Factors Contributing to Non-Compliance with Environmental Laws by a Coal Mining Company Operating in the Limpopo and Mpumalanga Provinces

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Declaration of Authenticity

I declare that the research project, Exploring the Factors Contributing to Non-Compliance with Environmental Laws by a Coal Mining Company Operating in the Limpopo and Mpumalanga Provinces, is my own work and that each information source has been acknowledged by means of the complete Harvard Referencing System. This dissertation has not been submitted before for any other research project, degree, or examination at any university.

Andries Andy Kabeng

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Signature of student

October 2024

Date

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Abstract

The South African government has enacted various environmental legislation aimed at protecting the environment. The environmental legislation imposes financial penalties for non-compliance. However, there is a concern that coal mining companies do not comply with various environmental legislation. This study explores the factors contributing to non-compliance with environmental legislation by a coal mining company with operations in Limpopo and Mpumalanga and recommends how the coal mine can address these factors.

An interpretive paradigm was used for the study. A qualitative research approach was followed as the researcher sought to understand the phenomena from the constructed knowledge of the study participants who have experience in the coal mining sector. Data for the study was collected using a documentation review of data related to the study subject, which included audit reports and other reports provided to competent authorities, in-depth interviews, and focus group interviews with mine personnel in management and operations. The researcher used non-probability purposive sampling to select the study participants based on their experience in the coal mining industry.

The findings of the study reveal that various factors contribute to non-compliance with environmental laws by the coal mining company. These factors include human behaviour, operational requirements, leadership and management style, financial constraints, and inadequate compliance monitoring. The study recommends that the coal mining company should increase monitoring to ensure that behaviour that results in non-compliance with environmental legislation is sufficiently monitored and that appropriate action is taken to address the behaviour. Further, the study recommends that the mining company should create an organisational culture of compliance through management commitment. The management commitment outlined is that the coal mining company should ensure adequate skilled personnel is available to ensure increased monitoring.

Keywords: non-compliance, environmental legislation, penalties, behaviour

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List of Acronyms and Abbreviations

CJEU:	Court of Justice of the European Union
DFFE:	Department of Forestry, Fisheries and Environment
DMRE:	Department of Mineral Resources and Energy
EAP:	Environmental Assessment Practitioner
EIA:	Environmental Impact Assessment
EMS:	Environmental Management System
EPI:	Environmental Performance Index
EU:	European Union
IEM:	Integrated Environmental Management
LAC:	Latin America and the Caribbean
MEC:	Member of the Executive Council
MPRDA:	Mineral and Petroleum Resources Development Act
NEMA:	National Environmental Management Act
NEMBA:	National Environmental Management: Biodiversity Act
NEMAQA:	National Environmental Management: Air Quality Act
NEMWA:	National Environmental Management: Waste Act
NWA:	National Water Act
USA:	United States of America

Chapter 1: Introduction and Background

1.1. Introduction

This chapter deals with the background and rationale of this study, the problem statement, the research aims and objectives, the research questions, the research philosophy, the research method, the theoretical and conceptual framework, the significance of the study, the delimitation and scope of the study, the chapter overviews and the conclusion of the chapter.

1.2. Research Background and Rationale

Mining companies in South Africa are required to contribute towards the government's commitments to ensuring sustainable development. Mining companies' social and environmental responsibilities have increased owing to global pressure on the government and companies to ensure sustainable development (Serfontein-Jordaan & Dlungwane, 2022). The Brundtland Report of 1987 defines “sustainable development” as “development that meets the needs of the present without compromising the ability of future generations to meet their own needs” (United Nations, 1987). South Africa has adopted the meaning of sustainable development as outlined in the Brundtland Report (Mosdell, 2022). Therefore, sustainable development in South Africa focuses on three significant issues: environmental protection, social, and economic development.

The NEMA specifically provides for promoting and protecting the social, economic, and environmental rights of all persons in South Africa, including future generations (Mosdell, 2022). Further to the NEMA, several environmental laws and regulations apply to the mining industry and advocate for sustainable development. These include the NWA, the MPRDA, as well as specific environmental management legislation, including the NEMAQA, the NEMWA, and the NEMBA. Environmental laws and regulations call for mining companies to consider the environment while undertaking mining operations. However, it is argued that mining companies do not comply with environmental protection legislation (Huizenga, 2019; Seloa & Ngole-Jeme, 2022).

Non-compliance with environmental legislation in South Africa may result in the imposition of financial penalties on mining companies, including criminal sanctions (Gaveni & Odeku, 2021). Non-compliance with environmental legislation may also result in reputational harm for mining companies. Reputational harm may result in loss of stakeholder and investor support (Wang, Li & Ma, 2019).

It is to be noted that South Africa is among the largest coal producers worldwide, with an annual production of 224 million tonnes (Wang, 2023). The researcher also notes that South Africa is still heavily dependent on coal mining for electricity-generation and economic growth. The understanding by mining companies of legislative requirements is essential for the achievement of South Africa's commitments to various international treaties and conventions as well as the United Nations Sustainable Development Goals that South Africa has committed to achieve by 2030 (United Nations, 2023). The United Nations tracks the overall progress made by countries in achieving sustainable development goals. Finland is currently in the lead with a score of 86.76% while South Africa currently has a score of 64.00% (United Nations, 2023b).

This study focuses on exploring the factors that contribute to non-compliance with South African environmental legislation by a coal mining company operating in the Limpopo and Mpumalanga Provinces to prevent financial penalties for such a coal mine and to prevent reputational harm. Most of the coal production in South Africa occurs in the Limpopo and Mpumalanga Provinces, which contain vast coal reserves and host South Africa's major power stations (Minerals Council of South Africa, 2023). The next section of this study states the problem to be investigated in this study.

1.3. Problem Statement

South Africa is a signatory to various environmental protection conventions that bind South Africa to take measures to contribute towards global environmental protection (Kruger, 2019). Since the promulgation of the Constitution, various environmental pieces of legislation have been enacted. The different pieces of legislation bind not

only government authorities to ensure compliance with the right to environmental and human health protection but also binds mining companies (Gaveni & Odeku, 2021). The legislation focuses on specific environmental areas, including soil, water, air, waste, and biodiversity. Non-compliance with environmental legislation results in the imposition of financial penalties. It negatively impacts a coal mining company's reputation and may result in the loss of stakeholder and investor support (Wang, *et al*., 2019). It is argued that despite the abundance of environmental legislation, pollution by mining companies continues and mining companies are still failing to achieve compliance with various environmental legislation and their regulatory requirements (Huizenga, 2019; Seloa *et al*., 2022).

The NEMA, the framework legislation for environmental protection in South Africa, requires every person who may cause the degradation of the environment to take reasonable measures to prevent the pollution or degradation from occurring or continuing. Where such harm is authorised by law or cannot be reasonably avoided or stopped, the person responsible must minimise and rectify environmental pollution or degradation (Lemine, 2021). The imposition of financial penalties for non-compliance with South African environmental laws is aimed at serving as a deterrence by regulators (Hall, 2022). The assistance of the coal mining company in identifying the factors that contribute to non-compliance with environmental laws allows for an opportunity for the coal mining company to address these factors and avoid the imposition of financial penalties together with the consequences of reputational harm.

South Africa is still heavily dependent on coal mining for electricity-generation and its contribution to economic and social development. However, coal mining is also the most significant contributor to environmental pollution and degradation. The latter risks human health and biodiversity sustainability (Wang, 2023). This research has identified a gap in the literature that previous studies and writings by scholars, such as Murombo and Munyuki (2019) and Kakade (2022), are focused on the enforcement of compliance with environmental laws and have not identified the factors that contribute to non-compliance with environmental laws by coal mining companies.

1.4. Research Aim and Objectives

The study aims to explore the factors that contribute to non-compliance with South African environmental legislation by a coal mining company with coal mining operations in the Limpopo and Mpumalanga Provinces. Further, this study makes recommendations on how the coal mining company can address the factors contributing to non-compliance with environmental laws. Addressing the factors that contribute to non-compliance with environmental legislation may enable the coal mining company to become compliant and prevent the imposition of financial penalties and reputational harm. Thus, the objectives that guide the study are as follows:

i. To explore the factors that hinder compliance with environmental laws in a coal mine.
ii. To determine reasons for the failure in the measures currently employed to ensure compliance with environmental laws.
iii. To determine the measures used to address repetitive environmental incidents and non-compliance.
iv. To recommend how the coal mining company can comply with environmental legislation.

