with the King IV Code, which includes sustainability and integrated reporting. These reports must, as outlined by JSE (2022), follow an "apply and explain" basis, detailing how companies incorporate ESG considerations into their business strategies and governance practices.

To support companies, the JSE has developed the Sustainability Disclosure Guidance and the Climate Change Disclosure Guidance, tailored specifically to the South African context while aligning with global best practices. These guidelines are designed to assist companies navigate the complexities of sustainability reporting and encourage transparency, high-quality disclosures, better decision-making, and accountability among investors and stakeholders (Wingard & Esterhuyse, 2016; JSE, 2020).

For a company to be listed on the JSE, it must comply with various listing requirements, including governance and financial standards. The JSE's commitment to sustainability is also reflected in its promotion of sustainability-linked financial products such as green and social bonds and the FTSE/JSE Responsible Investment Index, which evaluates companies based on their ESG performance. The Investment Index has three main pillars, namely, environmental, social, and governance, which cover over 300 indicators (biodiversity, climate change, pollution, health and safety, human rights and community, etc.) to form its rating. Companies only need to consider the indicators relevant to their industry (JSE, 2020).

In 2017, 92% of the top 100 South African companies reported on their sustainability performance, setting sustainability reports as a corporate standard (KPMG, 2017). Regrettably, the standards and JSE recommendations are not prescriptive, giving organisations the liberty to identify specific sustainability issues relevant to their operations and report on the impacts accordingly (JSE, 2022).

2.4 The driving factors for sustainability reporting

Over and above the JSE requirements and other global frameworks, several other factors can influence sustainability reporting in the mining sector. These include:

i) Societal expectations

Mining companies have initiated sustainability reporting to manage reputational risk and anticipate stricter government regulations (Bohling and Muguia, 2015). A survey conducted by Ernst and Young (2020) highlights that the primary industry risk for two consecutive years is the "social licence to operate," driven by increasing stakeholder expectations for enhanced social and environmental accountability. Social licences are significant, as external stakeholders can impose costs on companies through various legal, political, and social channels (Franks *et al*., 2014). Therefore, Mapstone et al. (2014) argued that the interaction between companies and communities is crucial for fostering connections and promoting societal acceptability of mining projects. Furthermore, Carr-Cornish et al. (2014) have noted that an increase in the transparency of mining firms is also driven by non-governmental organisation pressure.

ii) Financial implications

Investors globally are increasingly prioritising ESG factors in their decision-making processes. This trend aligns with the heightened focus on sustainability within numerous stock exchanges across the globe. Consequently, financial institutions are more engaged in ESG activities than previously (Palmen et al., 2023; Dincer et al., 2023).

For example, Standard Bank, a major South African bank, has ceased financing certain fossil fuel-based energy projects, particularly new coal-fired power plants and expansions, as well as tight oil exploration in Southern Africa (Erasmus, 2022). This strategy is part of a wider movement among South African banks towards sustainable financing. Furthermore, other local banks such as Nedbank and FirstRand have announced plans to stop funding new thermal coal mines by 2025 and 2026, respectively. Furthermore, these banks will also cease lending to new coal-fired power plants (Patrick and Mbokotho, 2021). Despite these developments, Seccombe (2023) is of the view that coal companies can still raise funds through listing on the JSE for activities such as exploration and expansion, provided the company's sustainability reports are in order and align with standards such as the SASB, GRI, and ISSN.

iii) Environmental concern

Mining activities contribute to air pollution and particulate matter through blasting, wind erosion, and coal handling (Tshehla and Wright, 2019; Anekwe and Isa, 2023). A study done by Dlamini (2007) showed that spontaneous combustion from mines contributes to atmospheric pollution, thus resulting in both environmental degradation and health impacts. Similar findings were reported by *Pone* et al. (2007), who stated that coalfields are releasing high concentrations of heavy elements, leading to unknown health impacts.

In 2007, the South African Minister of Water and Environmental Affairs declared the chosen study area a Highveld priority region to address air quality exceedances. However, data from the Mpumalanga Provincial Air Quality Management Plan (AQMP) indicates that air quality management regionalisation in South Africa is poorly managed, with only 25 of the 130 government-managed air quality monitoring stations in compliance with national standards (Winker, 2023).

Acid mine drainage (AMD) is another significant issue impacting water quality both locally and globally (Muzerengi and Nephalama, 2016; Shongwe, 2018). Land degradation is another consequence of mining, with significant land disturbed for open-cast sites during the commodity's life cycle. Additional environmental

concerns related to mining include waste generation, large water volume extraction, and high energy consumption (Shongwe, 2018).

In response to this, sustainability reporting requires mining organisations to inform and acknowledge the potential and actual impact caused by mining operations and implement mitigation measures.

iv) Legislation

South Africa has several legislations to enhance and reinforce reporting of environmental and social performance within the mining industry (Muswaka, 2017). The Mineral and Petroleum Resources Development Act (MPRDA, Act No. 28 of 2002) is the core legal framework, mandating reporting on exploration activities, mining rights, environmental compliance, social and labour plans, and financial contributions to the state (South African Government, 2002). These reports serve as tools for regulatory compliance and transparency, allowing government authorities to monitor and evaluate the impact of mining activities (Muswaka, 2017).

South African legislation also addresses environmental governance within the mining and other sectors through environmental legislation such as the National Environmental Management Act (NEMA, Act No. 107 of 1998), the National Water Act (NWA, Act No. 36 of 1998), and the National Environmental Management: Air Quality Act (NEM: AQA, Act No. 39 of 2004) (South African Government, 2024). These regulations require mining companies to conduct environmental impact assessments (EIAs), apply for Water Use Licenses (WUL), and submit Environmental Management Plans (EMPs), contributing to sustainable resource management and reporting (South African Government, 2024).

2.5 Evolution of sustainability reporting in mining

The above-mentioned drivers of sustainability reporting have been at play for several decades, fostering growth in sustainability reporting (Palmen et al., 2023). Studies indicate that the mining industry's sustainability reporting has evolved over time, focusing on transparency, accountability, and environmental stewardship. Initially, reporting was mainly driven by regulatory requirements, with Environmental

Impact Statements (EIS) being the first forms of reporting (Jenkins and Yakovleva, 2006; Buhr, 1998). In the 1990s, the concept of Corporate Social Responsibility (CSR) emerged, leading companies to publish CSR reports that included social and economic impacts (United Nations, 2020). This broader understanding of corporate responsibility extended beyond compliance.

In the 2000s there was a shift towards standardisation and benchmarking in sustainability reporting, with the GRI Sustainability Reporting Guidelines becoming widely adopted (Hamann, 2003). The International Council on Mining and Metals (ICMM) also developed a set of sustainable development principles and a reporting framework for global mining communities (ICMM, 2022). In the process, the Triple Bottom Line approach emerged, addressing economic, environmental, and social performance in reports. In the 2010s, integrated reporting emerged, combining financial and non-financial information into a single report, thus providing a more holistic view of a company's performance and strategy. D'Aquila (2018) asserted that advances in technology enabled more detailed and real-time data collection, enhancing the accuracy and depth of sustainability reports.

In the current decade, ESG criteria have become central to sustainability reporting, with investors and stakeholders increasingly using the ESG metrics to assess company performance. As a result, most mining companies are now reporting on their carbon footprint, climate risks, and strategies for reducing air pollutants such as GHG, SO_2, NOx and particulate matter. The reports now reflect how the organisation contributes to national and global development priorities, such as South Africa's National Development Plan (NDP) and the UN SDGs'. Furthermore, South African mining company reports provide detailed disclosure on specific ESG areas significant to their operations, including GRI reports, human rights reports, Broad-Based Black Economic Empowerment reports, and tax disclosure reports (United Nations, 2020).

Despite these advancements, concerns have been voiced that the reported data in sustainability reports lacks the necessary background information to allow a fair assessment of a company's genuine consequences (Szczepanik, 2019). The 2020

United Nations Environment Programme (UNEP) further highlights that mining corporations' management of environmental and social aspects and their sustainability reporting fails to meet the expectations of some stakeholders, particularly communities impacted by mining operations (United Nations, 2020). Critics argue that companies "cherry-pick" disclosures and manipulate the reporting process to present a deceptive picture (Asnani, 2022). A study by Memela (2020) on the Sustainability Reporting Practice of the South African Mining Industry concluded that discrepancies exist between the selected mining firms' sustainability reporting and community stakeholders' actual experiences with sustainability. The study indicated that in some instances, the community did not know what sustainability reports are or where they could obtain them. Despite the progress in sustainability reporting, the objective and accuracy must remain paramount to ensure its relevance and efficacy.

2.6 Sustainability theories

There are different theories that underpin ESG reporting and disclosures, encouraging businesses to adopt and promote these practices. These theories include the following.

2.6.1 Stakeholder theory

Stakeholder theory suggests that businesses should consider the interests of all parties affected by their operations, not just shareholders. Several studies also indicate that for firms to be successful and competitive, they must be accountable not just to shareholders but to stakeholders as well (Donaldson and Preston, 1995; Silva and Ediriweera, 2015; Shilongo, 2023). Freeman *et* al. (2010) defines a stakeholder as a group of people who can influence a company or who are affected by a company's operational activities. As a result of this influence, companies must ensure they maintain good, positive stakeholder relations. As part of their ESG disclosure, companies target interested and affected parties and include them in their social responsibility model (Silva and Ediriweera, 2015; Shilongo, 2023).

Information plays a crucial role in the management of stakeholders by organisations, enabling them to garner their support and acceptance while also mitigating resistance and disapproval (Shilongo, 2023). The stakeholder theory offers two perspectives. The first is the moral perspective, which asserts that individuals affected by an organisation's activities have the right to information and the ability to demand specific performance standards. The second is the strategic perspective, which acknowledges that stakeholders can offer advantages to the organisation, including risk management, learning opportunities, and a social licence to operate (Herremans *et al*., 2015; Brower and Mahajan, 2012; Evans and Miklosik, 2021).

2.6.2 Triple Bottom Line

The Triple Bottom Line (TBL) framework, introduced by John Elkington in 1994, proposes that sustainable long-term returns require well-governed and functional environmental, social, and economic systems. This concept is also particularly relevant to the mining industry due to its significant environmental impact and social challenges (Elkington, 1998). The TBL can be divided into three dimensions, namely:

i. Economic Dimension: Elkington (1998) defines the economic line as the impact of an organisation's business practices on the economic system, focusing on its sustainability and ability to provide for future generations.

ii. Social Dimension: This dimension includes community involvement, philanthropy, diversity and inclusion, human rights, labour practices, and employee well-being. Companies are held accountable for the social impact they have on the community (Alhaddi, 2015).

iii. Environmental Dimension: This dimension constitutes the impact of an organisation's operations and products on the surrounding environment. It considers carbon emissions, managing waste, preventing pollution, conserving resources, and using energy efficiently (Onyali, 2014). Organisations are encouraged by the TBL framework to reduce their environmental impact and

implement strategies that support sustainability and environmental stewardship (Alhaddi, 2015).

Critics, however, argue that the TBL framework can be inherently flawed when applied to industries like mining, where the environmental and social costs often outweigh the economic benefits. The extraction of non-renewable resources inherently involves significant environmental degradation, including habitat destruction, pollution, and resource depletion, which can be difficult to justify even with substantial economic gains (Jenkins, 2004).

2.6.3 Corporate social responsibility

Corporate Social Responsibility (CSR) theory posits that businesses should consider their impact on society, the environment, and stakeholders beyond just shareholders (Wirba, 2023). In the mining sector, CSR bridges the gap between companies and impacted communities through community development projects like educational initiatives and healthcare services, thereby enhancing the local quality of life (Abrahamsson and Segerstedt, 2019). Environmental conservation efforts, such as reforestation and water management, also demonstrate a commitment to sustainability (Guenther, 2021). These initiatives build goodwill and trust, fostering harmonious relationships.

Beyond community relations, CSR in mining can aid sustainable development and regulatory compliance, making it easier to obtain permits (Hilson, 2019). The idea of businesses taking voluntary initiatives to address social and environmental issues is central to CSR theory. A strong CSR strategy improves a company's reputation, attracting ethical investors and customers, and boosts employee morale and retention (Carroll, 2020)

While CSR in mining has many advocates, critics argue it often serves as a superficial public relations strategy rather than addressing deeper issues like community displacement, pollution, and resource depletion (Rajak, 2011). CSR projects can create dependency instead of fostering sustainable development

(Dashwood, 2014) and may distract from the need for stricter regulations and significant operational changes (Boiral, 2013).

Figure 1 depicts how the three frameworks interact with one another and with the mining environment.

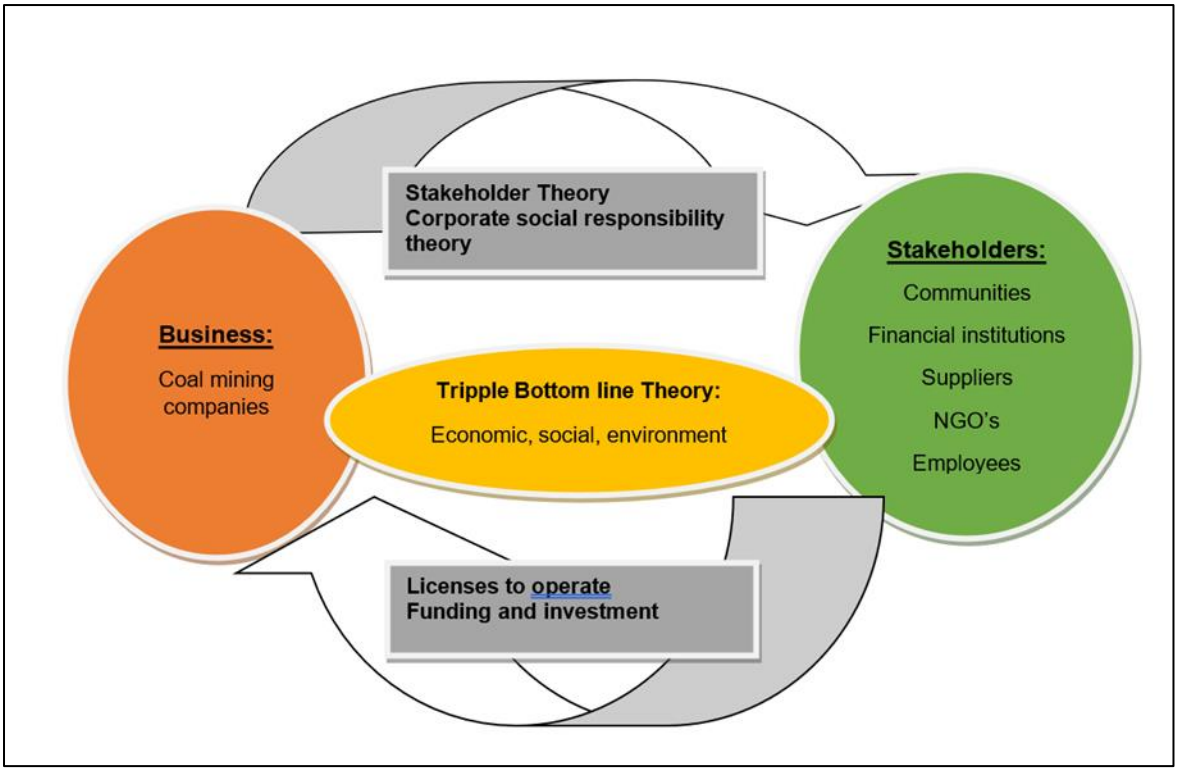

Figure 1: Stakeholder Theory, Tripple Bottom Line Theory and Corporate Social Responsibility Theory and its interconnectedness (Source: Author)

2.7. CONCLUSION

Responsible and sustainable mining practices are crucial for protecting both present and future growth. In contrast, irresponsible mining negatively impacts society, the environment, and the economy. Sustainability reporting plays a vital role in raising awareness and promoting responsible mining by highlighting its effects.

The literature review identified several factors driving sustainability reporting in the mining sector, including societal expectations, public pressure, financial implications, and environmental concerns. While sustainability reporting in the coal mining sector has made strides in adaptation and evolution, there are still concerns about the quality and comparability of these reports. Various frameworks and standards guide sustainability reporting, yet challenges in implementation and credibility persist.

This study is grounded in three theoretical frameworks, as illustrated in figure 1: Stakeholder Theory, Triple Bottom Line Theory, and Corporate Social Responsibility (CSR) Theory. Stakeholder Theory emphasises the importance of considering the interests of all affected parties. The Triple Bottom Line Theory evaluates performance based on economic, social, and environmental factors. The CSR Theory highlights the responsibility of businesses to consider their societal and environmental impacts.

2.7 Consistency table

Table 1: Research Consistency Table, Research Questions and Propositions

Research objective	#	Proposition (s)
To investigate types of reporting conducted by listed and non-listed JSE coal mining companies.	1	- JSE listed companies follow the reporting requirements of the entity, i.e. the King IV code, FTSE/JSE Responsible Investment Index, SASB and the GRI. - Non listed companies use legal regulation to guide reporting or may voluntarily report according to above mentioned frameworks. - Reporting may include integrated reports, sustainability reports, ESG reports, combined reports or other means of communications with stakeholders.
To identify the driving factors for sustainability reporting.	2	- Social licence to operate and public pressures due to stakeholder expectations for enhanced social and environmental accountability, NGO pressure. - Financial implications, investors are prioritising ESG factors into their decision-making processes. Companies using ESG reporting to acquire more investment and capital. - Environmental concerns such as air and water pollution, land degradation. - JSE requirements - Regulatory requirements such as NEMA and the MHSA.
To assess the evolution of sustainability reporting in coal mining.	3	- Mining companies' sustainability reports have increased over the years, in terms of content and quality due to internal and external pressure. - GRI has become widely adopted. - Integrated reporting is common, which is a combination of financial and non-financial information. - Companies' strategies now align with local NDPs and SDGs. - Companies have increased scope of environmental and social parameters they report on.

CHAPTER 3: METHODOLOGY

This section outlines the methodological approach used in this study. The study adopted a qualitative approach and integrated document analysis to explore sustainability practices in depth. This chapter further explains the reasons for the chosen methodology, details of the data collection and analysis, and some limitations of the methodology.

3.1 Research approach

To achieve the research aim, an assessment of the sustainability reports from the chosen mining companies was conducted. ESG data obtained from the reports may be categorised as either quantitative or qualitative. Qualitative data is derived when ESG sustainability factors are embedded in firm policies, such as risk mitigation frameworks or core values (Parker, 2005). On the other hand, obtaining quantitative data for ESG factors is challenging, but it can be collected through measurement parameters such as greenhouse gas emissions, water use, safety incidents, employment statistics, and other indicators (Parker, 2005). For this study, a qualitative comparative approach was used to gather and analyse sustainability reports of different mining companies.

Qualitative research inherently allows for an emphasis on the characteristics of entities, processes, and meanings that are not subject to experimental examination or quantification (Crotty, 1998; Memela, 2020). It extracts significance from textual material in its original form without the necessity to measure or combine it, which might divert from the primary goal of understanding a subject (Memela, 2020). A qualitative approach is therefore more suitable for this study.

3.2 Research design

The study collected and analysed two sets of secondary information to allow for a comparative analysis. First, the study gathered secondary information from archival sources such as journals, relevant websites, academic journals, and reports. Using

deductive techniques, the study aimed to understand sustainability reporting requirements from different frameworks and legislation, including the JSE requirements. The second set of information consisted of sustainability reports from the websites of the sampled mining companies.

The research also employed the content analysis method to analyse the information gathered, as seen in studies done by Isto (2022) and Palmen et al. (2023). Content analysis is a popular method in social reporting research, used to collect empirical evidence and make valid inferences from texts and their contexts (Parker, 2005; Guthrie and Abeysekera, 2006). White and Marsh (2006) state that to utilise this technique, three essential components are required, namely, sampling units (which involve identifying the population and establishing the sampling basis), data collection units (which are used to measure variables), and units of analysis (which serve as the foundation for analysis). Therefore, this research used sustainability reports as the sampling units. Phrases, visuals, or tables that provided specific information were collected as data collection units. The units of analysis were the evaluation criteria that were used and organised into assessment categories (Perez and Sanchez, 2009; Shilongo, 2023).

The primary advantage of this approach is that it allows for detailed contextual analysis while capturing a broad spectrum of practices. However, this method was time-consuming and could have introduced subjectivity through qualitative data, which required careful consideration during analysis to maintain objectivity.

The flow of the research design process is outlined in figure 2 below.

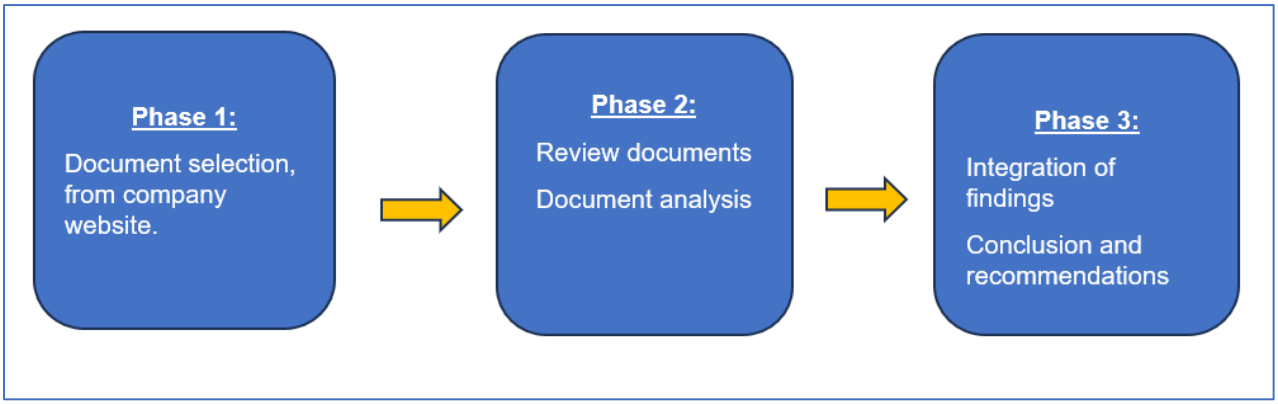

Figure 2: Research design flow

3.3 Data collection method

To ensure consistency, only reports from 2021 to 2023 were abstracted and reviewed. The selection of the 2021–2023 timeframe was guided by both practical and methodological considerations. This period represents a recent and relevant window that captures current trends in sustainability reporting, particularly in response to evolving global frameworks such as the TCFD and GRI.

- **Recency:** The selected years reflect the most current practices and regulatory responses, including post-COVID recovery strategies and climate transition planning.

- **Feasibility:** Narrowing the timeframe helped manage the volume of data, allowing for deeper qualitative content analysis without compromising the integrity of the study.

The information in the reports was also sufficient to answer the objectives of the research. This is because companies typically use their websites as reporting platforms for stakeholders and shareholders to obtain valuable insights on financial and sustainability matters.

3.4 Sampling method and Population

3.4.1 Sampling method

The research adopted a simple sampling methodology, which entailed the examination of sustainability reports only available on mining companies' websites, as they were neither sensitive nor restricted and posed no major ethical concerns. Coal mining companies with operations in Mpumalanga were considered, excluding mines that were under care and maintenance. Therefore, non-probability sampling was used in the study. Non-probability sampling means that not every member of the population had an equal chance of being selected for the research (McKinney, 2008). McKinney (2008) further emphasized that non-probability sampling involves a non-random selection of the group sampled, with the complete quota participating in the research.

The researcher used both judgmental and convenience sampling procedures to determine the sample size for data collection. Judgmental sampling, also known as purposive sampling, is a technique where the researcher selects units to be sampled based on their knowledge, judgment, and expertise (Palinkas et al., 2015). The goal was to choose samples that are most representative or informative for the study. Convenience sampling is a method where samples are selected based on their availability and ease of access (Golzar and Tajik, 2022). Convenience sampling was used to collect environmental and social data that was readily available on the companies' websites. Judgmental sampling was used to set the selection criteria, which include coal mining companies listed on the JSE and coal mining companies not listed on the JSE but containing some form of sustainable reporting.

3.4.2 Population

The research focused on a sample of six coal mining companies operating in the Mpumalanga area. The list of the companies includes three JSE-listed entities and

three non-listed mining companies that provide a certain level of sustainability reporting on their websites and public profiles. To protect their identities and adhere to ethical research practices, the names of the mining companies are replaced with pseudonyms. For this study, the three listed companies were referred to as Company A, Company B, and Company C, and the three non-listed companies selected are referred to as Company D, Company E, and Company F.

3.5 Research instrument

The data extraction presented in table 2 was used to ensure consistency with the extraction of information from the selected mining companies' websites.

The data extraction presented in table 2 was used to ensure consistency with the extraction of information from the selected mining companies' website. The form was designed to align with the study's objectives, which focused on comparing environmental and social sustainability reporting practices between JSE-listed and non-listed entities. The table was divided into five key sections:

1. **Company Information**: Capturing the company name, listing status, and year of report allowed for contextual differentiation between listed and non-listed entities and ensured temporal consistency (2021–2023) across all sampled reports (Golzar and Tajik, 2022; Global Reporting Initiative, 2022).
2. **Environmental Metrics**: This section was informed by the GRI Coal Sector 2022 standard and included critical environmental indicators such as water use, waste, air quality, climate change, energy, and closure and rehabilitation. These metrics were selected due to their relevance to the coal mining sector's environmental footprint and their alignment with both regulatory and voluntary reporting frameworks (Carmo and Migueis, 2022;Global Reporting Initiative, 2022).
3. **Social Metrics**: The social dimension included indicators such as local economic impact, community engagement, health and safety, land and resource rights, and the rights of indigenous people. These were chosen to

reflect the sector's social license to operate and the broader societal expectations placed on mining companies and informed by the GRI Coal Sector 2022 (Golzar and Tajik, 2022; Global Reporting Initiative, 2022)..

4. **Additional Information**: This section captured qualitative insights such as notable achievements, awards, areas for improvement, and future commitments. Including this category allowed for a more nuanced understanding of each company's sustainability narrative beyond compliance.
5. **Comments/Notes**: This final section provided space for any additional observations or contextual notes that could inform the interpretation of the data, such as inconsistencies, omissions, or unique disclosures.

Table 2: Data extraction form

1. Company Information	Company Name Listing Status (JSE-listed or non-listed) Year of Report
2. Environmental Metrics	Water Use and effluents Waste Air quality Climate change Energy Closure and rehabilitation
3. Social Metrics	Local economy Society/ Community Health and Safety Land and resource rights Rights of indigenous people
4. Additional Information	Notable Achievements Awards and Recognitions Areas for Improvement

	Future Commitments
5. Comments/Notes	Any additional observations or comments about the report.

3.6 Procedure for data collection

The data extraction process was conducted using a standardized extraction form (Table 2) to ensure consistency. Relevant information was extracted from the sustainability reports, specifically environmental and social-related data. Verification was carried out by cross-checking the extracted data for accuracy and completeness, ensuring that all required information was captured and correctly recorded. The data was then organised into a systematic style using spreadsheets to construct a database, with categories based on environmental and societal concerns to aid in analysis.

3.7 Data analysis and interpretation

For this study, content analysis was conducted by reviewing sustainability documents. Krippendorff (2004) defined content analysis as a research method for "drawing valid and repeatable conclusions about texts from their contexts of use." This method is frequently used in qualitative research to analyse, assess, and even rate the descriptive features of the text. It has been extensively applied in sustainability literature to assess secondary sustainability reporting material (Palmen et al., 2023).

Mining corporations use several sustainability reporting frameworks and may generate their sustainability reports in compliance with the GRI and/or the SASB. SASB standards are more focused on financially material sustainability issues that are likely to impact a company's financial performance, while the GRI standards are recognised for their comprehensive approach to sustainability reporting, covering a range of ESG issues. As a result, for the purpose of this study, content from the reports was compared to the GRI Coal Sector 2022 Standard (Table 3), as it is most

suitable for making a holistic assessment of a company's sustainability performance (Evans and Miklosik, 2021). Table 3 was also used to ensure consistency and comparability across environmental and social dimensions.

Table 3: GRI metrics that was utilised for the study

Environmental GRI disclosure checklist	1. GHG emissions 2. Climate adaptation, resilience and transition 3. Closure and rehabilitation 4. Air emissions 5. Waste 6. Water and effluents
Social GRI disclosure checklist	1. Economic impacts 2. Local communities 3. Land and resource rights 4. Rights of indigenous peoples 5. Occupational health and safety

3.8 Limitations of the study

- Sample Size and Selection Bias: The sample size and selection criteria used may limit the study's findings. Since the sample was not representative of the entire population of JSE-listed and non-listed companies in the coal mining industry, the results may not be generalisable.
- Data Availability and Reliability: The availability and reliability of data on sustainability reporting practices varied among companies. Some companies provided more comprehensive and transparent reports, while others had limited or inconsistent data. This variability affected the comparability of the findings.
- Self-Reporting Bias: The study relied on self-reported data from companies' sustainability reports, which may have been subject to bias. Companies may have selectively disclosed information or presented a more positive image of

their sustainability practices, potentially leading to an overestimation of their actual performance.

- Interpretation Bias: The interpretation of the findings may have been subjective and influenced by the researcher's own biases or perspectives.

3.9 Trustworthiness

3.9.1 Transferability

The findings of the study may be transferable to other industries with similar characteristics or challenges related to sustainability reporting. For instance, the study's findings may be pertinent to industries that are confronted with comparable environmental or social impacts, regulatory frameworks, or stakeholder expectations. Additionally, the study's findings can be transferable to other countries with socio-economic, political, and regulatory contexts similar to South Africa. The findings may also apply to companies of similar sizes and ownership structures within the coal mining industry. However, differences in reporting practices may exist based on specific characteristics and priorities of different companies, such as multinational corporations, state-owned enterprises, or small and medium-sized enterprises. It is important to note that the study's findings may have limited transferability over time due to changes in regulations, reporting standards, stakeholder expectations, or industry practices. Consequently, it is essential to account for the temporal context and regularly revise the research to maintain the relevance and applicability of the findings (KPMG, 2017).

3.9.2 Credibility

The data collection process was carefully planned and executed to ensure the accuracy and credibility of the data. This involved using multiple data sources, such as annual reports, sustainability reports, and other communication reports. The study employed credible measures to analyse sustainability reporting practices by comparing the reports to the established GRI framework. Previous research (Perez and Sanchez, 2009) had tested and validated this method.

3.9.3 Dependability

It is important that a particular study tool consistently produce identical outcomes when used repeatedly under identical circumstances (Heale et al., 2015). By sourcing the reports mostly from the company's website and using the GRI index for baseline coding, the reliability of the findings and research was enhanced.

3.9.4 Conformability

The study used content analysis to minimise subjective interpretations and personal biases, focusing on objective and measurable aspects of the data.

3.10 Ethical considerations

The following was deployed to ensure ethical considerations are met:

- Data Accuracy and Integrity

Ensured that data was accurately represented, not misinterpreted or manipulated, and that findings were presented honestly and transparently.