1.5. Research Questions

To achieve the purpose of the study, the primary research question is: “What factors contribute to a coal mining company's non-compliance with South African environmental laws?” The primary research question and objectives of the study resulted in the formulation of the following secondary research questions:

i. What factors hinder compliance with environmental laws in a coal mine?
ii. Why do measures currently employed to ensure compliance with environmental laws fail?
iii. How are the repetitive environmental incidents and non-compliance at a coal mine addressed?
iv. What recommendations may be made to a coal mining company to ensure compliance with environmental legislation?

1.6. Research Philosophy

“Research philosophy” refers to a system of beliefs and assumptions about the development of knowledge. It is the set of beliefs, assumptions, and principles that guide the researcher’s approach to the study and methodology (Al-Ababneh, 2020). The philosophical foundations and paradigm of this study are outlined below.

1.6.1. Philosophical Foundations

“Philosophical foundations” refers to the core beliefs shaping research (Ylönen & Aven, 2023). The philosophical foundations of the study, namely ontology, epistemology, and axiology are discussed below.

1.6.1.1. Ontology

Concerning the study's ontological position, it is essential to outline what is meant by ontology. “Ontology” is defined as the philosophical study of existence and reality. It is concerned with what constitutes reality and is a system of belief that reflects an interpretation by an individual about what constitutes a fact (Al-Ababneh, 2020). The latter means that every researcher has assumptions and beliefs about what constitutes truth and knowledge. The assumptions and beliefs guide society’s thinking (Khatri, 2020).

The researcher in this study has seven years of experience as a legal advisor. He holds two law degrees from respective higher education and learning institutions. During his career, the researcher has audited several coal mining companies in Limpopo and Mpumalanga concerning compliance with environmental legislation. The researcher has observed different attitudes and perceptions toward compliance with environmental legislation by the employees of respective coal mining companies. The level of attitude variation starts with senior managers and goes down to operational workers. The researcher’s interactions with the various mine workers and their different environments and circumstances present an opportunity to explore the

factors that contribute to non-compliance with environmental legislation by a coal mining company.

An ontological relativism approach applies to this study to explore the factors contributing to a coal mining company's non-compliance with South African environmental legislation. According to relativist ontology, it is believed that reality is a subjective experience developed socially and experientially and that there is no absolute truth (Rassokha, 2021). A relativist ontology provides that the truth is always relative to some reference, such as culture. Accordingly, the factors contributing to non-compliance with environmental legislation are perceived differently by the interviewees based on their different work environments and the circumstances in those environments. From a philosophical perspective, the researcher is an ethical relativist. The researcher has relevant experience within the mining industry and environmental law compliance requirements.

1.6.1.2. Epistemology

Epistemology is derived from the Greek words “episteme” meaning ‘knowledge’ and “logos” meaning ‘reason’. “Epistemology” refers to the study of the nature of knowledge and the justification of beliefs held to be true. It is thus a manner of understanding and explaining how we know what we know (Moon, Cvitanovic, Blackman & Scales, 2021). Epistemology is thus concerned with the nature of objects and knowledge development.

Given the ontological position outlined in this study, the researcher regards himself as an interpretivist. Interpretivism denotes a method of research that adopts the position that people’s knowledge of reality is a social construction by human actors. The researcher, thus, sought to experience and consider different interpretations of a particular social context to gain further understanding (Junjie & Yingxin, 2022). Interpretivists follow a qualitative methodology (Junjie *et al*., 2022). An interpretive method was thus appropriate for this study to enable the researcher to understand the

phenomena from the constructed knowledge of the study participants, who have experience in the coal mining sector.

1.6.1.3. Axiology

The word “axiology” originates from two Greek terms, axios meaning ‘worth’ or ‘value’ and logos meaning of ‘logic’ or ‘theory’ (Kryukov, Kicheev & Sotnikova, 2021, p. 7). Axiology primarily refers to the aims of the research. The axiology of interpretivism was followed in this study.

According to the axiology of interpretivism, research is value bound and the researcher is part of what is being researched and is, thus, subjective (Kryukov *et al*., 2021; Alharahsheh & Pius, 2020). The overall goal of this study is to develop an in-depth understanding of the factors that contribute to non-compliance with South African environmental legislation by a coal mining company to enable the prevention of the imposition of financial penalties and prevent reputational harm on the mining company because of non-compliance.

An interview process with various environmental managers and environmental specialists was followed at the respective coal mine operations in Limpopo and Mpumalanga. The aim was to determine the views of the various environmental managers, specialists, practitioners, and mine personnel on what they deem to be the factors that contribute to non-compliance with environmental laws. The researcher believes that values are an essential part of society and that the values of each group are equally important. The researcher has taken the participants' interpretations of the phenomenon in this research study as evidence for the study. The role of the researcher was that of a participant observer rather than a detached observer (Alharahsheh & Pius, 2020). All biases and the value nature of information is reported (Okesina, 2020). Further, in undertaking this study the identities of all participants were treated as confidential, and all necessary consent were obtained from all participants (Edwards, 2022).

1.6.2. Research Paradigm

A research paradigm is a philosophical way of thinking and refers to viewing the world as a researcher (Khatri, 2020). It constitutes the abstract beliefs and principles that shape the researcher's worldview. It informs the meaning or interpretation of research data (Bonache & Festing, 2020).

Various research paradigms include the positivist, interpretivist, and the pragmatism paradigms. Positivists believe that a single reality is possible to understand and measure. Interpretivists believe that numerous realities exist and that a predefined probability cannot predict human behaviour. Pragmatists believe that reality is continually interpreted and renegotiated against new and unpredictable situations (Bonache & Festing, 2020). An interpretivist paradigm is adopted to understand the elements that lead to the lack of adherence to environmental regulations in South Africa. A document analysis process was followed concerning a coal mining company with coal mines in Limpopo and Mpumalanga. Further, an interview process with mine personnel was undertaken. Lastly, a focus group interview process was followed at the two coal mines.

1.7. Research Methodology

Research methodology is “a way to systematically solve a research problem by logically adopting various steps” (Patel & Patel, 2019, p. 48). It refers to the approach, method, and technique followed to collect and analyse data to solve the phenomenon. A multi-method qualitative method was used in this study. A qualitative research method is most appropriate where the researcher requires a deep understanding of the phenomenon and how the participants view the subject under study (Busetto *et al*., 2020). The researcher has had recognition of the fact that the participants in this study have first-hand experience of the coal mining environment and were thus able to provide insight, based on their experiences, into the factors that contribute to non-compliance by a coal mine with environmental laws. The researcher has collected data through document review, individual in-depth interviews, and focus groups (Aspers &

Corte, 2019). The various methods of collecting data aimed to ensure that the data to be analysed was trustworthy, credible, and coherent (Dufour & Richard, 2019).

Further, an inductive research approach was followed during the study. This approach is one in which the researcher collects and analyses data to develop theories, concepts, or hypotheses based on patterns and observations seen in the data (Kim, 2021). In this study, the researcher has collected data, analysed the data for patterns, themes and relationships, as well as utilised the identified patterns, themes, and relationships to create a framework to understand the phenomena.

A case study research design was employed for this qualitative study. A case study research design is appropriate as it explores the phenomena within its context and through the participants' lived experiences and allows the researcher to utilise various sources for data collection (Asenahabi, 2019).

1.8. Theoretical and Conceptual Framework

The theoretical and conceptual frameworks of the study are discussed below. These frameworks assist in shaping the research design, including the choice of data collection and analysis methods. The theoretical and conceptual frameworks are “important in shaping the construction of new knowledge” (Luft, Jeong, Idsardi & Gardner, 2022, p. 2).

1.8.1. Theoretical Framework

A “theoretical framework” is a theoretical standpoint. It guides researchers in analysing data and assists with the interpretation of results. The theoretical framework shapes the research plan (Lakhani & Herbert, 2022). The purpose of a theoretical framework for this study was to assist in limiting the scope of available data by focusing on specific variables and defining the viewpoint that the researcher would take to analyse and interpret the data gathered. Further, the theoretical framework in this study aims to

explain the research phenomena and provide the reader with the logic behind the study as well as the methods used in the study (Luft, *et al*., 2022).

The theoretical framework for this study is the systems theory of compliance. The systems theory of compliance aims to assist in explaining compliance behaviour. According to Orozco (2019, p. 1), “the systems theory of compliance conceptualises the various actors, institutions, and relations that impact compliance practices”. The systems theory of compliance analyses the behaviour of each actor in the compliance process in relation to the economic and non-economic institutional forces that may affect such behaviour.

The systems theory of compliance recognises that various factors may impact compliance behaviour within an organisation. This theory “integrates various insights from behavioural ethics, administrative law, corporate governance, transaction cost economics, and regulatory arbitrage” (Orozco, 2019, p. 3). The systems theory of compliance can portray compliance as it exists in practice. The latter is achieved by recognising that each actor within the compliance process is influenced by specific forces and, in turn, these actors also impact compliance by an organisation (Thimm, 2022). This study recognises that each participant in the study has been exposed to coal mining and has had the experience of what may contribute to non-compliance with environmental laws. Therefore, the participants were able to provide relevant information based on their experience in the coal mining industry.

In exploring the factors that contribute to non-compliance with South African environmental legislation by a coal mining company with operations in the Limpopo and Mpumalanga Provinces, the systems theory of compliance enabled an exploration of various influential areas that may impact compliance with environmental legislation by a coal mining company as it required an analysis of the behaviour of each actor in the compliance process. The systems theory of compliance thus requires the researcher to have a holistic perspective of areas that may impact compliance and the interconnectedness of those areas (Orozco, 2019).

1.8.2. Conceptual Framework

A “conceptual framework” is defined as a visual or written product that explains, in graphic or narrative form, the main factors to be studied (Ruseckaite, Maharaj, Krysinska & Ahern, 2019). A conceptual framework should thus provide a map that connects the various dimensions within the research process. Based on the theoretical and literature review undertaken by the researcher, the researcher has created the conceptual framework presented in Figure 1-1. It conceptualises the literature review and theoretical framework that underpin this study. The framework outlines the various areas that may impact compliance with environmental laws. The conceptual framework considers both internal and external factors that affect compliance. It looks at how the regulatory environment, economic circumstances, resource availability, capacity development, organisational culture, employee behaviour, and literacy level contribute to non-compliance with environmental laws by a coal mining company.

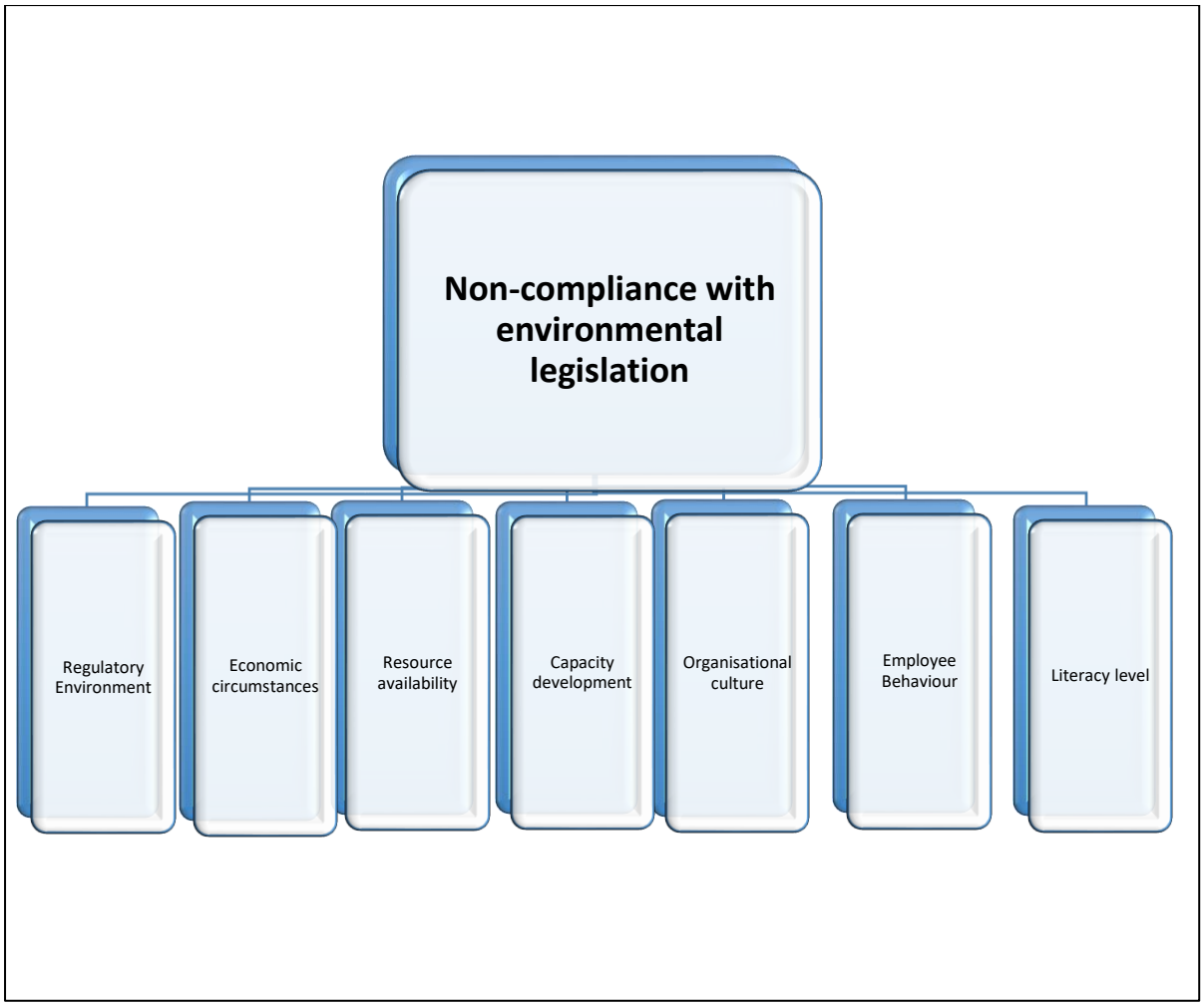

Figure 1-1: Conceptual Framework based on literature review and theoretical framework (Ruseckaite et al., 2019)

1.9. Significance of the Study

South Africa has various environmental legislation that is aimed at giving effect to the Constitutional right to an environment that is not harmful to the health or well-being of any person and is aimed at ensuring the protection of the environment. The various pieces of environmental legislation also provide for the imposition of financial penalties for non-compliance with the legislation. Further, non-compliance with environmental legislation may result in reputational harm for coal mining companies. Reputational harm results in loss of stakeholder and investor support.

Notwithstanding the various environmental legislation, it is argued that mining operations continue to pollute the environment and mining companies cannot comply with the numerous environmental legislations. However, the literature review shows that previous scholarly writing focus on enforcing compliance with environmental laws and there is a gap in identifying the factors contributing to non-compliance.

This study is significant because it is aimed at closing the gap in the existing literature by exploring the factors contributing to non-compliance with the respective environmental laws to prevent the imposition of financial penalties on a coal mining company and prevent the consequences of reputational harm. Furthermore, this study provides recommendations on how to comply with environmental laws by a coal mining company.

South Africa is a country that is still dependent on coal mining for a variety of reasons, including employment and community development (Khubana, Rootman & Smith, 2022). Avoiding penalties will allow the mining company to utilise the finance to continue creating employment and developing communities. Further, identifying the factors contributing to non-compliance with environmental laws by the coal mining company has a benefit to the academic community and researchers, in that it provides a better understanding of the issues relating to what influences non-compliance with environmental laws.

1.10. Delimitation and Scope of the Study

This study was limited to exploring the factors contributing to non-compliance with South African environmental law by a coal mining company. The data in answering the question of what factors contribute to non-compliance with South African environmental laws by a coal mining company was collected from various sources. This included the analysis of relevant documents obtained from the coal mining company, a literature review, conducting of interviews with various mine personnel including environmental managers, environmental specialists and practitioners, as well as focus group interviews at the respective coal mine operations in the Mpumalanga and Limpopo Province. The document review consisted of reviewing documents related to the study which included environmental audit reports, environmental compliance notices issued by government authorities, environmental incident and monitoring reports issued to government authorities.

The data collection process was limited to a coal mining company with coal mine operations in Limpopo and Mpumalanga. It did not extend to other industries and mining companies in South Africa. As a result, other factors within the other industries and mining companies may contribute to non-compliance with environmental legislation that this study may not have explored or identified.