- Confidential Information

The study was cautious of any sensitive or confidential information that might inadvertently have been included in the mining reports and it avoided disclosing or misusing such information. Pseudonyms are used to hide the identity of these mining companies.

- Fair Use

The study used the information in a manner consistent with fair use guidelines. Furthermore, it ensured that the use complied with the terms of use specified by the websites.

- Harm Minimisation

The study considered the potential impact of the research on the chosen mining companies and avoided presenting the data in a way that could unjustly harm their reputations or operations.

- Cultural Sensitivity

The study considered the cultural and social contexts in which the mining companies operate, ensuring that interpretations and presentations of the data were respectful and considerate of these contexts.

3.11 Consistency table

Table 4: Consistency table - Research questions, propositions, data collection detail and data analysis method

Research objective	#	Proposition (s)	Data collection detail	Data analysis method
To investigate types of reporting conducted by listed and non-listed JSE coal mining companies.	1	- JSE-listed companies follow the reporting requirements of the JSE, this includes the King IV Code and the FTSE/JSE Responsible Investment Index. They also report using frameworks like SASB and GRI. - Non listed companies use legal regulation to guide reporting or may voluntarily report according to above mentioned frameworks. - Reporting may include integrated reports, sustainability reports, ESG reports, combined reports or other means of communications with stakeholders.	- Sustainability or annual reports. - Other sustainability documents from companies' websites. - Literature review	Content analysis
To identify the driving factors for sustainability reporting.	2	- Social licence to operate and public pressures due to stakeholder expectations for enhanced social and environmental accountability, NGO pressure.	- Sustainability or annual reports from companies' websites.	Content analysis

		- Financial implications, investors are prioritising ESG factors into their decision-making processes. Companies using ESG reporting to acquire more investment and capital. - Environmental concerns such as air and water pollution, land degradation. - JSE requirements - Regulatory requirements such as NEMA and the MHSA.	- Other sustainability documents from companies' websites.	
To assess the evolution of sustainability reporting in coal mining.	3	- Mining companies' sustainability reports have increased over the years, in terms of content and quality due to internal and external pressure. - GRI has become widely adopted. - Integrated reporting common, which is a combination of financial and non-financial information. - Companies' strategies now align with local NDPs and SDGs. - Companies have increased scope of environmental and social parameters they report on.	- Sustainability or annual reports from companies' websites. - Other sustainability documents from companies' websites.	Content analysis

CHAPTER 4: RESULTS

This section presents a comparative analysis of the differences in sustainability reporting between the selected JSE-listed and non-listed companies across selected environmental and social topics. The sustainability reports of three listed companies (named Company A, B, and C) and three non-listed companies (named Company D, E, and F) were evaluated using the content analysis method. The section is divided into two parts, part A and part B. Part A analyses environmental topics reporting differences between selected listed and non-listed companies, and Part B presents the social topics reporting differences between listed and non-listed companies. These evaluations are done using the GRI standards, as they are highly recognised for a comprehensive approach to ESG reporting (Hariram, 2023). Furthermore, the GRI functions as the JSE's ESG requirement, as it is recommended by the King Code IV of Corporate Governance (JSE, 2022). Companies are expected to identify environmental and social topics that apply to them and consequently report on them (Global Reporting Initiative, 2022).

4.1. Part A: Environmental aspects

Environmental reporting has seen a significant increase in global adoption, with 96% of the world's leading 250 companies (G250) currently publishing sustainability reports that include environmental performance (Morales, et al., 2023). While the GRI remains the most widely used frameworks, standards such as the Task Force on Climate-related Financial Disclosures (TCFD) and the Sustainability Accounting Standards Board (SASB) are also increasingly shaping regulatory landscapes (Eccles & Klimenko, 2019). The adoption of these frameworks varies globally, with developed economies integrating them into mandatory disclosure requirements, while many developing nations continue to rely on voluntary compliance (Fonseca, 2010).

4.1.1 GHG emissions

Greenhouse gas (GHG) emissions are defined as air pollutants that contribute to climate change, including carbon dioxide (CO_2) and methane (CH_4) (Filonchyk et al., 2024). The GHG topic includes direct emissions from an organisation's activities (known as Scope 1), energy indirect emissions from the consumption of purchased electricity (known as Scope 2), and other indirect emissions that occur in the supply chain and product lifecycle (known as Scope 3), both upstream and downstream of the operations (Global Reporting Initiative, 2022). The below section highlights the different GHG emissions reporting details between listed and non-listed companies:

i) GHG emissions reporting details

It is observed that Company A conducts periodic reviews and updates of its GHG inventory, methodologies, and emission factors to align with Intergovernmental Panel on Climate Change (IPCC) and GHG Protocol standards. The IPCC was established in 1988 to provide policymakers with regular scientific assessments on climate change, its impacts, future risks, and adaptation and mitigation strategies (IPCC, 2023). The GHG Protocol is the leading global standard for accounting and reporting GHGs, providing a standardised framework for organisations to measure and manage their emissions (GHG Protocol, 2024; Khamisu et al., 2004; Khan et al., 2023). Company A also embarked on improvements in GHG calculation methodologies following independent technical audits. This is evident when comparing reports from various years. For energy disclosures, the company reports energy consumption and intensity on a site-by-site basis, categorised by energy types such as hydropower, natural gas, and coal, with comparisons to previous years and explanations for any changes. Furthermore, the company reports on its Scope 1, 2, and 3 emissions, providing detailed data on both location-based and market-based Scope 1 and 2 emissions in its ESG data book.

On the other hand, Company B’s energy and carbon management program intends to reduce energy consumption and improve diesel and electricity efficiency to lower GHG emissions. Projects highlighted by the company include reducing diesel use through fuel additives and payload management. The company promotes energy

awareness among employees through an energy efficiency program and a transition profiler to track progress toward 2050 carbon neutrality. Company B supports supplier decarbonization, monitors emissions from electricity and diesel, and reports energy consumption and intensity relative to a 2020 baseline and provides annual comparisons. Its ESG report includes emission trends and detailed data by business unit and mining operation, covering Scope 1, 2, and 3 emissions, along with emission-reduction initiatives and investments.

Company C ESG reporting focuses on energy efficiency since 2005 and has joined the Energy Productivity (EP100) initiative (a global corporate commitment program that encourages companies to improve their energy productivity by doubling their economic output per unit of energy consumed or implementing a smart energy management system) (The Climate Group, 2024). Its GHG roadmap incorporates operational improvements and capital solutions. The company also supports its customers in reducing GHG emissions by offering natural gas as an alternative energy source. For GRI disclosures, Company C reports on operational energy consumption, Scope 1, 2, and 3 emissions, and GHG intensity, with year-on-year comparisons and brief calculation descriptions. These metrics are detailed in both its sustainability and climate change reports.

Among the non-listed, Company D states that it is dedicated to enhancing climate-related financial disclosures, focusing on measuring and reporting its carbon footprint, mitigating contributions to climate change, and assessing associated risks and opportunities. Key initiatives mentioned include reducing carbon emissions and supporting a low-carbon future economy through the Just Energy Transition umbrella. However, it is observed that Company D only reported on GHG emissions from 2018 to 2020, indicating inconsistency in the reporting requirements or regime.

Contrary to the above organisations, Companies E and F have not provided any disclosure on, or any initiatives to reduce GHG emissions. The lack of GHG emissions disclosure by non-listed companies, who are coal suppliers to Eskom, poses significant risks, particularly in the context of South Africa's Just Transition

framework and the National Development Plan (NDP) (Climate Investment Funds, 2022)

As observed above, all listed companies provide reporting of their GHG emissions on an annual basis and for all three scopes, including a methodology aligned to the GHG protocol and the IPCC. Asnani (2022) and Ahmad et al. (2024) stated that this practice is seen amongst big mining corporations globally. Tracking emissions is essential for a mining company's business strategy, as it enables the measurement of progress toward carbon neutrality by 2050. It also offers vital information about areas requiring operational improvements, ensuring that efforts are effectively directed to meet sustainability goals (Legge et al., 2021). This suggests that the mining companies listed on the JSE are more aligned with global requirements as compared to the non-listed companies. From the reporting perspective, the listed companies are more likely to provide accurate and valuable information that can assist in understanding the GHG contributions, unlike non-listed companies that are not compelled to report.

4.1.2 Climate adaptation, resilience, and transition

Climate adaptation, resilience, and transition can be defined as the ways in which organisations respond to both current and future climate change risks while also helping societies and economies manage the impacts of climate change (Pelling, 2010). This encompasses the organisation's strategy for transitioning to a low-carbon economy and considers the effects of this transition on employees and local communities (Global Reporting Initiative, 2022). The below analyses the different climate commitments made by the different organisations to reduce GHG emissions and to adapt to climate change:

i) Climate adaptation, resilience, and transition reporting details

For listed companies, it is observed that Company A shares its climate change progress in its annual report, featured as a dedicated chapter. Additionally, the company publishes a separate climate report that outlines pathways and ambitions to Net Zero by 2050, updates on short- and medium-term targets, and a review of

industry positions on climate change. The company follows the TCFD's voluntary framework for reporting climate-related financial risks. TCFD is a framework developed by the Financial Stability Board (FSB) in 2015 to help organisations assess, manage, and disclose climate-related financial risks and opportunities (TCFD, 2017). The framework provides guidelines for voluntary reporting on climate-related risks in a way that is transparent and comparable. Adopting the TCFD framework signifies a company's commitment to transparently reporting climate-related financial risks and opportunities (Pizzi & Principale, 2023; Gebhardt et al., 2024).

Similarly, Company B has committed to achieving carbon neutrality by 2050 to support global decarbonization and energy transition goals. Similar to company A, their climate response strategy aligns with TCFD recommendations and their sustainable growth strategy. The company highlights its plans to retain coal in its portfolio, focusing on optimal and responsible extraction to ensure energy security. Furthermore, Company B integrates climate-related risks and opportunities into its risk management, supported by the board and executive management, thus demonstrating its risk-based approach towards climate-related matters. Integrating climate-related risks into corporate risk management is crucial for effective adaptation and mitigation. A risk-based approach helps companies systematically identify, assess, and manage climate risks, improving resilience and supporting sustainability efforts. For instance, Yohe (2024) emphasizes that responding to climate change involves an iterative risk management process that includes both adaptation and mitigation strategies. This approach allows organisations to adjust their actions as new information becomes available, ensuring flexibility and responsiveness in the face of climate uncertainties.

Using this approach, a climate scenario analysis was undertaken to evaluate and prioritize risks, highlighting transition-related challenges such as carbon pricing, credit exposure, and insurance liabilities. Assessments such as these highlight how climate change could impact revenues through patterns like heatwaves, drought, and extreme rainfall while also noting financial institutions reluctance to fund the

companies with high climate risk exposure (Ndlovu, 2018; Patrick & Mbokotho, 2021).

On the other hand, Company C has stated that its long-term net zero includes transitioning from coal to net-zero feedstocks like hydrogen and renewables, using strategic partnerships, technology, and innovation. Similarly to Companies A and B, Company C has stated that it adheres to the TCFD framework and reports through the Carbon Disclosure Project (CDP). The CDP is an international nonprofit organisation that provides an environmental impact database system for use by both the private and public sectors. Organisations use the CDP's annual questionnaire for disclosing environmental data regarding their greenhouse gas emissions, water resource use, how they evaluate climate change risks, and how they protect natural resources (Safdie, 2024). The data gathered from the disclosure procedure allows CDP to monitor the progress of firms and localities on various sustainability concerns and to compute ratings for each declaring entity (Gomstyn & Jonker, 2024). Elliott Davis (2023) emphasises that CDP disclosure ratings allow firms to assess their environmental credentials relative to competitors, therefore attracting investors and consumers seeking sustainable enterprises.

In 2020, Company C's initial 2030 GHG reduction target was deemed insufficient and was reset in 2021 to better align with the Paris Agreement. Additionally, Company C has stated that it is addressing climate change risks by developing solutions to reduce physical risks and enhance community resilience.

Of the non-listed companies, only Company D has stated its acknowledgement of the scientific consensus on climate change and global warming, recognizing the role its coal mining activities play in these issues. The company states that it supports a just and responsible transition to a less carbon-intensive economy, emphasizing that there must be careful management of this shift. As such, Company D advocates for transforming or retrofitting existing power stations and transitioning coal mining jobs to other sectors. The company emphasizes the importance of developing technologies to reduce emissions from coal-fired power stations until they are phased out, highlighting innovations such as Carbon Capture

Utilisation and Storage (CCUS) and advanced technologies in both new and retrofitted coal-fired power stations. This perspective is endorsed by Strambo et al. (2024), who emphasise that a fair transition from coal must strike a balance between environmental objectives and socio-economic realities, particularly in communities that rely on coal. Similarly, Xaba (2023) contends that the implementation of clean coal technologies must consider the broader socio-economic implications for coal-dependent industries and labourers, even though they can reduce emissions. These studies emphasise the importance of incorporating clean coal innovations into a framework that emphasises inclusivity and equity in the energy transition process.

Company E and F have not reported on climate adaptation, resilience, and transition thus demonstrating minimal effort in climate related initiative.

ii) Reduction of GHG emissions

South Africa is aiming to reduce its GHG emissions in line with the Paris Agreement, aiming to limit them to 398-510 $MtCO_2e$ by 2025 and 350-420 $MtCO_2e$ by 2030 (NDC Partnership, 2023). However, the country's dependence on coal-fired power generation and ongoing energy crises pose challenges (Mukherjee, 2023). To facilitate a just energy transition, South Africa has partnered with international stakeholders like the Just Energy Transition Partnership (JETP) to secure funding for sustainable energy projects (Nangoy et al., 2024). Despite progress, the transition to a low-carbon economy remains complex, requiring a balance between environmental, economic, and social priorities.

Company A highlight that it aims to reduce its total emissions (Scopes 1, 2, and 3) by 50% by 2035 and achieve net-zero emissions by 2050. Their strategy involves closing some of their coal-based operations by 2035 through investments in low-carbon technologies such as green hydrogen and developing low-carbon products. Despite having a transition strategy, the company acknowledges coal's ongoing role in industries such as steel production, which is crucial for renewable energy infrastructure. Furthermore, the company supports global value chain decarbonization and is committed to a "just transition," ensuring fair distribution of

benefits and support communities likely to be economically affected by the transition. Their sustainability report covers governance, risk management, and post-pandemic rises in Scope 1 and 2 emissions, with reporting in line with the GHG Protocol. Their climate goals align with IPCC and IEA targets, monitored by a Climate Change Taskforce. Organisations that conform to IPCC and IEA objectives ensure that their decarbonisation strategies are scientifically sound and support the Paris Agreement's aim of limiting global warming to under 1.5°C (Dagnachew, *et al*., 2021; Clarke & Ashworth, 2023)

On the other hand, Company B indicates that its intention is to achieve a 40% reduction in Scope 1 and 2 emissions by 2030 and zero emissions by 2050 through operational optimization, partnerships, and stakeholder engagement. Recently, they launched decarbonization workstreams focusing on technology and sustainable impact. Key to their initiatives are battery electric vehicles, methane and carbon capture, and emission offsetting. Similar to Company A, they have stated they are committed to ensuring a fair and equitable transition for its workers, communities, and value chain partners. Company B also targets the reduction of Scope 3 emissions, emphasizing stakeholder education on climate resilience, and invests in sustainability research through partnerships with institutions of higher learning.

Company C aims for carbon neutrality by 2050, with emission reduction roadmaps for 2030 and 2050 developed. Their sustainability efforts include a Memorandum of Cooperation for hydrogen projects and a partnership to develop a green hydrogen mobility ecosystem. Additionally, they aim to support small-scale farmers and plan to procure solar PV farms and renewable power by 2025. Committed to a just transition, Company C has stated that it supports employees through entrepreneurship development and career transition training, aiming to create jobs in low-carbon sectors and enhance skills. They state that they mitigate socio-economic repercussions by reconciling adverse effects with advantages via public and private collaborations to attain economies of scale across their regions. This is essential to guarantee that the transition does not adversely affect communities and the economy (National Planning Commission, 2012).