Further, the study focused on non-compliance with South African environmental laws and particularly the factors contributing to non-compliance by a coal mining company. Owing to the topic's sensitivity, the participants were reluctant to disclose their personal experiences fully to the researcher. This resulted in the researcher having to emphasise the confidentiality of the study constantly to participants.

Conducting focus group interviews also presented a challenge for the researcher in terms of managing group dynamics and participation. Further, other participants in the group tended to dominate the discussion, resulting in the researcher spending more

time listening to the views of an individual. However, the researcher has fully considered the views of all participants equally and without any bias.

1.11. Chapter Overviews

This study is divided into five chapters. **Chapter 1** introduces the study and provides the research context and background of the study together with the problem statement. The chapter also deals with the purpose and objectives of the study, the research questions, the research philosophy, and the research methodology utilised for the study. The chapter also provides the significance of the study, the delimitation and scope of the study, chapter overviews, and the conclusion of the study.

Chapter 2 of this study consists of a discussion of the literature relevant to the study. It provides the views of different authors about the factors who contribute to non-compliance with environmental law in the mining industry. The chapter looks at various concepts and theories as well as how these have been analysed by others to explain compliance behaviour. The chapter also explores the systems theory of compliance and how it links to explaining non-compliance with environmental legislation by a coal mining company with operations in Limpopo and Mpumalanga.

Chapter 3 outlines the research methodology used in conducting the study. It outlines the procedures used to identify, select, process, and analyse information about the study. It discusses the research design, the research philosophy, population, and sampling strategy, the data collection instruments utilised, and the data analysis used for the study. The pilot study, limitations, ethical considerations, and conclusions reached are also discussed in the chapter.

Chapter 4 provides the findings of the study and a discussion of the findings. The chapter provides the research findings according to the research questions. Further,

a discussion based on a view through the lens of the Da Vinci TIPS Managerial Leadership Framework is provided, together with a conclusion of the chapter.

Chapter 5 provides the conclusions of the overall study. It also deals with a discussion of the return on investment, the limitations of the study, the recommendations, future research, and the conclusion of the chapter.

1.12. Conclusion

The coal mining industry is important in South Africa as it contributes to economic and social development. However, notwithstanding the benefits of coal mining, mining companies must also ensure that their operations are undertaken in a manner that does not harm the environment and human health.

This study outlines the factors that contribute to non-compliance with environmental legislation by a coal mining company with operations in the Limpopo and Mpumalanga Provinces. This study also makes recommendations for the coal mining company on how to address these factors to enable the avoidance of financial penalties and reputational harm associated with non-compliance with environmental laws. Further, by addressing the factors that contribute to non-compliance to environmental laws, the latter will assist in ensuring better protection of the environment and human health by the coal mining company.

Chapter 2: Literature Review

2.1. Introduction

This section reviews the literature related to non-compliance with environmental laws. It reviews the opinions, perspectives, and interpretations of various writers relating to the study as well as the various theories that explain compliance and non-compliant behaviour, and the various institutions and variables that play a role in compliance and non-compliance with environmental laws. The literature review aims to provide the foundation of the available knowledge and to outline the inconsistencies, gaps, and conflicts in existing research on the topic (Raju & Phung, 2021).

2.2. Environmental Compliance in Mining

Mining is categorised as an invasive industry in relation to the environment (Singh, Saha, Kumar & Bauddh, 2021). Despite the plethora of existing environmental legislation, it is argued that mining companies are failing to comply with the environmental legislation (Huizenga, 2019). It is argued Mining companies, and their operations still negatively impact the health of communities within which they operate through water, soil, and air pollution and that mining operations also have an impact on biodiversity and ecosystems (Mpanza, Adam & Moolla, 2021). Igbayiloye and Bradlow (2021) argue that mining companies are still failing to comply with environmental laws and that such non-compliance threatens the health and safety of host communities and trumps on their human rights. It is argued that mining companies prioritse profits over environmental compliance (Nyikahadzoi, Lotriet & Smit, 2022).

2.3. Cases of Pollution and Environmental Degradation by Mining Companies

Various studies have been conducted in relation to pollution and environmental degradation by mining companies in Limpopo and Mpumalanga. A view of some of the studies is presented below.

2.3.1. Case Studies in Limpopo

A study by Shackleton (2020) highlights that mining activities have resulted in the loss of critical ecosystems on which community members relied on for subsistence. A study by Seloa and Ngole-Jeme (2022) highlights that mining in Limpopo has resulted in severe social and economic impacts on communinities in Limpopo which have been caused by the loss of water quality and arable land by mining operations. This has resulted in the mining communities depending on the assistance of mining companies for survival. A study by Odiyo, Mathoni and Makungo (2020) highlights how mining activities have impacted the health and well-being of mining communities in Limpopo due to impacts on drinking water.

The above studies serve to highlight the consequences of non-compliance with environmental legislation by mining companies and the impact thereof on mining communities. Further, the above studies reveal that the continued pollution by mining companies may compromise South Africa's international commitment of ensuring environmental protection and sustainability. Furthermore, the studies highlight that should pollution continue by mining companies, South Africa might not be able to achieve its Sustainable Development Goals by 2030 as per the 2030 Agenda for Sustainable Development.

2.3.2. Case Studies in Mpumalanga

A study by Wernecke, Langerman, Garland and Feiget (2022) highlights the impact of coal mines and coal-fired power stations on the well-being and health of communities in the Highveld region in the Mpumalanga Province. The study reveals severe levels of air pollution affecting people. The area has been declared a priority area by the government whereby an air quality control plan needs to be implemented to mitigate the levels of pollution caused. A study by Laisani and Jegede (2019) also highlights the impacts of mining on water and air quality and the impacts thereof on the surrounding communities in Witbank, Mpumalanga Province. According to the study, mining activities have resulted in land degradation and loss of arable land, water pollution due to acid mine drainage, and the emission of toxic gases. A study by Dzhangi and Atangana (2024) also highlights how mining companies have impacted farming and ecosystems through the pollution of water resources in the Mpumalanga Province. The study reveals the social and economic consequences that mining has had on the communities that are suffering from various ailments as a result of polluted water.

Again, the above studies also highlight the consequences of non-compliance with environmental legislation by mining activities on mining communities in the Mpumalanga Province. The studies reveal that the consequences range from health issues to economic consequences where livestock farming and food production are suffering as a result of pollution by mining companies. As mentioned above, the continued pollution by mining companies may compromise the ability of South Africa to comply with its international commitments to ensuring environmental protection and sustainability.

2.4. Legal Framework Governing Environmental Compliance in South Africa

South Africa is a signatory to various international treaties that bind the country to take measures that contribute towards global environmental protection (Van der Bank & Karsten, 2020). The Constitution of the Republic of South Africa gives effect to the

international treaties by mandating that recognition should be given to binding and non-binding international law. Further, the Constitution of the Republic of South Africa, as the supreme law of the country, provides for the right to an environment that is not harmful to the health and well-being of any person and to have the environment protected for the benefit of current and future generations (Cooper, 2019). To give effect to the environmental right, the Constitution requires the promulgation of national legislation aimed at environmental protection (Lemine, 2021).

The NEMA is the framework environmental protection legislation in South Africa and requires any person who causes or may cause pollution to the environment to take reasonable measures to prevent or remedy the harm to the environment. This principle contained in the NEMA is referred to as the “duty of care” and forms the framework principle for all specific environmental management legislation such the NEMBA, and NEMAQA (Gaveni & Odeku, 2021). The NWA contains a similar duty of care in relation to water protection (Maphela & Cloete, 2019).

2.5. Nature of Environmental Legislation

Non-compliance with the enacted environmental legislation results in the imposition of financial penalties and negatively impacts a coal mining company's reputation and may result in a loss of stakeholder and investor support (Wang, *et al*., 2019). However, it is argued that despite the plethora of environmental legislation, pollution by mining companies continues and mining companies are still failing to achieve compliance with various environmental legislation and regulatory requirements (Huizenga, 2019; Seloa *et al*., 2022).

All environmental legislation, like any other legislative enactment, must comply with the Constitution. However, the environmental right, as contained in the Constitution, has posed challenges relating to its interpretation (Murcott, 2023). Further, another challenge is that South African courts cannot rely on the international community for guidance as there is no consensus on how environmental rights should be formulated

and interpreted. Either a bio-centric, anthropocentric, or eco-centric approach is followed. Proponents of the bio-centric approach value all forms of life such as plants, animals, and micro-organisms and require environmental protection laws to be directed at the protection of all such life forms. Further, proponents of the bio-centric approach believe that all living things can live together in harmony and all living things deserve equal protection (Have & Patrão Neves, 2021).

It is argued that proponents of the anthropocentric approach focus more on the interests of humans than animals and plants. They require environmental protection to place human needs first (Taylor, Chapron, Kopina, Orlikowska, Gray & Piccolo, 2020). Further, it is also argued that the eco-centric approach places nature before human interests. Proponents of the eco-centric approach believe that by protecting ecosystems and nature, humans will be forced to change their harmful behaviour towards nature (Berning, North, Stevens & Clarke, 2023).

Lemine (2021) argues that the Constitution follows a sustainable approach to environmental protection. A sustainable approach requires economic and social development to have regard for the environment and natural resources. It is argued that achieving sustainability has been difificult to realise and requires a change of perspective by humans who currently either support the anthropocentric or ecocentric approach. Further, it is argued that achieving sustainability requires learning from indigenous societies on how humans may interact harmoniously with nature (Berning, *et al*., 2023).

It is also argued that the Constitution mandates all spheres of the South African government to work together to ensure that all rights contained in the Bill of Rights are realised through the coordination of their actions. It is argued that there is currently a failure of the government to coordinate their processes to govern effectively and to give effect to the right to an environment that is not harmful to health and well-being. The failure by the government is argued to be attributable to, among others,

“fragmentation and uncoordinated policies, legislation, and decision making” (Lemine, 2021, p.166). It is argued that effective environmental governance requires the government to have a clear direction, coordination, capacity, and for the government to be informed and accountable relating to environmental issues. The government also needs to be able to ensure that all people tasked to ensure compliance operate within the defined borders of their duties as set out in empowering legislation. Where government officials operate strictly according to legislation, the latter enhances their legitimacy and set the tone for compliance. Further, it is argued that for the government to be effective in environmental governance, the government needs to adopt an innovative and flexible approach to environmental governance (Falayi, Gambiza & Schoon, 2021).

Another argument is that the enactment of environmental legislation itself can stimulate technological innovation for achieving sustainable development (Wu & Tham, 2023). It is argued that a flexible approach will require the government to ensure that flexible policies for the management of the environment are developed to support legislation. It is argued that the latter will enable the government to respond quickly to and adjust to economic, social, political, and environmental needs that are constantly changing. Changing or amending environmental legislation is argued to be cumbersome and lengthy and results in the government being inefficient in responding to issues. Flexible policies will result in timely responses and faster decision-making relating to various issues by the government (Mukwevho, Retief & Burger, 2022; Adamides, Georgousoglou & Mouzakitis, 2023). A flexible policy approach by the government will also necessitate innovative ways to ensure such compliance. According to studies by Njinyah, Asongu, and Adeleye (2022), environmental legislation will encourage investment in research and development in firms and will result in innovative environmentally friendly production processes as well as products aimed at ensuring compliance. Further, it is argued that collaboration between firms and research institutions should be encouraged by the government to enable knowledge transfer.

It is argued that the active involvement of the government in ensuring the protection of the environment will strengthen the legitimacy of the government and the trust relationship of citizens in the government. When people are faced with severe environmental pollution which is a danger to their health and well-being, their confidence in government and its authority will diminish (Ruan, Qiu, Chen, Liu & Ma, 2022). It is also argued that good state governance can influence the business environment and the behaviour of firms within a country toward a culture of legal and regulatory compliance (Chen, Zhang & Luo, 2024). It is also argued that the quality of good governance should consist of transparency, legal security, and infrastructure quality. Government also needs to be consistent in delivering what it promises to people. Furthermore, it is argued that if legislation is seen as just and fair, the latter increases willingness to obey such laws (Berkel, Estmann & Rand, 2022).

The NEMA is the framework legislation for environmental protection in South Africa and aims to give effect to the environmental right enshrined in the Constitution. It requires every person who may cause the degradation of the environment to take reasonable measures to prevent pollution or degradation from occurring or continuing. Where such harm is authorised by law or cannot be reasonably avoided or stopped, the person responsible must minimise and rectify environmental pollution or degradation (Lemine, 2021).

The NEMA and other specific environmental legislation impose financial penalties relating to violations of the duty to take reasonable measures toward protecting the environment. The imposition of financial penalties for non-compliance is aimed at serving as a deterrence by regulators (Hall, 2022). According to the deterrence theory, criminals act rationally and will commit a crime only when the benefit of the crime outweighs the risk (Abramovaite, Bandyopadhyay, Bhattacharya & Cowen, 2022). Therefore, the deterrence theory holds that to prevent crime, punishment must be so severe as to enhance the risk and to make the crime less appealing. However, there is no consensus in the literature that penalties imposed by environmental legislation and associated reputational harm serve as a deterrence on their own. Some scholars

are of the view that certainty, severity, and celerity need to work together to deter crime (Schneider, 2019). It is thus argued that the combination of certainty, severity, and celerity will increase the expected risk of committing a crime and will thus maximise deterrence. “Certainty” refers to the idea that people must know that by committing a certain act or omission, punishment will be imposed. Severity relates to the idea that to deter people from committing a crime, the punishment associated with the crime must be severe enough. “Celerity” relates to the idea that once a crime has been committed; punishment must be imposed quickly to enable the avoidance of the consequence (Raskolnikov, 2020).

It is argued that the NEMA also introduces the concept of IEM, which aims to promote the integrated environmental management of activities by the government that may affect the environment. It requires the integration and use of several environmental assessment and management tools relating to environmental decision-making by all spheres of government and is aimed at achieving sustainable development enshrined in the Constitution. IEM is argued to be aimed at assisting decision-makers relating to environmental matters to align their goals and objectives with the principles of sustainable development. It assists the government with achieving consistent decision-making relating to environmental matters across all spheres of government (Park, Kang, Chae, Sunwoo & Hong, 2024). The NEMA is argued to provide a framework for cooperative environmental governance in South Africa and thus IEM is argued to be necessary in achieving consistent environmental decision-making by the government. It is further argued that section 23 of the NEMA specifically requires the Director-General of the DFFE to coordinate the activities of the different government departments to assist them in the adoption of the IEM principles. IEM requires government departments to consider the impact of a particular activity on the environment before any decision may be taken in relation to the authorisation of that activity (Lemine, 2021). The specific principles of IEM which are aimed at guiding environmental management decisions by the government are argued to include the requirement for the accountability and responsibility of all stakeholders to be clarified before a decision is taken to authorise an activity that may impact the environment

and for decisions to take into account the needs and interests of all interested and affected parties (Park, *et al*., 2024).

There is a serious need in South Africa to clarify the environmental responsibility imposed by legislation to improve compliance and ensure that the constitutional right to an environment that is not harmful to human health and well-being is achieved. It is suggested that the latter may be achieved by undertaking a reassessment of environmental liability legislation to ensure that such laws are able to deter non-compliant behaviour. It is further argued that well-developed legislation and supporting policies are critical, however, the implementation, administration, and enforcement thereof are more important (Gaveni & Odeku, 2021, p. 23).

2.6. Enforcement of Environmental Legislation

Kakade (2022) highlights that although environmental legislation is enforceable against wrongdoers, enforcement against them is difficult for enforcers given various hurdles. These hurdles include the fact that violators can use multiple defences which the regulatory system itself provides and that there is a lack of resources for enforcement agencies to conduct proper investigations.

It is also argued that globally, there is a lack of adequate and effective enforcement tools and that the lack of community involvement in enforcement makes it difficult to ensure the achievement of compliance (Zulu, Zulu, Chabala, Musonda, Kavishe & Chileshe, 2022). It is also noted that the lack of trust in enforcement authorities and lack of political support also add to the difficulty in enforcing environmental legislation. It is suggested that to make environmental compliance sustainable, the availability of resources for enforcement agencies needs to be improved. Further, other factors such as judicial systems and civil society engagement need to be improved (Aliyev, 2022). According to Tshehla & Wright (2019), political support requires all spheres of government - from national, provincial, and the local level - to ensure that

environmental issues are given enough attention and that appropriate resources are allocated to environmental programs aimed at assisting compliance.