Company D indicates that it acknowledges the ongoing importance of coal for economic development and base-load electricity generation in South Africa. However, they have introduced renewable energy projects to integrate with its existing coal assets. This is a demonstration of the company's effort to reduce its carbon footprint and ensure long-term sustainability as a diversified energy producer. Additionally, the company has signed a Memorandum of Understanding (MoU) with various stakeholders to increase the use of wind and solar energy in its facilities, with the goal of reducing CO_2 emissions. This is an indication of collaborative efforts in addressing climate change, with Wang et al. (2020) stressing the need for global partnerships in climate projects and implying that these kinds of initiatives can improve the success of mitigating measures.

It should be highlighted that all three listed firms have acknowledged the need to reduce GHG emissions and are actively engaged in research, partnerships with government and non-governmental organisations, and working groups to support a careful transition. Several pathways toward achieving carbon neutrality, accompanied by clear goals and targets, are a key indication of their efforts. However, while Company D recognizes the transition and has implemented initiatives, the lack of recent GHG disclosures makes it challenging to assess and hold the company accountable for its progress. As mentioned in the previous environmental element, the lack of climate practice disclosure by non-listed companies E and F reflects a misalignment with national priorities. Given Eskom's leading role in South Africa's transition to a low-carbon economy, its suppliers face growing scrutiny to align to sustainability goals (Montmasson-Clair, 2021).

4.1.3 Closure and rehabilitation

According to the GRI, closure and rehabilitation refer to the processes undertaken when commercial activities end, requiring organisations to shut down assets and facilities and restore operational sites. This topic addresses an organisation's strategy for closure and rehabilitation, including how it considers the consequences for the environment, local communities, and employees (Global Reporting Initiative, 2022). In line with this, several studies have underscored the necessity for mining

industries to implement effective closure and rehabilitation strategies to mitigate adverse environmental and social consequences (Bainton & Holcombe, 2018; Sturman et al., 2019). Table 5 shows various closure and rehabilitation aspects and actions by the assessed mining companies.

Table 5: Closure and rehabilitation reporting differences between the selected listed and non-listed coal companies

Aspect	Company A	Company B	Company C	Company D	Company E	Company F
Final Provision & Assurance	Submits financial estimates for post mining restoration to DMRE*.	Reviews financial provisions annually, ensures coverage through ERF* and bank guarantees.	Not explicitly mentioned.	Not specified	Not specified	Submits financial guarantees to DMRE.
Closure & Rehabilitation strategy	Has social and economic frameworks to minimize community workforce and supplier impact.	Focuses on land transfer to local farmers, integrating Agri -economies into closure planning.	Covered under biodiversity.	Focuses on mine closure from the development stage.	Not specified	Not specified
Stakeholder Engagement	Engage stakeholders during planning for financial assurance and cultural heritage stewardship.	Engages communities post closure to align rehabilitation and land management.	Limited details available.	Exploring approaches to utilise rehabilitated land to empower communities, i.e. renewable energy projects.	Not specified	Not specified
Audit & Performance	Conducted gap analysis using ICMM's* framework and revised standards for a risk-based approach.	External audit and bi-weekly KPI* reports track rehabilitation progress and land use integration.	Not specified	Not Specified	Not specified	Not specified
Employee Transition	Minimize workforce impacts through closure planning frameworks.	Provides employees with portable skills for transition post-closure.	Not specified	Not Specified	Not specified	Not specified
Reporting	Land disturbed vs. rehabilitated.	Land disturbed vs. rehabilitated.	Not specified	Total hectares of land rehabilitated up to the year 2022 per operation, no hector disturbed is reported.	No reporting done	No reporting done

*** ERF –** *Environmental Rehabilitation fund; DMRE - Department of Mineral Resources;* ***ICMM*** *- International Council on Mining and Metals;* **KPI** - Key performance indicator

Companies A and B lead in rehabilitation reporting, providing post-mining restoration estimates and aligning closure efforts with social, economic, and environmental frameworks. They prioritize stakeholder engagement by addressing community needs and minimizing impacts on employees affected by closures. Nsontaulwa and Kaonda (2024) highlight that effective rehabilitation planning should incorporate community perspectives, ensuring that post-mining land use aligns with local socio-economic needs and environmental conservation efforts. Both companies integrate closure planning into their broader strategies, detailing specific initiatives. Notably, they are the only companies to report annually on the proportion of land disturbed versus rehabilitated.

In contrast, Company C does not offer specifics about their closure or recovery strategy. It is unclear whether this lack of data is related to the company's primarily underground operations, which may not have a major surface footprint. However, Hahn and Lülfs (2014) warn that exclusions in sustainability reports might generate a false picture, causing stakeholders to mistakenly believe that the lack of information indicates compliance or limited environmental effect.

Companies D, E, and F provide minimal disclosure and lack specific mention of closure and rehabilitation practices. The observation is that despite Company D referencing some post-closure land utilisation efforts in partnership with its communities and commendably reporting on land rehabilitated in hectares across the operations it owns. However, this is only up to the year 2022. Poor disclosure may indicate inadequate planning or resources allocated for closure and rehabilitation. This can lead to abandoned mines and socio-economic challenges for affected communities (Sibeko, 2022).

4.1.4. Air Emissions

This aspect includes the effects of air pollution emissions such as sulphur oxides (SOx), nitrogen oxides (NOx), particulate matter (PM), volatile organic compounds (VOC), carbon monoxide (CO), and heavy metals such as lead, mercury, and

cadmium (Global Reporting Initiative, 2022). These air emissions can negatively impact air quality and ecosystems, affecting both human and animal health. For instance, a study analysing air pollution emissions from Australian coal mining between 2008 and 2018 found significant increases in PM_{10} levels, metals, and NO_x over the study period, highlighting the environmental and health challenges associated with mining activities (Hendryx et al., 2020). Similarly, a 2020 case study on platinum group metals and nickel mining in South Africa revealed that particulate and metal emissions pose serious health risks to surrounding communities, underscoring the need for stronger regulatory enforcement and air quality management (UBA, 2020). Given these impacts, robust air quality monitoring and transparent reporting are essential to mitigate risks and to inform policy decisions (Han et al., 2018).

Table 6 contrasts the examined organisations' approaches to air quality management, focusing on regulatory compliance, dust fallout management, emissions reduction, and community considerations.

Table 6: Air emissions reporting differences between the selected listed and non-listed coal companies

Aspect	Company A	Company B	Company C	Company D	Company E	Company F
Regulatory compliance	Aligns with Air Quality Act. Reports on its air emissions management.	Aligns with Air Quality Act, Adheres to National Dust Control Regulations and submits five-year pollution prevention plans.	Aligns with Air Quality Act and Highveld priority area requirements.	Not specified	Aligns with Air Quality Act.	Not specified
Dust management reporting	Does not report on dust fall out.	Actively measures and mitigates dust (e.g., dust suppressants, vegetation, blasting control).	Does not report on dust fall out.	Reports on dust emissions per operation only up to the year 2022.	No reporting done	No reporting done
Performance metrics	Year-on-year SOx, NOx, PM10 and TSP trends.	Year-on-year SOx, NOx, PM10 TSP trends, including dust fall out.	Year-on-year SOx, NOx, PM10 TSP trends.	Only reports on dust fall and not PM or other gases.	No reporting done	No reporting done
Emissions reduction strategies	Not explicitly mentioned.	Exploring monitoring of wider emissions in real time.	Plans to transition plants to lower-carbon feedstocks to improve air quality.	Not explicitly mentioned.	Not detailed	Not specified
Community focus	Not specified	Focuses on dust impact due to operations near residential areas.	Aims to address health impacts in the Highveld Priority area.	Aims to reduce PM and dust fall out due to its proximity to sensitive receptors; operation in two airsheds: Vaal triangle and Highveld.	Not specified	Not specified

Company B leads in air quality disclosure, showcasing detailed mitigation strategies, real-time monitoring, and community-focused initiatives. Furthermore, it is notably the only company to report on both PM and dust fallout from their activities. Meanwhile, Company A provides moderate disclosure, reporting compliance with PM standards but showing limited proactive mitigation or community engagement. Company C emphasizes transitioning to cleaner feedstocks and addressing health impacts in priority areas. All listed companies report on other gases such as SOx, NOx, and TSP trends.

In contrast, Companies D, E, and F offer minimal or no meaningful disclosures, revealing significant gaps in transparency and air quality responsibility. However, Company D does acknowledge its operations in airshed areas and reports on dust fallout results up to the year 2022. As mentioned above, it is unclear whether this data is still collected internally but not disclosed to the public. Carno and Migueis (2022) suggest that companies may retain data internally and only publish it when necessary or required.

A commonality among Companies A, B, C, and E is their stated alignment with the National Environmental Management Air Quality Act (Act no. 39 of 2004). It is commendable, however, that Companies B and D report the data on a per-operation basis rather than as consolidated company-wide figures. This practice offers stakeholders detailed insights into the environmental impacts of each site, thereby enhancing transparency, fostering trust, and demonstrating a commitment to responsible practices (United Nations, 2020).

4.1.5 Waste

The waste management comparison in Table 7 highlights that the reporting and recycling practices of listed companies align with global circular economy principles, focusing on resource efficiency, waste reduction, and the reintegration of materials into production cycles to minimize environmental impact (Matsuda, 2023). According to the GRI, waste includes any material that a holder discards, intends to

discard, or is mandated to be discarded. Improper waste management can lead to adverse environmental and human health effects, potentially affecting areas far beyond the original waste generation and disposal sites (Global Reporting Initiative, 2022).

Table 7: Waste reporting differences between the selected listed and non-listed coal companies

Aspect	Company A	Company B	Company C	Company D	Company E	Company F
Waste management policies	Manages waste disposal and recycling per operation, aligns with NEM:WA.	Aligns with the NEM:WA and FTSE Russel.	Evolved policies to align with NEM:WA and industry practices.	Aligns with the NEM: WA.	Aligns with the NEM:WA	Aligns with the NEM:WA
Waste reporting	Reports on hazardous, non-hazardous waste, % of waste recycled, and reasons for fluctuations, in tons year on year.	Reports on hazardous, non-hazardous waste, % of waste recycled and provides reasons for fluctuations, in tons year on year.	Reports on hazardous, non-hazardous waste, % of waste recycled in tons year on year.	No reporting done	No reporting done	No reporting done
Compliance and strategy updates	Not explicitly mentioned.	Waste policy updated in 2021: Collaborated with DFFE* to clarify the waste definitions under the National Environmental Management Laws Amendment Act (2022).	Supported BUSA* review of the NEM:WA's third edition; Engaged in reclassification of waste streams with DFFE.	Substituting harmful substances with environmentally friendly alternatives whenever possible.	No reporting done	Not specified

Circular Economy Initiatives	Not explicitly mentioned.	Procured new equipment under SLP* and ESD* initiatives: Aims to treat waste near its source to reduce transport emissions.	Evaluated ash beneficiation and its potential to reduce overall negative footprint through legacy ash sites.	Investigating solutions for waste tires for potential energy production and other by-products.	Reducing, reusing and recycling waste and minimising final disposal.	Not specified
Collaboration and partnerships	Not explicitly mentioned.	Works with suppliers for sustainable waste streams solutions.	Works with suppliers for sustainable waste streams solutions.	Creating downstream business opportunities through recycling.	Not Specified	Not specified
Other	Reported on some moderate incidents around waste.	Company reported to have received a non-compliance notice regarding old waste tires.	Not explicitly mentioned	Not specified	Not Specified	Not specified

** **DFFE –** Department of Forestry, Fisheries and the Environment; **BUSA –** Business Unity South Africa; **ESD** - Enterprise and Supplier Development; SLP – Social labour plan*

From this table, it is observed that Companies B and C offer the most comprehensive waste management disclosures, while Company A provides slightly less detailed information. All three listed companies disclose data regarding waste volumes disposed of and recycled. Commendably, Company B reports waste volumes per operation. However, Companies B and C further elaborate on their initiatives by detailing partnerships and collaborations aimed at enhancing waste management practices through waste reduction. This aligns with research by Kalisz et al. (2022), which emphasises the importance of developing comprehensive strategies that encompass waste reduction, recycling, and safe disposal methods, particularly in the extractive industry. Interestingly, only listed Companies A and B report on incidents related to waste management obtained. In contrast, Companies D, E, and F do not report operational waste volumes. While Companies D and E mention efforts to reduce and recycle waste, Company D specifically highlights its collaboration with community businesses. However, without consistent year-on-year reporting of waste volumes, tracking performance in this area remains challenging (Geissdoerfer et al., 2017). Only listed Companies A and B report on incidents related to waste management obtained. In contrast, Companies D, E, and F do not report operational waste volumes. While Companies D and E mention efforts to reduce and recycle waste, Company D specifically highlights its collaboration with community businesses. However, without consistent year-on-year reporting of waste volumes, tracking performance in this area remains challenging (Geissdoerfer, et al., 2017).

Furthermore, all evaluated companies reference compliance with the National Environmental Management: Waste Act, demonstrating a baseline commitment to regulatory standards (Ahmad et al., 2024). Listed companies have demonstrated transparency in waste management by also reporting on waste-related grievances.

4.1.6 Water use and effluents

Access to fresh water is a fundamental human right and is crucial for human life and well-being (Fantini, 2019; Nehaluddin & Lilienthal, 2021). A company’s water usage

and the quality of its water discharges can significantly affect ecosystems and communities. This topic aims to address the implications of water withdrawal, consumption, and discharge quality (Global Reporting Initiative, 2022). The table below compares the six coal mining companies' approaches to water management, focusing on transparency, collaboration, efficiency, innovation, and regulatory compliance.

Table 8: Water use and effluents reporting differences between the selected listed and non-listed coal companies

Aspect	Company A	Company B	Company C	Company D	Company E	Company F
Transparency and reporting	Water withdrawal, recycling discharge & consumption with detailed analysis, targets and trends, provides reasons for variances.	Water withdrawal, recycling discharge & consumption with detailed analysis, targets and trends, provides reasons for variances.	Water withdrawal, recycling discharge & consumption with detailed analysis, targets and trends, provides reasons for variances	Not specified	Not specified	Not specified
Collaboration for sustainable water solutions	Local communities, MWCB and Business for Development.	Communities, mining firms, Coaltech, universities.	DWS, Eskom, Rand water to tackle catchment water challenges.	Not specified	Not specified	Not specified
Water Management processes	Linked to SDG, group-wide policy and group environmental standards.	Aligned to NWA and DWS's Integrated water resource management hierarchy.	Aligned to NWA, focused on maintaining WUL compliance and infrastructure improvements.	Aligned to NWA and DWS's Integrated water resource management hierarchy.	Aligned with NWA, stated that employees and contractors are bound to adhere to the conditions in its WUL.	Aligned with NWA
Water usage efficiency	Reports on efficiency and has water targets for water stressed areas vs not.	Includes targets in STI* scheme, focused on reducing water intensity and water security.	Focuses on reducing water consumption in water scarce areas. Reports its water use efficiency targets to the CDP*.	Reports water use efficiency per operation only up to the year 2022.	Flow meters installed at points where water is abstracted.	Not specified

Innovation in water projects	Wetland offset project, repurposing mine land for agriculture.	Leak detection, pressure monitoring and alternative water sources projects.	Wetland reinstatement, additional dam linings, provide technical support to DWS on critical pump stations.	Not specified	Processing plant to filter and separate solids from clean water for water recycling. Utilizes a closed water recirculation system, to prevent contaminated water release to the surrounding environment. Treatment of sewage water that's released to wetland system after testing.	Not specified
Other	Reports on water related fines due to exceedances of permissible pollutant concentrations over the years.	Water discharge related impacts/fines not included in their reports.	Water discharge related impacts/fines not included in their reports.	Not specified	Not specified	Not specified

*__STI__ - *Short-Term Incentive* * __CDP -__ *Carbon Disclosure Project*

Similar to other environmental topics, Companies A, B, and C exhibit detailed practices for reporting water management compared to their non-listed counterparts. These listed entities provide comprehensive analyses of water withdrawal, recycling, discharge, targets, trends, and explanations for variances in their data. Conversely, non-listed companies generally lack transparency in water data reporting, except for Company D, whose water efficiency reporting is limited to the year 2022.