According to Molaiwa (2021, p. 1), South African environmental law contains the principle of environmental justice, which is the principle that provides that “no group of the population should bear a disproportionate share of the negative environmental consequences resulting from industrial, governmental, and commercial operations or policies. It calls for the fair treatment and meaningful involvement of all people regardless of race, colour, national origin, or income concerning the development, implementation, and enforcement of environmental laws, regulations, and policies” (Banzhaf, Ma & Timmins, 2019, p. 167). It is thus argued that the involvement of affected communities in the development, implementation, and enforcement of environmental legislation may lead to better compliance as the involvement of communities in the development and implementation of environmental legislation may shed light on the community standards firms are required to comply with.

It is argued that firms prefer to locate their operations in locations where there is a tolerance for pollution and a willingness to accept compensation (Banzhaf, *et al*., 2019, p. 198). This tends to happen in communities with low literacy levels and standard of living. Therefore, it may be said that firms such firms exploit the economic, social, and developmental circumstances of those communities. Knox and Tronolone (2023) argue that in terms of environmental human rights law, countries must ensure environmental protection education and the awareness of environmental problems. Molaiwa (2021) is of the view that municipalities have a duty, together with other spheres of government, to realise the right to environmental protection and human health as part of the constitutional right of those communities to a safe and healthy environment. Further, it is argued that municipalities have not fulfilled their duties as enforcement agencies to ensure that there is compliance with environmental legislation. It is proposed that municipal courts should assist in ensuring that perpetrators of environmental legislation are prosecuted. This will in turn also give effect to the provisions of the NEMA which provide that any person or group of people may approach the court to protect the environment. However, it is pointed out that to

enable municipal courts to deal effectively with environmental offences, such courts would need to be empowered through the amendment of the Local Government: Municipal Systems Act to give it powers to prosecute based on legislation administered by municipalities only.

2.7. Theories on Compliance

Various theories relating to compliance have emerged in the literature over the past years. The various theories include normative, rationalist, behavioural, and socialist theories. An in-depth look at these theories is necessary for exploring the factors contributing to non-compliance by a coal mining company with environmental legislation to understand the conclusions of previous authors relating to non-compliance and what motivates certain behaviours.

2.7.1. Normative Theory

According to proponents of the normative theory, people and entities comply with environmental laws because they feel obliged to comply with the law or because of societal pressures that favour compliance with environmental laws to protect the environment (Peat, Fikfak & Van der Zee, 2022). Normative theories thus provide for how people should act and articulate what a person must do in order to act morally. These theories are thus aimed at providing guidelines for determining moral behaviour.

Normative theories may be categorised into teleological, deontological, and virtue theories. According to teleological theory, the morality of any behaviour is determined by the consequences or outcomes of that action (Amer, 2019). An act will thus be considered morally acceptable if its consequences are good. The teleological theory thus focuses on the result or consequence of a particular act and not the act itself. However, in deontological theory, a person must act morally. This moral action is not dependent on the outcome or consequence of the act (Tseng & WangYa-Huei, 2021). The virtue theory emphasises that people should develop virtuous and moral traits and

act according to them (Berg, 2020). Thus, a person should develop character traits such as honesty and generosity and live according to such traits. The latter normative theories inform people's decision-making based on the normative stance adopted. Culture, values, background, and philosophical contexts may influence a person's normative stance (Orozco, 2019).

2.7.2. Rationalist Theory

Proponents of the rationalist theory provide that individuals and entities are self-interested, rational actors and act to maximise their economic interests by calculating the cost and benefit of alternative actions. The issue of deterrence and incentives are said to be measures that may influence a person's or entity's behaviour in relation to compliance (Peat *et al*., 2022). According to the rational theory, people will always calculate the cost and benefit in decision-making and will take decisions that align with their goals or benefit them (Schmidt & Wight, 2023).

Various rational choice theory categories are found in the political, social, and economic sciences. These include the general choice, expected utility, and rational expectation theories. According to the general choice theory, people use their self-interests to make choices that benefit them most (Ray, Baker & Caudy, 2020). In terms of the expected utility theory, an individual will decide based on the expected utility of different options. Thus, individuals make choices to maximise their expected utility and benefit (Sapre, 2021). Regarding the rational expectation theory, people make decisions based on their experiences and the information available to them (Curtin, 2022).

2.7.3. Social Norms Theory

The social norms theory suggests that people will behave according to their perception of how others act or what they perceive as appropriate. Social norms are thus defined as informal, unwritten rules that define what is acceptable and appropriate (Gross & Vostroknutov, 2022). It is argued that people tend to accept behaviour where such

behaviour is followed by many others within society and the degree of dependence on the behaviour of others also varies according to different circumstances. Thus, where non-compliance is perceived as the social norm. This will encourage an individual to continue with the non-compliance. It is also argued that the law is critical in shaping societal norms and perceptions towards compliance and it is argued that this may be achieved through ensuring that people understand the law and through proper enforcement and appropriate sanctions (Roy, 2021).

2.8. Measures to Assist and Ensure Compliance

Compliance with environmental legislation means acting in accordance with the provisions of the legislation. Various measures are available to assist with and to ensure compliance with environmental legislation. Some of these measures have been included in the environmental legislation by the legislature. The various measures aimed at assisting and ensuring compliance with environmental legislation are discussed below. Compliance with environmental legislation is important for the protection of human health, biodiversity, and ecosystems.

2.8.1. Environmental Authorisation

The NEMA, which is the framework legislation for environmental protection, includes a measure aimed at assisting with compliance. The NEMA requires, in terms of section 24, that any person (including mining companies) is required to apply for environmental authorisation to undertake an activity listed by a competent authority. This activity is regarded by competent authority to be environmentally invasive.

What is envisaged with environmental authorisation is that any potential consequences to the environment which may be caused by a particular activity should be assessed and reported to the competent authority before the activity commences (Lemine, 2021, p. 159). The applicant for the environmental authorisation is required to appoint an EAP to assess the potential impacts of the proposed activity. The EAP is then required to compile an environmental management programme that will specify how the identified potential impacts on the environment will need to be mitigated and

controlled by the applicant. The latter process followed by the EAP is referred to as an EIA process. The effectiveness of the EIA process has been questioned. Where it was intended that a person who knows and has agreed to implement certain prescribed measures by the EAP would do so, it is found that the mitigation measures prescribed by EAPs are inadequately implemented.

2.8.2. Public Participation

The preamble to the NEMA requires public participation as well as for procedures and institutions to be set up to enable better governance of environmental issues. The inclusion of the public participation process starts when a person needs to apply for environmental authorisation relating to an activity listed under the NEMA listing notices for an activity that may have a detrimental impact on the environment. The inclusion of the public participation process under the Environmental Impact Assessment Regulations of 2014 was aimed at ensuring that decisions to grant licences relating to activities that may detrimentally impact the environment are fair and equitable, and lead to better environmental outcomes.

A public participation process allows for interested and affected parties by an activity to advise on the mitigation measures that the person responsible for the activity would need to put in place to manage the environmental, health, and social impacts of the activity (Maphanga, Shale, Gqomfa & Zungu, 2022). There are, however, concerns that the inputs of interested and affected parties are only considered in the pre-authorisation phase and that they are not taken into account in the full life cycle of the environmental management of an activity. At times, public participation is undertaken as a tickbox exercise, and interested and affected are not meaningfully consulted and their views are not at all taken into consideration about the management of an activity that may detrimentally impact the environment (Cilliers, Van Staden, Roos, Alberts & Retief, 2020; Sibanda & Lues, 2021).

2.8.3. Compliance Notices

The issuing of compliance notices is a mechanism used in environmental laws to assist with compliance and enforcement. In South Africa, environmental management inspectors are tasked with the responsibility of monitoring compliance with environmental legislation and to ensure enforcement about non-compliance. Section 31 of the NEMA empowers environmental management inspectors to issue compliance notices, the power to access and inspect any property as well as the power to ask questions, undertake searches without a warrant and seize property to undertake an investigation relating to compliance with environmental authorisation conditions, licence conditions and any other environmental instrument issued in terms of environmental legislation. Any person who receives a compliance notice from an environmental management inspector is required to comply with the provisions of the notice within the period stipulated in the notice. Failure to comply with a compliance notice may result in revocation by the Minister or MEC of the DFFE of an environmental authorisation or licence issued in terms of environmental legislation. However, the NEMA also provides a mechanism for a person to object to the compliance notice by making written submissions to the Minister of the DFFE or the MEC. Compliance notices are thus aimed at preventing and mitigating harm to the environment by directing a person to take specific measures within a prescribed period (Xaba, Nkomo & Harrypersad, 2022).

2.8.4. Directives

Both the NEMA and the NWA contain measures to empower certain competent authorities to issue directives where there is a failure with the duty of care towards the environment and any water resource. Section 28 of the NEMA creates liability for any person who factors or who may cause environmental damage and provides that the Director-General of the DFFE, the Director-General of the DMRE, a provincial head of department, or a municipal manager has the authority to direct such people who cause or may cause environmental damage to undertake certain measures before a prescribed date or to cease the activity resulting in or which may cause environmental damage.

Should a person issued with a directive in terms of section 28 of the NEMA fail to comply with such directive, the competent authority issuing the directive may approach a competent court for appropriate relief against the infringer. Furthermore, the NEMA empowers a competent authority to issue the directive even when the activity undertaken is authorised by law but there is non-compliance with the conditions of the authorisation (Gaveni & Odeku, 2021).

2.8.5. Monitoring and Reporting

Another mechanism found in the various environmental legislation is that the various legislation requires the monitoring and reporting on environmental compliance as well as compliance to authorisations and regulatory instruments issued in terms of the respective environmental legislation. Section 24 of the NEMA provides that every environmental authorisation must contain an adequate provision for the management and monitoring of an activity until the completion of such an activity. Monitoring reports are required to be submitted to the relevant competent authority responsible. Further, in undertaking monitoring and reporting, mining companies are required to source independent experts to undertake auditing of environmental compliance and to monitor the compliance of certain activities undertaken by the mine. The impacts that mines are required to monitor compliance include compliance with environmental management programmes, dust monitoring, and water monitoring (Dzhangi, 2023; Zhao, Zhao, Han, Song, Wang, Fan, Jia & Jiang, 2021).

2.8.6. Environmental Management Systems

An EMS is a current key focus tool in assisting organisations to comply with environmental legislative requirements. This is achieved by ensuring that the organisation has the necessary policies in place to achieve compliance and that those policies are implemented accordingly. It is argued that organisational policies, no matter how well drafted, become useless without proper implementation. The use of EMS to implement and monitor compliance is argued to assist companies in gaining a competitive advantage by achieving various stakeholder support such as support from regulatory authorities and customers. The latter results from the organisation

being viewed as a responsible corporate citizen. An environmental management system allows the organisation to understand the context within which it operates, the potential impact of its activities, the needs and expectations of various stakeholders, and enables the organisation to respond accordingly (Fet & Michelsen, 2023).

An EMS is argued to consist of several processes and practices that enable companies to mitigate the risk of environmental impacts as a result of its activities. It is argued that the implementation of an EMS may enable a company to achieve sustainable development because an EMS system allows for coordination and cooperation to be achieved between humans and the environment. This is because it encourages the efficient use of natural resources (Ibenrissoul, Benjouid & Kammoun, 2023).

It is further argued that an EMS can assist with the improvement of management's commitment to environmental compliance and continual improvement in environmental compliance as it engages leadership within the organisation, involves planning, and requires performance evaluation. Further, it is argued that an EMS is able to assist in the achievement of environmental compliance in that it requires the establishment of environmental objectives by an organisation and a commitment of resources towards achieving those objectives. Further, the latter is then followed by the requirement of performance evaluation for the organisation to track the achievement of its set goals. An EMS is argued to help develop the competence of employees in dealing with environmental matters, mitigating impacts on the environment and assisting with defining roles and responsibilities (Ali, Belal, Roy, Rahman & Raihan, 2022). The adoption and implementation of an environmental management system is also argued to improve the image and reputation of the company.

Waxin, Bartholomew, Zhao, and Siddiqi (2023) argue that through the adoption and implementation of an environmental management system, various stakeholders, such as communities, government, and investors, realise the commitment of the company's

leadership to ensuring compliance with environmental legislation. The latter allows for investors to become interested in the company and investing in it. It is also argued that the implementation of an environmental management system leads to the overall competitiveness of the firm as the company is also able to reduce the cost of certain activities such as water and waste management activities.

2.9. Empirical Review of Factors Affecting Compliance

An empirical review of the factors affecting compliance with environmental legislation involves looking at research findings regarding what influences compliance with environmental legislation. The below section identifies factors affecting compliance with environmental legislation at a global, regional, and national level.

2.9.1. Global Level Factors

On a global level, environmental protection is regulated by international environmental law. However, empirical studies reveal that the enforcement of international environmental has failed (Kassie, 2024). It is argued that the difficulty in the enforcement of international environmental law is mainly linked to the issue of state sovereignty. State sovereignty is a principle which states that a country, through its government, cannot be subjected to the laws of another country. Environmental pollution impacts countries across borders. Therefore, without the creation of international institutions, to which all countries can be subjected, enforcement of international environmental law becomes a challenge. It is thus proposed that more international enforcement institutions, such as the International Court of Justice, should be established for the enforcement of international environmental law (Nurse, 2020).

Empirical studies show that the major causes resulting in non-compliance is the “ambiguity in international law of key concepts, lack of legal enforcement, and educational differences between countries”. Kassie (2024) suggests that international environmental law and treaties should have strict enforcement mechanisms that can

influence compliance to avoid monetary consequences and that strict cooperation between member states in enacting laws is consistent with the signed treaties to eliminate ambiguity in the interpretation and to close the knowledge gaps between member states.

According to studies undertaken by the United Nations (2019, p. 191), the failure to fully implement and enforce environmental laws and the various gaps in environmental laws is a challenge to environmental protection despite the increase in environmental laws by many nations. Studies conducted by the United Nations reveal that inaccessible dispute resolution as a result of jurisdictional and financial barriers, lack of capacity and accessibility of judges and legal experts, together with the lack of government investment in legal infrastructure, are some of the contributing factors to the lack of implementation and enforcement. The latter is supported by a study by Harrison (2023) which argues that for the successful implementation of multinational environmental agreements, such agreements should cover key elements which include dispute resolution procedures, and mechanisms that are capable of holding all actors, states and individuals, accountable for non-compliance at a global level.

It is argued that capacity-building and technology-transfer between participating nations should be encouraged. A study by Drumbl and Uhlířová (2021) argues that capacity-building regarding compliance with international environmental agreements requires continuous engagement between member states regarding advising one another on the interpretation and the objects of the agreement.

The United Nations (2019) has highlighted that to give effect to international environmental law fully, states need to adopt and make the environmental rule of law a priority. The environmental rule of law is aimed to harmonise economic and social development with environmental protection and can be achieved by creating specialised environmental courts and tribunals, so enhancing the enforcement of environmental laws that tailor legal remedies in environmental laws to relate to the harm and benefit derived from environmental harm and creating environmental

awareness and participation by citizens. Table 2.1 indicates the remedies needed for environmental adjudication and enforcement.

Table 2.1: Remedies for environmental adjudication and enforcement

Remedy	Effect
Preventive and injunctive relief	Maintain the status quo; stop harmful behavior
Declaratory relief	Provide clarity as to what the law says and means
Fines and money penalties	Remove economic incentive; punish noncompliance
Compensation	Make harmed parties whole
Corrective orders	Require parties to act to correct harm
Imprisonment and other criminal sanctions	Punish noncompliance; deter future violations
Administrative penalties	Punish noncompliance for minor violations
Supplemental environmental projects	Provide direct environmental benefits

Source: United Nations (2019, p. 213)

2.9.2. Regional-Level Factors

At a regional level, studies by Khan and Xu (2021, p. 4) highlight that international environmental law has led to the development of regional environmental laws which are mostly flawed owing to poor enforcement, and which are non-binding on member states owing to "regional political sensitivity, historical conflicts, lack of scientific consensus, lack of technical competence, and a lack of political will at the national level". Khan and Xu (2021) highlight the attitude of developing nations is that they cannot afford the environmental cost which is mostly attributable to the activities of developed nations who became rich by exploiting the environment to its fullest and are now trying to prevent developing countries from doing the same.

Regional-level studies by Goncalves (2023) show that the European Union has been struggling to implement and enforce its environmental legislation. The challenges are a result of the financial crisis faced by the EU in 2018. Further, the COVID-19 pandemic also placed financial strain on the EU, together with the war in the Ukraine.