Listed companies elaborate on various water resource management techniques, such as wetland offsets and leak detection systems, to manage water on-site. Similarly, Company E reports on the installation of flow meters at water abstraction points; however, unlike non-listed companies, it fails to disclose the volumes. Furthermore, despite claiming to operate a sewage treatment plant for water discharge, the company does not provide any water quality reports. Although Company E reports on water management initiatives, the absence of data on abstraction volumes and water quality makes it difficult to assess their effectiveness. Transparent, data-backed reporting is essential to demonstrate whether sustainability efforts are genuinely impactful or merely well-marketed (Bednárová et al., 2019; Isto, 2022).

Both listed and non-listed companies claim to comply with the National Water Act and the terms of their Water Use Licenses. Additionally, listed companies adopt a collaborative approach with DWS and other external stakeholders, such as Coaltech and other mining companies, to address potential and actual water issues, including pollution and scarcity. This collaborative approach is commendable, as water is a shared resource between mining operations and local communities, necessitating coordinated efforts among users (Kunz & Fraser, 2018).

4.2. Part B: Social aspects

Social topics in sustainability reporting have gained prominence as companies recognize their role in addressing human rights, labour practices, community engagement, and diversity, equity, and inclusion (DEI) (KPMG, 2022). In the mining sector, social reporting is particularly crucial due to the industry's significant socioeconomic impact on local communities, workforce welfare, and indigenous rights (ICMM, 2022). Frameworks such as the GRI and SASB emphasize the need for transparency on social performance, requiring disclosures on workforce diversity, occupational health and safety, and community investments (Morales, et al., 2023). Studies indicate that stakeholders, including investors and regulatory bodies, increasingly consider social indicators alongside financial performance, reinforcing the necessity for standardized and comparable disclosures (Eccles & Klimenko, 2019).

4.2.1. Socio-Economic Impact

According to Glaeser and Poterba (2021), an organisation's economic impact pertains to how the value it creates affects economic systems. This can occur through various means, such as procurement practices and employment (Eriksson, et al., 2022). Moreover, an organisation's investments in infrastructure and the services it supports can significantly influence a community's well-being and long-term development. This section covers the selected companies' socio-economic impacts on local, national, and global scales (Global Reporting Initiative, 2022). Table 9 demonstrates how the different selected mining corporations create value for the economies they operations in.

Table 9: Economic reporting differences between the selected listed and non-listed coal companies

Category	Company A	Company B	Company C	Company D	Company E	Company F
Social economic strategy	Social Contribution Framework to enhance contributions through co-development and partnerships.	Procurement and supply chain strategies promote local economic development, historically disadvantaged suppliers, transparency, and governance.	Committed to equal employment and local entrepreneurship.	Implemented employee and community trusts, exceeding mining charter and SLP requirements.	Addresses CSR* through SLPs* focusing on sustainable community development.	Focus on empowering previously disadvantaged members of host communities.
Local Employment & Economic Development	Focus on local capacity building, support discretionary and non-discretionary contributions. Collaborate with local authorities for social initiatives (e.g., medical services). Provides local employment, contracting opportunities,	Takes an integrated approach to infrastructure, education, healthcare, and ESD*. Engages with industry bodies like the Minerals Council SA and aligns initiatives with SDGs and NDP* 2030. Reports on community employment.	Creates socio-economic value through healthcare, education, skills development, and infrastructure. Encourages employee volunteerism. Does not report on community employment.	Community Trust, funds local healthcare, education, housing, and services, including primary healthcare centers and GBV support. Reports on local employment from 2018-2020.	Collaborates with statutory bodies such as Mines Qualifications Authority, for skills development in mining. Does not report on community employment.	Provides resources, support, and skills for economic participation and improved livelihoods. Fosters inclusive growth and community well-being. Does not report on community employment.

Education & Skills Development	Details education, and bursary initiatives.	Details education, and bursary initiatives.	Invests in employees that will be impacted by the transition.	Invests in employee development through training, internships, learnerships, bursary schemes, and study assistance.	Offers bursaries, learnerships, internships, and career development programs. Provides functional literacy and numeracy programs for employees.	Offers skills training, internships, learnerships, and funds higher education.
SLP Availability & Reporting	References SLPs in reports, but not available online.	SLP documents not published but referenced in ESG reports.	References for SLPs in media articles but full copies are not available online.	SLP documents available online, including a translation into isiZulu.	SLP* available on website.	No information on SLP availability.
ESD and local suppliers' initiative	Established ESD hubs. Hubs offer funding, consultations, training, and mentoring. Supplier portals allow local black-owned businesses to register for procurement opportunities and access a one-year business skills training program.	Committed to increasing black youth-owned SMME involvement in supply chain to tackle youth unemployment. Aims to support cost reduction, reskilling business units, and managing conflicts of interest within supply chain.	ESD approach aligns with local needs. Focus on local procurement, black-owned businesses, responsible sourcing, market access, capability building, and funding.	Reports on ESD spend per operation (up to 2022). Provides technical and business development support through mentoring and coaching.	Not specified	Not specified

***ESD –** *Enterprise supplier development*; **CSR** - *Corporate social responsibility*; **SLPs –** *Social labour plan*; **NDP-** *National development plan*

Both listed and non-listed companies have detailed the socio-economic impact of their mining operations in their reports. These organisations detail the various socio-economic initiatives they undertake within the communities where they operate. Companies adopt a range of strategies aimed at enhancing local economic development, employment, education, and infrastructure development. It is not surprising that socioeconomic impact was disclosed in depth in comparison to the environmental topics. This trend can be attributed to the more immediate and tangible nature of socio-economic factors, such as employment and community development, which are linked to a company's operations and are often more straightforward to measure and report (Nugrahani & Artanto, 2022; Farisa, 2017).

Moreover, mining firms emphasize social contributions via partnerships, co-development efforts, and compliance with legal frameworks such as the Mining Charter and Social and Labour Plans (SLPs). While non-listed companies may not publish formal reports, they nonetheless emphasize their positive impact on communities, aligning with the theory of Corporate Social Responsibility (CSR). According to Abrahamsson and Segerstedt (2019), CSR connects companies with affected communities by implementing community development projects, thereby improving the quality of life in those areas through local development initiatives as explored above. Additionally, CSR can be a tool for obtaining a social license to operate (Hilson, 2019).

Furthermore, the SLP is one of the only standalone documents published by non-listed companies, as exemplified by Companies D and E. Company D distinguishes itself further by providing an IsiZulu translation of the SLP to facilitate understanding among community members. Company E also releases an 8-page biannual publication dating back to 2018, covering topics such as internships, bursaries, Adult Basic Education and Training programs (ABET), employee achievements, and supplier development. The implementation of ESD initiatives at company F is not well-documented, making it challenging to determine the extent to which these programs are being carried out.

Interestingly, unlike non-listed companies, listed companies do not publish SLP reports as separate documents but include SLP details in their sustainability or ESG reports. For example, Company B provides details on completed and delayed projects. This approach is acceptable since the MPRDA does not explicitly mandate online disclosures, but the Promotion of Access to Information Act (PAIA) requires companies to make SLPs accessible to stakeholders upon request (Republic of South Africa, 2002).

4.2.2. Local communities

Local communities consist of individuals who reside or work in areas influenced by or potentially influenced by an organisation's operations (Gurr & Kansilembo, 2024). Organisations are expected to engage with these communities to understand their vulnerabilities and how they may be impacted by the organisation's activities (Global Reporting Initiative, 2022). Engagement includes making complaint platforms available for interested and affected parties (Wielga & Harrison, 2023). The comparison of community engagement and community complaint processes between the selected listed and non-listed mining companies is highlighted in table 10 below.

Table 10: Local communities reporting differences between the selected listed and non-listed coal companies

Category	Company A	Company B	Company C	Company D	Company E	Company F
Stakeholder Engagement Approach	Asset-based community engagement strategy fostering relationships with decision-makers. Uses open-house sessions, face-to-face discussions, and grievance mechanisms.	Stakeholder engagement standard aimed at managing business risks and supporting strategic objectives. Uses engagement scores (1-4) to assess stakeholder relationships.	Engages with communities, societies, and NGOs for business sustainability and societal upliftment. Use perception surveys to identify areas for improvement.	SHE Way framework mandates stakeholder management as part of compliance. Business units must establish processes to identify stakeholder expectations.	No reported stakeholder management plan.	No reported stakeholder management plan.
Engaged Stakeholder Groups	Local communities, decision-makers, and authorities.	Government, regulators, employees, labour unions, communities, investors, customers, suppliers.	Employees, labour, customers, investors, government, communities, NGOs.	Eskom, shareholders, board, employees, unions, communities.	Not specified	Not specified
Key Discussion Topics	Local employment, procurement, socio-economic projects, environmental management, operational impacts.	Service delivery, job creation, engagement trends, stakeholder needs, business risks.	Strategic direction, environmental impacts, transition programs, SDGs.	Stakeholder expectations, compliance, safety, health, economic transformation.	Not reported	Not reported
Community Complaints & Grievances	Reports complaints via local grievance mechanism. Issues include air emissions, odours, fumes, noise, workforce conduct, and dust. Processes aligned with UNGPs and reviewed regularly.	Not reported	Not reported	Not reported	Not reported	Not reported

The analysis indicates that the selected mining companies adopt varying approaches to stakeholder engagement. Some implement structured strategies, while others provide minimal or no disclosure. Companies A, B, C, and D, for example, outline their engagement frameworks, whereas Companies E and F lack reported stakeholder management plans. It is commendable that Company B conducts stakeholder feedback through surveys to assess the level of engagement received, which may drive continual improvement. Fu et al. (2023) argue that stakeholder feedback plays a vital role in helping organisations enhance their operations and align with expectations. It promotes open communication, allowing for early issue identification and better decision-making. It guarantees that all stakeholders agree on critical objectives by sustaining consistent feedback loops. This active engagement enables organisations to adapt to the evolving needs of their communities and market conditions (Hansen & Spitzeck, 2010).

There is also a similarity in the types of stakeholders engaged/involved with Companies A, B, C, and D engaging local communities, authorities, employees, investors, and industry bodies. In contrast, Companies E and F provide no stakeholder engagement disclosures. Key topics and engagement themes include employment, procurement, service delivery, safety, environmental impacts, economic transformation, potential site closures, and the just transition. Company C has declared that it uses the engagements' output to understand risks, opportunities, and material matters. This is critical, as integration leads to more informed and socially responsible business decisions, aligning company operations with community expectations and legal requirements (IRMA, 2018). However, Companies E and F do not report any engagement themes.

Transparency in terms of community grievances is limited, with only Company A detailing a local grievance mechanism, addressing air emissions, noise, workforce conduct, and dust issues. All other companies fail to disclose how they track or resolve community complaints. The absence of openness in community grievance mechanisms is especially troubling in the Mpumalanga coal region, where air

pollution, land degradation, and water contamination pose significant issues for the communities in question. (McCarthy & Pretorius, 2021).

4.2.3. Land and resource rights

Land and resource rights involve entitlements to use, manage, and control land, fisheries, forests, and other natural resources (Sikor et al., 2017). An organisation's influence on the availability and accessibility of these resources can affect local communities and other users (Agrawal & Gibson, 1999). This section analyses the impacts of the selected mining companies use of land and natural resources on human rights and tenure rights, including the effects from the resettlement of local communities (Global Reporting Initiative, 2022). The comparison in approach to land and resource rights between the selected listed and non-listed organisations is highlighted in Table 11 below.

Table 11: Land and resource rights reporting differences between the selected listed and non-listed coal companies

Aspect	Company A	Company B	Company C	Company E	Company F	Company G
Resettlement Policy	Aims to avoid involuntary resettlement; follows IFC Performance Standard 5.	Aligns with IFC Standard 5, DMRE guidelines, and the Minerals Council's Human Rights Framework.	No specific resettlement reporting; unclear if resettlement occurs.	Not specified	Not specified	Not specified
Sustainability Report Details	Lists relocations in 2021 and plans through to 2031.	Details community development efforts, such as skills training and food security initiatives.	No mention of resettlement activities in the sustainability report.	Not specified	Not specified	Not specified
Community Development	Focuses on stakeholder participation and long-term livelihood building.	Donates land with claims to the government and leases land to emerging farmers.	Addresses community rights through a human rights policy.	Not specified	Not specified	Not specified
Challenges Reported	Not explicitly mentioned.	Respect for graves and family relocations handled on a case-by-case basis; specifics not provided.	No challenges reported related to resettlement.	Not specified	Not specified	Not specified

There is limited reporting on resettlements and the potential displacement of community members due to mining activities. Companies A and B provide some insights into their resettlement strategies, aligning them with the IFC Performance Standard and the Minerals Council's Human Rights Framework. The IFC Performance Standard 5 addresses Land Acquisition and Involuntary Resettlement, emphasising the need to avoid involuntary resettlement wherever possible. When unavoidable, it mandates minimising displacement by exploring alternative project designs and implementing measures to mitigate adverse impacts in affected communities. This includes providing compensation for lost assets at full replacement cost and ensuring that resettlement activities are conducted with the appropriate disclosure of information and informed participation of those affected (IFC, 2012). The alignment of resettlement activities to IFC standards is seen to be a widespread practice globally, as alluded to by Partridge & Halmo (2021).

Company A is transparent in detailing planned relocations, while Company B goes further by outlining potential land uses post-rehabilitation and processes for grave relocation. In contrast, Companies C, D, E, and F do not specify their resettlement policies, nor do they provide clear disclosures on whether resettlement occurs, posing risks to affected communities and corporate accountability. Resettlement, particularly in extractive industries, is a complex socio-economic issue that can lead to human rights violations, loss of livelihoods, and community displacement if not managed effectively (Owen & Kemp, 2015).

4.2.4 Occupational health and safety

According to the International Labour Organisation 2016, occupational health and safety involve preventing physical and mental harm to workers and promoting their overall health. This topic addresses the impacts related to workers' health and safety. The comparison of health and safety practices, incidents analysis and reporting including leadership involvement between the selected listed and non-listed mining companies is highlighted in Table 12 below.

Table 12: Occupational health and safety comparison between the selected listed and non-listed coal companies

Aspect	Company A	Company B	Company C	Company D	Company E	Company F
Occupational Health and Safety strategy	Focuses on eliminating fatalities and severe injuries through protocols, behaviour and efficient tools. Aligned with the Mine Health and Safety Act.	Focuses on eliminating fatalities and severe injuries through safety compliance, plans and audits. Aligned with the Mine Health and Safety Act.	Focuses on eliminating fatalities and severe injuries through risk assessments and use of technology. Aligned with the Mine Health and Safety Act.	Focuses on eliminating fatalities and severe injuries through SHE management system, “Eyethu rules”. Aligned with the Mine Health and Safety Act.	Aligned with the Mine Health and Safety Act.	Focuses on eliminating fatalities and severe injuries through HSE management. (Attached HSE policy was noted to be outdated). Aligned with the Mine Health and Safety Act.
Incident analysis and learning	Analyses and compares HPIs annually to learn and revise processes.	Focuses on structured safety audits and plans for compliance, but less emphasis on specific incident-based learnings.	Investigates incidents to determine root causes and corrective actions.	Investigates incidents to determine root causes and to identify corrective actions and manage consequences.	Not specified	Not specified
Leadership involvement	CEO accountability with safety KPIs. Strong emphasis on leadership- driven safety culture.	Leadership held accountable for ensuring employee safety responsibilities are met.	Leadership supports safety culture through operation governance frameworks.	Leadership involvement through SHE management and individual site safety management.	Not specified	Not specified

Employee and contractor involvement	Safety coaching provided in local languages.	Provides training programs on safety awareness and on the job training.	Regular safety and health training integrated into operational practices.	Provides safety training to employees and contractors.	Not specified	Employees provided with ongoing training and protective gear to prevent injuries and health risks.
Occupational Health services	Focuses on healthy lifestyles and early intervention, including rehabilitation, health coaching and cultural sensitivity training.	Health and wellness strategy to address occupational and non-occupational risks. Offers employee wellness with a focus on financial, emotional, and social health.	Prioritises disease prevention, rehabilitation, and health promotion through screening and first aid services. Integrates health services and wellness programs into governance frameworks.	Occupational Health Programme to uphold high standards of physical, mental, and social well-being, based on SANS16001. The company's Emergency Response Service (ERS) provides emergency medical, trauma, and rescue services.	Not specified	Stated to have an occupational health and safety management system to drive continual improvement.
Community and social engagement	Extends health programs to host communities, contractors, and employee families.	Tracks and reports on HIV/AIDs awareness and community health targets.	No specific mention of community engagement.	Not specified	Not specified	Aims to achieve zero harm for its communities.

Risk management	Uses safety management systems specific to each site to manage risks.	Compliance is monitored through structured plans and audits.	Employs PSM* framework and OMS* for systemic risk mitigation.	Focuses on identifying and addressing high risk work.	Not specified	states that appropriate risk management systems are in place.
Data reporting and trends	Reports on HPIs*, LTIs*, LTIFR* and occupational diseases, inclusive of trends.	Reports on HPIs, LTIs, LTIFR and occupational diseases, inclusive of trends.	Reports on HPIs, LTIs, LTIFR and occupational diseases, inclusive of trends.	Reports on occupational diseases for the years 2020-2022. Reports HPIs up to the year 2023.	No reporting done	No reporting done

* ***HPI -*** *High-Potential Incidents;* ***LTI*** *- Lost Time Injuries;* ***LTIFR*** *- Lost Time Injury Frequency Rate;* ***PSM*** *- Process Safety Management;* ***OMS*** *- Operations Management System*

The mining industry is known for exposing employees to unsafe working conditions (Donoghue, 2004; World Health Organisation, 2016), making it understandable that health and safety are detailed in various company documents. However, the selected mining companies demonstrate varying levels of commitment, with some aligning closely with industry standards while others provide minimal transparency. All companies claimed compliance with the Mine Health and Safety Act, aiming to eliminate fatalities and severe injuries, but implementation varied. Some incorporated technology, behavioural change, and governance frameworks, while others, like Company F, focused only on standard compliance without specifying measures. Additionally, Company F's outdated policy raised concerns about adherence to the standards or whether it was used as a tick-box exercise. Companies A, B, and C have reported on the initiatives that they have in place to prevent adverse harm to their employees. This includes safety management systems and PSM and OMS frameworks. Companies A, B, C, and D also provide details on the root cause analysis they conduct with corrective actions taken to prevent recurrence of incidents.

Furthermore, all companies except Company E detail the measures and initiatives employed to address and drive occupational health and well-being in the workplace. Key initiatives include managing exposures, disease prevention, health promotion, rehabilitation, return-to-work programmes, and first aid services. While community health engagement is not a GRI requirement, it is commendable that some of the selected mining companies extend health initiatives beyond mine operations, as seen with Companies A and B.

However, data reporting on OHS trends is inconsistent, amongst the selected companies. Companies A, B, and C disclose key health and safety metrics and provide a trend analysis of performance over the years. Additionally, Company D reported statistics on different occupational diseases up to the year 2022. Companies E and F, on the other hand, do not provide any OHS performance data, making it difficult to assess accountability or evaluate the success of their stated

policies and procedures. Leadership involvement also varies, with some firms emphasising CEO accountability and safety KPIs, while others, including Companies E and F, lack clear leadership accountability structures. Jerab (2023) highlights the crucial role of good leadership in shaping and modifying organisational culture, focusing on leaders' roles as cultural architects, modelling desirable safety and health behaviours, and creating clear accountability systems.

4.3. Conclusion

This section analysed the reporting practices of both listed and non-listed companies, with a particular emphasis on essential environmental and social topics and compared them to the GRI requirements. The analysis reveals notable differences in transparency and disclosure between the selected listed and non-listed companies. Listed companies tend to take a comprehensive approach, providing detailed information on critical environmental issues, such as GHG emissions, air pollution, and monitoring, while actively participating in climate change mitigation and sustainability initiatives. In contrast, non-listed companies often exhibit limited transparency and lack detailed disclosures regarding their sustainability practices. Nevertheless, although both categories of companies emphasise their socio-economic contributions, listed firms integrate these contributions into more comprehensive strategic frameworks, while non-listed companies prioritise immediate effects. Generally, JSE-listed companies align more closely with global standards, offering valuable insights and useful information to stakeholders.

4.4 Consistency table

Table 13: Consistency table – Research objective, propositions, and findings from the study

Research objective	#	Proposition (literature review response to research objective	Findings from study
To investigate types of reporting conducted by listed and non-listed JSE coal mining companies.	1	-JSE-listed companies follow the reporting requirements of the JSE; this includes the King IV Code and the FTSE/JSE Responsible Investment Index. They also report using frameworks like SASB and GRI. -Non-listed companies use legal regulations to guide reporting or may voluntarily report according to the above-mentioned frameworks. -Reporting may include integrated reports, sustainability reports, ESG reports, combined reports or other means of communications with stakeholders.	-Listed companies reporting aligns with frameworks such as the JSE, SASB, ISSB, and TCFD. Additionally, it aligns with affiliations like the CDP, IFC, and ICCM. The SDGs and the UNFCCC Paris Agreement are also aligned with listed companies. -Listed companies produce other various reports in addition to traditional ones (sustainability reports, ESG reports), depending on stakeholder requirements or voluntary frameworks. For example, they may issue a climate change report. -A few regulations guide non-listed companies reporting i.e. MPRDA. -Non listed companies do not produce formal reports, with the exception of SLPs. Reporting is done through media and website tabs. -Listed companies' SLP initiatives are integrated into sustainability reports and not documented in a standalone document.
To identify the driving factors for sustainability reporting.	2	-Social licence to operate and public pressures due to stakeholder expectations for enhanced social and environmental accountability, NGO pressure.	-Social license and stakeholders, including communities, drive both listed and non-listed company reporting, however more prevalent in non-listed companies. However, listed companies disclose S topics in greater detail and with more transparency.

		-Financial implications: Investors are prioritising ESG factors in their decision-making processes. Companies are using ESG reporting to acquire more investment and capital. -Environmental concerns such as air and water pollution and land degradation. -JSE requirements -Regulatory requirements such as NEMA and the MHSA.	-Environmental concerns are a stronger driver for listed companies than non-listed companies. Listed companies also offer greater detail and transparency on E topics. -As expected, the JSE and GRI are major drivers, along with other relevant regulations and frameworks mentioned in Objective 1 above. - Regulatory requirements serve as a big driver for both listed and non-listed companies, i.e., the BEE Act and NEMA. -Listed companies use sustainability reporting not just to attract investment but as a risk management process, i.e. TCFD as a means for climate risk identification and mitigation. Trend analysis used to drive strategic decision.
To assess the evolution of sustainability reporting in coal mining.	3	-Mining companies' sustainability reports have increased over the years in terms of content and quality due to internal and external pressures.	-Sustainability reporting evolved over time due to the adoption of various reporting standards and frameworks as well as the drivers mentioned in objective 2 above. -Listed companies on average produce 10 different types of reports. -There is an increase in the number of environmental and social topics listed companies report on; however, the detail and quality of disclosure differ from company to company due to differences in the application of frameworks. -Advances in technology have facilitated improved data collection in listed companies. -Some reporting takes place in non-listed companies, but it is often inconsistent and ad hoc. No improvement in evolution of reporting has taken place for these companies.

CHAPTER 5: DISCUSSION

The previous chapter explored the main differences in reporting between listed and non-listed companies. This chapter will thoroughly analyse and discuss the findings. The analysis will assess how these distinctions align with existing literature and their relevance to the research aims.

5.1 Types of reporting conducted by listed and non-listed companies

Du Toit (2024) highlights that sustainability reporting can take various forms. During this research, it was noted that for non-listed companies, the reporting system typically includes webpages, media articles, SLPs, presentations, press releases, and internal documents such as policies. However, these companies do not generate formal reports. In contrast, listed companies produce similar documents to non-listed companies and additionally provide different downloadable sustainability reports on their websites. These reports are often signed by the CEO and/or the board chairperson and are aligned with different frameworks, requirements, and stakeholder expectations. Table 14 illustrates the distinct types of reports released by each evaluated company.

Table 14: Comparative table indicating different document types produced by the selected listed and non-listed companies (Source: Author)

Document type	Company A	Company B	Company C	Company D	Company E	Company F
Annual/Integrated report	X	X	X	○	○	○
Sustainability/ESG report	X	X	X	○	○	○
ESG Data Book/Index	X	X	X	○	○	○
Basis of selected ESG KPIs/ Definitions of reporting criteria	X	X	X	○	○	○
Climate Action transition plan/ Climate change report	X	X	X	○	○	○
Ethics and compliance report	X	●	●	○	○	○
Modern slavery statement	X	○	X	○	○	○
Payments to government report/ Tax report	X	X	X	○	○	○
Voluntary principles on security and human rights	X	●	●	○	○	○
Scope 3 emissions calculation methodology	X	●	●	○	○	○
United Nations Global Compact Communication on Progress	●	X	X	○	○	○
Climate advocacy and policy supplement	●	●	X	○	○	○
Conflict minerals	●	○	X	○	○	○
Water security CDP	●	●	X	○	○	○
Climate change CDP	●	●	X	○	○	○
Other: webpages, media articles, SLPs, presentations, press releases, policies and standards	X	X	X	X	X	X

X Disclosed in a standalone document

● Disclosed in another report

○ Not disclosed

The analysis shows that listed companies often produce similar types of reports, with occasional differences in naming conventions. For instance, Company A publishes an annual report, while Companies B and C release integrated reports. Previously, annual reports focused solely on financial information, while integrated

reports provided a more comprehensive view by incorporating both financial and non-financial elements. However, many annual reports now include non-financial data as well. As a result, the distinction between the two reporting styles is becoming less pronounced, and the choice between them depends on a company's stakeholder expectations and strategic objectives (Fasan, 2013; Joss, 2023). In terms of sustainability disclosures, for example, Company B issues an ESG report, whereas Companies A and C publish sustainability reports. These terminological differences indicate subtle distinctions in reporting approaches, despite similarities in content and purpose. Moreover, formatting and presentation vary between companies, with differences in granularity and emphasis on specific ESG topics.

Figure 3 further compares the types of reports produced by listed versus non-listed companies. For listed companies, integrated or annual reports cover both financial performance and key ESG performance data, as observed with Companies A, B, and C. The listed companies align their reporting with the King IV Report on Corporate Governance and JSE requirements, as seen in similar studies on listed company reporting. As noted by Martini et al. (2020), King IV supports the integration of ESG considerations into corporate strategy to promote long-term value creation and mandates the disclosure of material ESG issues, including climate change, social equity, and governance practices. King IV also emphasises stakeholder inclusivity, ethical leadership, and transparency to meet stakeholder needs and ensure accountability (IoDSA, 2016; JSE, 2022).

Another common report is the ESG Data Workbook or Index, often presented as an Excel spreadsheet, providing detailed numerical values, data trends, and targets for each ESG topic. Listed companies also frequently produce Climate Action Transition Plans or Climate Change Reports, outlining strategies for mitigating climate risks and transitioning to a low-carbon economy. These reports include emissions data, reduction targets, and alignment with global frameworks such as the Paris Agreement, reflecting a broader international trend (Isto, 2022). However, not all listed companies produce the same types of reports. Some integrate specific reports into broader documents, while others publish them separately. For instance,

Companies A and B do not release their Water and Climate CDP reports as standalone documents but incorporate them into their sustainability reports. In contrast, Company C publishes these as separate reports. A similar pattern is observed with the Voluntary Principles on Security and Human Rights and the Scope 3 emissions calculation methodology, where Company A produces separate reports, while Companies B and C integrate this information into their sustainability reports. This reveals that each organisation implements distinct methodologies for disclosing information. These differences may result from strategic preferences, stakeholder expectations, market dynamics, jurisdictional requirements, or differing interpretations of legal and regulatory obligations (Ioannou & Serafeim, 2017). As previously mentioned, non-listed companies do not produce similar reports but rather produce informal documents, a point also highlighted by Spence et al. (2019) and Moneva et al. (2006).

Table 15 highlights the frameworks, standards, principles, and global agreements that listed companies' reference in their reporting to demonstrate compliance or alignment. In addition to the GRI, several comparable standards shape corporate reporting. Notably, the Sustainability Accounting Standards Board (SASB) plays a key role by providing industry-specific standards that help companies disclose financially material sustainability information to investors (Emergent Africa, 2023; SASB, 2018).

Table 15: Differences in frameworks, principles, global agreements and regulations cited by selected listed and non-listed companies (Source: Author)

Cited by only listed companies	Cited by both listed and non-listed companies
• Sustainable development goals (SDGs) • Global reporting initiative (GRI) • Task Force on Climate-related Financial Disclosures (TCFD) • Paris Agreement • Companies Act, 2008 (Act 71 of 2008), as amended (Companies Act) • Sustainability Accounting Standards Board (SASB) • International Financial Reporting Standards (IFRS) • JSE Limited (JSE) Listings Requirements • King IV Report on Corporate Governance for South Africa, 2016 (King IV) • International Integrated Reporting Council's Integrated Reporting Framework 2021 (<IR> Framework) • United Nations Global Compact (UNGC) • International Finance Corporation's (IFC) • UN Guiding Principles on Business and Human Rights • Extractive Industries Transparency Initiative (EITI) • EU Accounting and Transparency Directives • IEAs Sustainability Development Scenario (SDS) • The International Energy Agency's (IEA) • International Financial Reporting Standards (IFRS) • Glasgow climate pact • Presidential Climate Commission (PCC) framework • The South African Code for the Reporting of Exploration Results, Mineral Resources and Mineral Reserves, • Resources and Mineral Reserves, 2016 edition (SAMREC Code) 2022 • Department of Trade, Industry and Competition (DTIC) • New York stock exchange (NYSE) listing requirements • United States Securities and Exchange Commission (SEC) rules and regulations • Sarbanes-Oxley Act of 2002	• ISO 14001 • ISO 45001 • the South African Mining Charter III • Broad-Based Black Economic Empowerment (B-BBEE)

Global frameworks such as the Paris Agreement and the UN Global Compact play a pivotal role in shaping ESG practices, guiding companies in setting sustainability goals and performance indicators, particularly around greenhouse gas emissions (Iysto, 2022). In this study, it is observed that Companies A, B and C reference alignment with the local and global treaties such as the Paris Agreement, the

Presidential Climate Commission (PCC) framework, and the Task Force on Climate-related Financial Disclosures (TCFD). Liu et al. (2022) indicate that mining companies aligned with TCFD frameworks can better manage climate-related risks, enhancing resilience and strategic planning. However, there is variability in TCFD-aligned disclosures, suggesting a need for standardised practices to ensure consistency (Visavadia, 2022).

The assessed companies also mention compliance with the International Financial Reporting Standards (IFRS) Foundation, established in 2001 (IFRS Foundation, 2018), and the International Integrated Reporting Council (IIRC), which released the first International Integrated Reporting (<IR>) Framework in December 2013 (Deloitte, 2013). The 2021 merger of the IFRS Foundation and the IIRC aims to enhance global consistency and comparability in corporate reporting (IAS Plus, 2022).

Adoption of different frameworks among listed companies often arises from their operational jurisdictions. For example, Company C adheres to the New York Stock Exchange (NYSE) requirements, U.S. Securities and Exchange Commission (SEC) regulations, and the Sarbanes-Oxley Act of 2002. In contrast, Company B uniquely aligns with Broad-Based Black Economic Empowerment (B-BBEE) practices, reflecting its status as a South African mining company. According to Hauptmann et al. (2021), firms in jurisdictions where ESG reporting is voluntary tend to adopt frameworks selectively, often prioritising those that enhance corporate reputations. In contrast, countries with mandatory disclosure laws lead to more standardised reporting. Von der Porten (2021) highlights that investor preferences vary by region, influencing the choice of frameworks. For instance, European investors prefer GRI and ESG reporting aligned with the EU Green Deal, whereas North American investors emphasize TCFD and SASB standards due to capital market expectations.

In contrast, it is observed that non-listed companies do not explicitly state their alignment with frameworks such as the SASB, GRI, Paris Agreement, or the PCC framework. This aligns with the observation that these companies have not clearly

proclaimed their views on factors that have to do with climate change or sustainable development (Stubbs et al., 2013). However, they share similarities with listed companies by adhering to standards like ISO 14001, ISO 45001, the South African Mining Charter III, and B-BBEE Codes of Good Practice, which shape their reporting practices.

In conclusion, the analysis presented within table 14 & 15 highlights significant differences in the reporting practices of listed and non-listed coal companies, largely influenced by the diverse frameworks and standards they adopt. Non-listed companies often display unstructured reporting with minimal coherence or reliance on a basic framework, whereas listed companies tend to produce more robust reports grounded in multiple established frameworks, an observation similar to findings of Stubbs et al. (2013), Spence (2016), and Alves et al. (2019). The variations in the reporting among listed companies can make it challenging for investors and other interested and affected parties to make direct comparisons (Evans et al., 2021). Objective 2, below, further explores additional drivers of reporting practices.

5.2 Driving factors for sustainability reporting

i) Regulatory Compliance

From the analysis, it has been noted that regulation is a significant driver for reporting among both non-listed and listed companies, with many coal companies emphasising their alignment with legal frameworks and associated authorizations. This aligns with research by Deegan (2014), which highlights that companies use sustainability reporting to maintain legitimacy and comply with regulatory expectations, particularly in environmentally sensitive sectors such as mining. Several studies have found that regulatory pressure strongly influences sustainability disclosure, as companies seek to demonstrate compliance with environmental laws and industry regulations (Fonseca, 2010). For instance, Company F and Company E assert adherence to, among others, the National Water Act (1998), the National Environmental Management Act (1998), the Mineral and

Petroleum Resources Development Act (2002), and the Mine Health and Safety Act (1996). These regulatory frameworks set out compliance obligations for environmental protection, water resource management, mine health and safety, and responsible resource extraction, shaping how mining companies report their sustainability performance (MHSA, 1996; NEMA, 1998; NWA, 1998; MPRDA, 2022). A critical regulation for both listed and non-listed companies is the MPRDA, which mandates that mining companies submit a SLP when applying for mining rights. The Local Economic Development (LED) projects within the SLP must align with the local municipality's Integrated Development Plan (IDP) (DMRE, 2010) (Thobatsi, 2014). There are legal implications for non-compliance with the SLP, as seen in the case of *Mining Forum of South Africa and Another v. Minister of Mineral Resources and Others (2019).* In the case of Mining Forum of South Africa and Another v. Minister of Mineral Resources and Others (2019), Lonmin faced allegations of failing to meet its SLP commitments. Following an audit by the DMRE, Lonmin was found to be non-compliant in areas such as the Human Resources Development Programme and Local Economic Development Programme. Consequently, the DMRE issued a notice directing Lonmin to suspend all mining activities immediately. All companies, with the exception of Company E, have SLPs in place.

Furthermore, both listed and non-listed companies have stated that they actively engage with regulators to ensure compliance and foster collaboration, such as improved service delivery. They have also asserted their adherence to the BBBEE Act through local procurement policies. Trade unions represent another facet of regulatory compliance for the companies.

The alignment of reporting and sustainability practices with various regulations was anticipated, as several regulations in South Africa require companies to engage in non-financial reporting (Rungan, 2010). For example, the MHSA mandates that mining companies report on health and safety measures, including incidents and preventive strategies to protect the well-being of mine workers (South Africa, 1996). Despite this, the analysis shows that non-listed companies often lack specificity in

their reporting on certain topics, including the number of safety incidents, new work-related injuries, and environmental performance. It is essential to note that this does not necessarily imply that non-listed companies do not possess such data. Instead, the information might exist, but it is not disclosed to the public. Certain regulations mandate that reports be submitted directly to governing bodies without requiring public disclosure (Rungan, 2010). This scenario was highlighted by Carmo & Migueis (2022), who found that companies engaging in voluntary reporting often collect and maintain data internally and do not prioritise making this information available publicly. As a result, regulatory bodies may be the only ones with access to this information and the enforcement thereof, and not necessarily the impacted communities. necessarily the impacted communities.

South Africa has a robust legislative framework guiding sustainable mining practices, including the MPRDA and environmental statutes. However, environmental degradation and socio-economic challenges persist. A 2024 multi-stakeholder report by Mining Dialogues 360° and Good Governance Africa reveals that policy gaps and weak enforcement mechanisms continue to undermine the effectiveness of these laws, calling for stronger institutional alignment and accountability (Mining Dialogues 360° & Good Governance Africa, 2024). Nonadherence to these regulations contravenes Section 24 of the Constitution, which guarantees the right to an environment that does not harm health or well-being. The analysis concludes that regulation alone is insufficient to drive transparency in sustainability reporting, especially in the absence of consistent enforcement and stakeholder engagement.

ii) Environmental Stewardship

Another reason for reporting was seen to be for environmental transparency, as seen in studies by van Staden & Dobbs (2016) and Bednárová et al. (2019). All non-listed companies have acknowledged their contribution to environmental degradation through their activities, including potential water and air pollution and poor waste management practices. They claim to have policies and frameworks in place to prevent degradation and conservation of the environment. The companies

assert compliance with environmental regulations through permits and licenses but offer little evidence of their conservation efforts. They lack clear trends or targets, making accountability difficult for stakeholders. Detailed reports on critical issues, such as water discharge and dust exceedances, are absent. This is concerning, especially in areas with high particulate matter levels, where companies fail to disclose mitigation plans or current data on air quality. The lack of transparency may mislead stakeholders and pose health risks to local communities (Winker, 2023; DFFE, 2024). However, it is important to note that the GRI standards do not mandate companies to report on dust fallout but rather on particulate matter (PM) emissions and other gases such as NOx and SOx (Global Reporting Initiative, 2022). Consequently, Company A and Company C report only on their gas emissions and not on dust fallout. This is unfortunate, as Company A has stated that several of the grievances, they have received from the community relate to dust.

It was encouraging to see Company D release a publication on the Just Transition, especially as they are one of the largest coal miners in South Africa, contributing significant supplies of coal to Eskom. They acknowledge climate change and their contribution to it but remain clear and practical about the coal mining industry's positive impact on South Africa’s economy. None of the other non-listed companies have referenced carbon emission reduction or the Just Transition. This is notable, especially considering that Companies E and F supply coal to Eskom. They have not indicated how the transition towards more sustainable practices will impact their operations, employees, or the communities in which they operate. Apart from the GRI, Chapter 5 of South Africa's NDP addresses and encourages the transition to a low-carbon economy, emphasising the importance of balancing the economic growth with environmental stewardship, aiming to achieve a just transition that safeguards vulnerable communities and workers (National Planning Commission, 2012)

Unlike non-listed companies, listed companies take a proactive approach to climate adaptation and energy transition. They release distinct climate disclosures,

including CDP submissions and climate change reports, outlining strategic pathways toward achieving net zero. This allows companies to align their climate actions with broader business goals, ensuring sustainability is integrated into their overall strategy and is not just a tick-box exercise (Skarne, 2022). Furthermore, these companies report on their carbon emissions and reduction targets. The listed companies have also stated that they have internal committees to track their emission lifecycles. A study by Issa (2024) illustrates the importance of internal governance structures in environmental management. The research indicates that companies with dedicated sustainability committees are better equipped to implement and verify GHG reduction initiatives, leading to improved carbon performance. The presence of such committees facilitates the integration of sustainability into corporate strategy and enhances the credibility of environmental reporting.

Listed companies are also demonstrating leadership in the areas of closure and rehabilitation which is particularly critical for opencast mining operations. These companies assert they have comprehensive closure and rehabilitation plans, validated by external parties and submitted to government departments for compliance. External auditors conduct regular audits, including biannual site visits, to ensure these plans meet environmental and regulatory standards. Engagement with external parties is essential, as they often provide the technical expertise necessary for effective closure (Brock, 2020). On the contrary, non-listed Company D mentions responsible rehabilitation practices but only reports on rehabilitation volumes up to the year 2022. Company F stated that appropriate financial guarantees were provided to the DMRE to cover rehabilitation costs at mine closure; however, no rehabilitation targets and volumes were given. These issues are particularly concerning, given that South Africa was reported to have approximately 800 abandoned coal mines as of 2019 (Sibeko, 2022). The responsibility for non-rehabilitation typically falls upon the government and local communities, who continue to experience the adverse effects of these unrehabilitated sites. For instance, the tragic incident occurred in 2016 when two boys drowned in an abandoned coal mine on the outskirts of Ermelo (ESI-Africa, 2012; Sibeko, 2022).

It is noteworthy that closure plans for listed companies are reported to include social transitioning strategies. This aspect is significant, as rehabilitation and closure processes often involve stakeholder engagement to ensure that rehabilitated land is suitable for diverse and productive uses, such as agriculture (Holcombe et al., 2021).

In terms of water management, all three listed companies report on their water withdrawal volumes and track these against internal targets, with the practice being absent for non-listed companies. It is notable that the GRI does not mandate the reporting of water quality results, whether positive or negative, or whether acidic or not. This is particularly unfortunate given the water pollution issues in the eMalahleni region (Muzerengi and Nephalama, 2016; Shongwe, 2018). However, the GRI does recommend disclosing actions to prevent or mitigate the negative impacts caused by acid mine drainage. Transparency in water monitoring is essential for holding mining corporations responsible for water consumption and providing host communities with public data on how mining companies use and dispose of water (Robertson et al., 2024).

In conclusion, listed companies tend to provide accurate and up-to-date environmental data, tracking their performance against internal targets, international standards, regulations, and sometimes best practices. Additionally, they often include narratives in their reports that explain fluctuations in data compared to previous years. In contrast, non-listed companies typically do not exhibit the same level of disclosure and transparency, potentially leaving interested and affected parties without crucial information.

iii) Social stakeholders: Communities and employees

Another driving force for sustainability reporting, as noted from the analysis, is the influence of internal and external stakeholders, such as employees and the community. Besides the GRI, the ICMM principles highlight the importance of involving stakeholders in sustainable mining practices, especially in principles 3, 4, and 10 of the frameworks (ICMM, 2020).

Both listed and non-listed companies heavily invest in the development of the communities in which they operate. They publish media articles about their community socioeconomic initiatives and activities as well as the support of their SMMEs. They also enhance socio-economic conditions through targeted procurement and initiatives like education and infrastructure. Laurence (2011) maintained that a company's ability to include and maintain good connections and relationships with various stakeholder groups determines its degree of success.

Collaboration is a significant theme for social performance, with companies indicating partnerships with the Mining Qualifications Authority (MQA) and other government bodies to enhance societal benefits. Another key theme is the commonality of stakeholder groups engaged, for example, Eskom and trade unions. As noted in the results, some non-listed companies fail to mention their stakeholder engagement processes throughout their mining lifecycle. This lack of disclosure raises transparency and accountability concerns, possibly leaving key groups uninformed about their activities and decisions. As a result, crucial environmental, social, and economic considerations may be overlooked, potentially worsening negative impacts and hindering effective mitigation strategies. This suggests potential issues in corporate governance and risk management within their mining operations (Lodhia, 2018).

The analysis also suggests that both listed and non-listed companies tend to disclose more information on social topics than environmental ones, with non-listed companies showing this tendency more prominently. This pattern highlights that obtaining a social license to operate and managing stakeholder perception are key motivators for their reporting practices. This aligns with the findings of Shilongo (2023), who noted that labour issues, social aspects, and human rights are typically the most disclosed topics. Similarly, Carmo and Migueis (2022) also emphasised the importance of the local community as a crucial stakeholder. This commonality suggests that companies, regardless of their listing status, prioritize social issues to maintain their legitimacy and positive relationships with stakeholders

Furthermore, a study by Isto (2022) indicated that community investment is another statistic used by mining firms to assist them in maintaining maintain a favourable public image in communities. Companies measure this indicator to show their worth to local communities and for tax purposes. However, as critiqued in the literature, CSR in mining, especially among non-listed companies that provide limited disclosures on critical aspects, may function more as a superficial public relations strategy. This approach can address significant issues adequately, such as community displacement and pollution, thereby diverting attention from the need for stricter regulations and meaningful operational changes (Rajak, 2011; Boiral, 2013).

Even though non-listed companies report on several community initiatives and programmes, significant gaps remain. None of the three non-listed companies reported on possible violations involving the rights of indigenous people or potential displacements due to mining expansion. This is dangerous, as a pertinent example is the Marlin Mine in Guatemala, which illustrates how neglecting stakeholder engagement can lead to human rights violations. In 2005, Indigenous communities filed a complaint alleging that the mine was developed without Free, Prior, and Informed Consent (FPIC), violating their rights under international law. This lack of consultation caused mistrust and tensions, worsened by concerns over environmental harm, including water contamination and reduced access to resources critical for livelihoods. The case highlights the importance of meaningful consultation and respect for Indigenous rights to prevent social conflict, environmental damage, and harm to corporate reputation (Selva, 2005). Furthermore, listed companies have indicated that they report on community complaints and grievances, which has proven to be critical as complaints determine which aspects of their social connections need the greatest improvement (Isto, 2022).

The analysis also highlights a correlation between environmental topics reported by listed companies and their local communities. Research suggests that corporate environmental reporting often reflects community concerns and stakeholder engagement strategies (Lyon & Maxwell, 2004). For instance, Company B's water

strategy includes community communication and training to raise awareness about water issues, aligning with Sarni's (2011) findings that corporate water stewardship requires engagement with local communities for effective water resource management. Similarly, Company C works with the community to address water shortages in their catchment area, reinforcing the argument that businesses play a crucial role in local water governance. This community involvement extends to waste management too, with Company B awarding waste management contracts to local communities through its SLP and ESD initiatives. Tarigan et al. (2020) highlight that community-led waste management models improve efficiency and create local economic opportunities, further supporting the integration of waste-related corporate social responsibility initiatives. Air quality management is also linked to community interests, with Company C developing abatement plans and roadmaps to reduce emissions and mitigate health concerns, a practice echoed in Lyon and Maxwell (2004) and of particular importance in Mpumalanga.

Lastly, listed companies emphasize their commitment to communities during the just transition by providing skills training and supporting local entrepreneurship. Scales (2018) discusses common social impacts of mine closures, such as changes to the community's economic structure and dynamics. As a result, he emphasises the importance of proactive management to mitigate negative outcomes for local communities. Furthermore, Schelly (2020) presented research on using community engagement methods to promote just transitions in energy services. The talk highlights the importance of collaboration with community members to achieve equitable and just energy transitions.

iv) Health and safety

Health and safety disclosures make up a sizable portion of the companies reporting, highlighting that employees are key stakeholders in the mining industry. Given that mining is considered a high-risk sector, both listed and non-listed companies emphasize their commitment to ensuring employee safety. This study demonstrates that the industry actively promotes the establishment of safe working conditions for employees and contractors, with the goal of achieving zero harm.

However, as noted, occupational health and safety (OHS) data, such as statistics on occupational diseases or safety performance, has not been provided to assess the effectiveness of these initiatives in non-listed companies. A study by Pillay et al. (2015) pointed out that lack of data hampers the ability to track improvements in health and safety performance. The authors argue that without initial data and ongoing metrics, it's difficult to determine whether safety practices lead to tangible improvements, highlighting the necessity of empirical evidence in evaluating safety interventions. While inversely, as in the case of listed companies, authors Zhou et al. (2018) argue that ongoing collection of OHS data can allow companies to develop systems for dynamic monitoring and early warning of risks.

v) Investors and risk management

The research also sought to evaluate the issue raised by Khamisu et al. (2024), who suggest that ESG reporting is primarily a tool to attract investment rather than a genuine effort to address environmental and social concerns. However, the analysis did not clearly demonstrate this phenomenon. Listed companies indicated that their sustainability reporting serves multiple stakeholders, including NGOs, local communities, and other non-investor groups, in addition to shareholders.

Nevertheless, one could argue that the substantial costs associated with sustainability reporting, such as data collection and preparation, suggest that listed companies would not engage in this practice if it did not yield tangible benefits, such as increased access to investments. This may explain why non-listed companies do not formally report on ESG matters, as the associated costs might not justify the perceived benefits. Yu et al. (2020) further reinforces this perspective, contending that ESG reporting is often more symbolic than substantive, with companies leveraging it to enhance investor confidence rather than to drive meaningful sustainability initiatives. The authors criticise ESG reporting frameworks, particularly the GRI, for being excessively flexible, enabling companies to selectively disclose only those sustainability topics they deem "material." This was evident in the study, as some listed companies chose not to report on certain issues

directly relevant to them. For example, Company C omitted disclosures on land and resource rights affecting local communities.

While non-listed companies may not produce sustainability reports purely as a means of attracting investment, they are also not necessarily making major strides towards addressing social and environmental concerns, or at least, they are not transparently reporting such efforts. This suggests that the JSE and investor-driven ESG disclosure mandates are compelling listed companies to be more accountable for their sustainability performance. Supporting this notion, some listed companies go beyond the GRI standards mandated by the JSE and voluntarily report under additional ESG frameworks.

From the analysis, it is also evident that sustainability reporting by listed companies serves as both a form of risk management and a driver of business opportunities. For instance, listed Company B explicitly stated that effective stakeholder engagement is integral to identifying business risks. Additionally, all listed companies analysed in the study acknowledged that frameworks such as the TCFD have helped them assess climate-related risks that could impact their operations and business objectives. This aligns with the findings of Khan et al. (2016), who provide empirical evidence that companies focusing on material sustainability issues experience improved financial performance. The authors argue that genuine ESG reporting efforts lead to operational efficiencies and risk mitigation, ultimately benefiting both the company and its stakeholders.

5.3 Evolution of sustainability reporting in the coal mining industry

From the analysis of the listed companies in the research, it is evident that reporting has improved and become more prevalent over the years. This trend is largely attributed to the adoption of various reporting standards and frameworks, including GRI, SASB, TCFD, and JSE's King IV. Additionally, affiliations and guidelines such as the ICMM, SDGs, and IFC have further propelled this trend. This trend is also noted by the increase in the number of different reports that each company

publishes (see table 14). On average, the listed companies reviewed produced an average of ten reports each, a substantial increase from the early 2000s. This suggests a heightened commitment to sustainability reporting and a desire to address the diverse interests of stakeholders, as each report focuses on distinct aspects. The research analysis also highlights an increase in the reporting of environmental and social topics compared to the early 2000s. This aligns with findings by Kolk (2004) and Ioannou & Serafeim (2017), 2017) which document a global rise in ESG reporting, driven by investor pressure, heightened awareness of business risks, alignment with sustainability goals, and regulatory mandates. Furthermore, sustainability reporting covers many more climate-related disclosures than ever before, likely influenced by the Paris Agreement, GHG Protocol, and the introduction of other voluntary frameworks over the years (Akrofi et al., 2022; Horn et al., 2022). Additionally, advances in technology have facilitated improved data collection and analysis, leading to more accurate and comprehensive reporting. Companies are increasingly using various tools and software to track their ESG metrics. The transition towards digital reporting has further enhanced the accessibility and interactivity of sustainability reports (Chomsky, 2024; Zhang & Huang, 2024).

Nevertheless, as noted earlier, the detail and quality of reports differ among the listed companies; some disclosures are comprehensive, while others fall short. Hariram (2023) and Shilongo (2023) have argued that the lack of detail in quality is due to the lack of an authoritative body to oversee the report. This contrasts with the stringent regulations overseeing financial metrics for publicly traded companies, which require adherence to frameworks and principles such as Generally Accepted Accounting Principles (GAAP) and are subject to audits and penalties for inadequate quality and transparency. In comparison, no equivalent repercussions exist for the reporting of non-financial environmental metrics by any authorities (Ioannou & Serafeim, 2017).

In contrast, non-listed companies frequently exhibit inconsistent and ad hoc reporting practices; these entities typically refrain from public disclosure of their

sustainability processes and seldom provide justifications for discontinuities or omissions in their reporting. Notably, some firms have ceased reporting after specific years. Nonetheless, some reporting does take place, particularly concerning social aspects. The involvement of non-listed companies in some form of reporting aligns with the findings of Carmo & Migueis, (2022) research, which concludes that concerns about the impact of sustainability on a company's image and reputation are shared by both listed and non-listed companies. Further research noted that sustainability reporting is often used to highlight and provide visibility to certain social projects that a company is engaged in. However, their reporting still fails to address and propose potential mitigations for the negative environmental and social impacts caused by operations in the Mpumalanga area.

There has been some evidence of non-listed companies adopting voluntary principles of reporting, including SASB and the GRI, particularly in the manufacturing industry, as highlighted by the study by Carmo & Migueis (2022). However, there aren't a lot of studies or evidence suggesting early adoption of voluntary reporting by non-listed mining companies. A study done by Stubbs et al. (2013) and Dissanayake et al. (2021) indicated a proprietary cost theory, which suggests that voluntary disclosure entails costs for information preparation and distribution as well as the possibility of disclosing confidential information that competitors might exploit against the business. Companies would sometimes withhold information that might damage the company's competitive position and only reveal sustainability information if the advantages outweigh the costs. As previously mentioned, this is unfortunate, as some non-listed coal companies are not small entities but rather major suppliers to Eskom. This suggests that they may have the resources to engage in formal reporting.

The evolution of sustainability reporting in South Africa's coal mining sector reflects a broader global trend toward greater corporate accountability and transparency. Studies by Palmen et al. (2023) indicate that future reports are anticipated to exhibit more transparency about accessibility and assurance, as well as include more site-specific performance data. While listed companies lead the way with more

comprehensive and detailed reports, non-listed companies are lagging with their reporting driven by only regulatory requirements and stakeholder expectations.

Conclusion

The chapter underscores notable disparities in the reporting methods of publicly traded and privately held enterprises, influenced by regulatory mandates, stakeholder demands, and environmental accountability. Listed firms exhibit more extensive reporting in accordance with various frameworks, but non-listed companies frequently present unstructured reports with little adherence to frameworks, creating difficulties for stakeholders attempting to make direct comparisons.

CHAPTER 6: CONCLUSION AND RECOMMENDATIONS

This chapter presents the conclusion of the study, which aimed to assess the differences in sustainability reporting between JSE-listed and non-listed companies based on the study's observations. It also offers key recommendations derived from the findings.

6.1. Conclusion

The analysis of sustainability reporting between JSE-listed and non-listed coal mining companies reveals significant differences in both structure and approach. Listed companies produce comprehensive and formalised reports that exceed the requirements of the JSE and the GRI, often incorporating additional frameworks. In contrast, while non-listed companies do report on some ESG practices, their data presentation is less formal, lacks comprehensive coverage, and is often inconsistent. These reports typically do not include trend analyses or underlying data to support claims and are confined to internal documents, web content, and compliance-orientated disclosures.

Despite these differences, both listed and non-listed companies are driven by similar factors in their reporting practices, such as regulatory requirements, environmental stewardship, stakeholder engagement, risk management, and alignment with standards. However, non-listed companies are more heavily influenced by regulatory compliance and the need to maintain their social license to operate. The limited adoption of voluntary reporting by non-listed companies highlights the significant influence of JSE-mandated reporting, compelling listed companies to be more accountable for their sustainability performance.

Furthermore, among listed companies, there is variability in reporting practices due to factors such as differing jurisdictions, stakeholder expectations, and interpretations of reporting standards. This inconsistency can pose challenges for investors and stakeholders attempting to compare or benchmark data.

Sustainability reporting in South Africa's coal mining sector has made notable progress, particularly among listed companies, aided by technological advancements and voluntary frameworks. On the other hand, non-listed companies have not kept up with this progress. This represents a missed opportunity to demonstrate accountability and address vital environmental and social issues, especially in regions like Mpumalanga. Although some non-listed companies have started engaging with voluntary principles, these efforts remain sporadic and inconsistent.

Enhanced regulatory enforcement and integration with financial reporting may be essential to foster wider acceptance and efficacy of sustainability reporting. These measures could improve openness and accountability within the sector, allowing both listed and non-listed companies to more effectively tackle societal and environmental issues and promote sustainable development in the coal mining industry.

6.2. Recommendations

This study also acknowledges several limitations that could be addressed as future research. One limitation is the restriction to the three-year study period (2021–2023); future studies could compare reporting practices over a broader timeframe. Another potential research avenue could involve interviewing personnel from both non-listed and listed mines can be considered for this interview to get a holistic view on their position on sustainability reporting in general.

Further research could also involve analysing firms closer to 2035. The time lag would allow for an investigation into how closely mining companies have progressed toward achieving sustainability targets, such as reducing scope emissions. This would provide insight into the efficacy of ESG frameworks and the commitments made by these companies. By 2035, the just energy transition should be more mature, offering a unique opportunity to assess how coal mining companies have prepared their communities and employees for the transition. Additionally, many of the evaluated companies will have reached the natural end of their mine operations, making it valuable to investigate whether closure commitments, particularly in the Mpumalanga region, have been fulfilled.

6.3 Consistency table

Table 16: Consistency table: research questions, conclusions and contribution to knowledge

Research objective	**#**	**Proposition (literature review response to research objective)**	**Findings from study**	**Key differences between initial proposition and researcher findings**
To investigate types of reporting conducted by listed and non-listed JSE coal mining companies	1	- JSE listed companies follow the reporting requirements of the entity, i.e. the King IV code, FTSE/JSE Responsible Investment Index, SASB and the GRI. - Non listed companies use legal regulation to guide reporting or may voluntarily report according to above mentioned frameworks. - Reporting may include integrated reports, sustainability reports, ESG reports, combined reports or other means of communications with stakeholders	- Listed companies reporting aligns with frameworks such as the JSE, SASB, ISSB, TCFD. Additionally, aligns with affiliations like the CDP, IFC, ICCM. Also aligned with the SDGs and Paris Agreement - Listed companies produce other various reports in addition to traditional ones (sustainability report, ESG report), depending on stakeholder requirements or voluntary framework. For example, they may issue a climate change report. - A few regulations guide non listed companies reporting i.e. MPRDA. - Non listed companies do not produce formal reports, with the exception of	- In addition to the JSE requirements, and other voluntary frameworks, listed company reporting is also guided by affiliations like ICMM, CDP, and IFC and adoption of SDGs and the Paris Agreement. - Reporting for non-listed companies is informal, takes place in media or website pages, except for the SLP. - Listed companies produce other various reports in addition to traditional ones (sustainability report, ESG report), depending on stakeholder requirements or voluntary framework. For example, they may issue a climate change report.

			SLPs. Reporting is done through media and website tabs. - Listed companies SLP initiatives are integrated into sustainability reports and not produced as a standalone document.	
To identify the driving factors for sustainability reporting	2	- Social licence to operate and public pressures due to stakeholder expectations for enhanced social and environmental accountability, NGO pressure. - Financial implications, investors are prioritising ESG factors into their decision-making processes. Companies using ESG reporting to acquire more investment and capital. - Environmental concerns such as air and water pollution, land degradation. - JSE requirements	- Social license and stakeholders, including communities, drive both listed and non-listed company reporting, however more prevalent in non-listed companies. However, listed companies disclose S topics in greater detail and with more transparency. - Environmental concerns are a stronger driver for listed companies than non-listed, listed companies, listed companies also offer greater detail and transparency on E topics. - As expected, the JSE and GRI are major drivers, along with other relevant regulations and frameworks mentioned in Objective 1. - Regulatory requirements serve as a big driver for both listed and non-listed companies, i.e. the BEE Act and NEMA.	- Listed companies are exceeding mandatory JSE and GRI sustainability requirements by adopting additional voluntary frameworks, showing a higher commitment to sustainability beyond minimum obligations. - Regulation and external and internal stakeholders serve as the biggest drivers for non-listed companies reporting, while it plays a crucial role in prompting initial compliance and guiding sustainability efforts, it falls short of consistency and accountability. - Environmental concern is more of a driving factor for listed companies in comparison to non-listed companies.

		- Regulatory requirements such as NEMA and the MHSA	- Listed companies use sustainability reporting not just to attract investment but as a risk management process, i.e. TCFD as a means for climate risk identification and mitigation. Trend analysis used to drive strategic decision.	- Whilst financial gains from sustainability reporting are evident, this incentive appears to drive listed companies to invest meaningfully in societal and environmental initiatives. Creating a mutually beneficial dynamic, where sustainable practices support both societal progress and financial success. - Sustainability reporting includes data collection and trend analysis to determine risks that would have not been determined before. Frameworks such as TCFD also assist with risk identification and mitigation, i.e. climate risk.
To assess the evolution of sustainability reporting in coal mining.	3	- Mining companies' sustainability reports have increased over the years, in terms of content and quality due to internal and external pressures.	- Sustainability reporting evolved over time due to adaptation of various reporting standards and frameworks as well as the drivers mentioned in objective 2. - Listed companies on average produce 10 different types of reports. - There is an increase in the number of environmental and social topics listed	- Sustainability reporting evolved over time due to adaptation of various reporting standards and frameworks. Quality differs though amongst listed companies due to differences in application of frameworks. - Advances in technology have made it easier to collect and analyse data more accurately and effectively.

			companies report on, however the detail and quality of disclosure differs from company to company due to differences in application of frameworks. - Advances in technology have facilitated improved data collection in listed companies. - Some reporting takes place in non-listed companies, but often inconsistent and ad hoc. No improvement of evolution of reporting has taken place for these companies	- Reporting by non-listed companies has not shown improvement over time and, in some cases, has even declined.

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