Goncalves (2023, p. 3) notes that “70 percent of EU member states were found to be at high risk of non-compliance with their air emission reduction commitments for ammonia for 2020 to 2030 upwards”. The EU has devised a work plan to focus on environmental protection to curb non-compliance (European Commission, 2022).
According to studies by Squintani (2020), EU environmental laws are flawed by the reporting obligations contained in such laws which require organisations to report non-compliance voluntarily. The main issue is that clear and reliable data regarding non-compliance is not made available and, as such, proper enforcement becomes flawed.

Studies by Epstein and Kantinkoski (2020) recommend that to improve the enforcement of EU environmental laws, member states should agree on members of the public, mostly non-governmental organisations within those states, to partaking in enforcement by being able to bring non-compliance to the CJEU. Currently, most EU environmental law non-compliance is enforced by national courts, which do not have the capacity and who are at times faced with difficulty in interpreting EU Law.

Studies indicate that most East African countries lack the knowledge and resources to implement effective environmental non-compliance monitoring systems such as EIAs and that in Africa in general, there is a lack of alignment between economic activities and environmental protection (Zulu, *et al*., 2022). Studies undertaken by Tigre (2024) in the LAC region indicate the challenges in complying with the Escazu Agreement. The Escazu agreement was adopted in the LAC region in 2018 and officially came into force in 2021. The issue relating to non-compliance with the Escazu agreement in the LAC region is that it expressly requires each party within the LAC region to enact legislation aimed at the protection of human health and the environment. The challenge faced by countries in the LAC is the lack of implementation of required legislation to give full effect to the sustainable development requirements of the agreement. The challenges indicated in the implementation of laws and regulations to give effect to the agreement are the lack of competence to compile sustainable development legislation as well as cultural and language differences between the countries. It is proposed that voluntary information-sharing by member states and collaboration is thus encouraged to assist with the formulation and implementation of

domestic legislation. Furthermore, another challenge raised in implementing the agreement within the LAC countries is the lack of proper access to courts. The lack of competent courts within the member-state countries to enforce the provisions of the agreement is a challenge. As a result of the challenges in implementing the agreement, a committee to support implementation and compliance has been established to assist member states.

2.9.3. National-Level Factors

On a national level, empirical studies reveal that many countries have been struggling with environmental pollution over the years. This is argued to be owing to a lack of structured environmental legislation that clearly outlines the responsibility of, and liability for, environmental protection (Kassie, 2024). Environmental legislation is argued to contain highly ambiguous terms which could be used to escape liability. The implementation of environmental legislation by many countries is poor owing to the uncertainties in the legislation (Lemine, 2021).

The enforcement and monitoring of environmental legislation are a challenge for many countries because of a lack of adequate enforcement resources. This lack of resources results in enforcement officers having limited visibility of the true state of compliance within a country (Zulu, *et al*., 2022). Studies undertaken by Giles (2022, p. 51) in the USA, highlight that if there are “1 000 facilities in a state required to comply and enforcement officers only select to inspect 100 and find that 25 facilities are in violation, the latter does not mean that there is a 25 percent non-compliance rate as there is an unknown compliance status relating to 900 facilities. The latter means that the true compliance rate could be between 5 and 90 percent”. Further, it is indicated that in 2019, out of 346 000 regulated entities only 3 407 were inspected in the USA. This represents less than 1 percent of the regulated entities. Therefore, the resource limitation of enforcement inspectors creates difficulty in establishing the true compliance rate within states. Studies undertaken by Sánchez-Ocampo and Gómez-Oliván (2022) in Mexico reveal that environmental that there is a need for environmental education to assist with environmental issues in the country. Further, it is highlighted that most environmental legislation in Mexico is not updated to deal with

current challenges and emerging pollutants. It contains no enforcement mechanisms, such as significant penalties, to curb non-compliance. It is proposed that legal reform of environmental laws with a focus on sustainable development should take place in Mexico.

In Africa, studies undertaken in Zambia reveal that environmental sustainability was not being pursued and that there was a lack of understanding and awareness of environmental protection laws (Zulu, *et al*., 2022). Studies by Emetumah, Okoye and Okoye (2020) highlight the lack of enforcement and monitoring of environmental legislation in Nigeria owing to corruption and the incompetence of enforcement officers. It is indicated that the Nigerian government has not ensured the adequacy of enforcement officers to ensure that they are not overwhelmed by the workload.

Bwala, Yusuf and Usman (2022) argue that the Nigerian government has failed to ensure sufficient enforcement mechanisms in environmental legislation to support enforcement. Studies by Edo, Etemike, and Clark (2022) reveal that another challenge with environmental laws in Nigeria is the vagueness of provisions in the legislation which further poses a challenge to their enforcement. It is argued that the vagueness of the legislation also poses a challenge to the interpretation by regulated entities and regulators themselves. The studies indicate that the lack of effective deterrents in the environmental legislation of Nigeria also supports non-compliance.

According to studies by Awolorinke, Takyi, and Amponsah (2023), in Ghana political interference in the enforcement of environmental legislation was identified as a concern. It is argued that the lack of political support from the government in the enforcement of environmental legislation has resulted in the non-implementation of the legislation and rendering it purposeless. Further, it is argued that in Ghana the government has failed to provide enforcement officials with financial support and adequate training owing to a lack of political will. Another factor contributing to non-compliance with environmental legislation in Ghana is argued to be the shift in community values (Mensah, Mattah, Amoah & Mattah, 2022). Instead of communities

assisting in enforcement, it is argued that communities have become more inclined to condoning bad practices and have stopped reporting certain non-compliant behaviour. It is argued that the latter also makes it difficult for enforcement officers to enforce legislation against behaviour condoned by the community. The EPI is an index that is used to capare the environmental performance of 180 countries accross the globe. Currently, no southern hemisphere country features in the top 10. The countries are currently topped by Denmark with an EPI score of 77.90 over 100 and with India having the lowest score of 18.90 over 100 (Wolf, Emerson, Esty, De Sherbinin, Wendling & Block, 2022).

2.10. Conclusion

The above literature review reveals that South Africa, like many countries, has enacted various environmental legislation. The environmental legislation enacted in South Africa is aimed to give effect to the right enshrined in the Constitution to an environment that is not harmful to the health and well-being of any person and is also aimed at assisting South Africa to achieve its international commitments to ensuring environmental protection.

The main mechanism used in environmental legislation to ensure compliance is the use of financial penalties. A literature review reveals that certain scholars are of the view that financial penalties in environmental legislation serve as a deterrent to non-compliance while others are of the view that financial penalties are insufficient to ensure compliance.

It is also advised by scholars that the various mechanisms included in the environmental legislation aimed to assist in compliance may be defective and need to be reassessed. These mechanisms include the EIA process which is part of the application for an environmental authorisation, the public participation process, the issuing directives, and the requirement for monitoring and reporting.

According to scholars, the EIA process undertaken by EAPs is flawed as many recommendations provided by EAPs are ignored during the duration of an activity thus resulting in environmental impact by that activity. Further, scholars are of the view that the public participation process required for obtaining an authorisation to undertake an activity that may be detrimental to the environment is flawed in that applicants for environmental authorisations do not meaningfully engage with interested and affected parties as well as the views of interested and affected parties are often not considered when implementing and managing the activity.

Scholars are also of the view that compliance notices that the EMI may issue are flawed in that they may be contested using a written objection. The use of an EMS seems to be favoured by most scholars in terms of assisting with environmental compliance. The use of EMS requires the participation and consideration of various stakeholders as well as responding to and addressing those needs.

It is noted from empirical studies that the enforcement of environmental laws is also a challenge globally. It is noted that countries do not have sufficient resources to enforce environmental legislation. It is suggested by scholars that the participation of the public in the enforcement of environmental legislation may better assist with compliance. The participation of the public in the enforcement of environmental legislation may also assist in overcoming the lack of trust in enforcement authorities. The backing of enforcement authorities by political and judicial support is also encouraged by scholars. All spheres of government should thus coordinate their efforts to work together in enforcing environmental legislation. This should start at the local municipal level, and up to the national level, to ensure that enforcement is strengthened.

Various studies also reveal the failure of international environmental law to guide the respective countries adequately on the formulation, implementation, and enforcement of national environmental legislation. It is argued by scholars that international environmental law itself contains various ambiguities and is a challenge to enforce. It is argued that barriers to the enforcement of international environmental law are

created by the recognition of the principle of state sovereignty. State sovereignty provides that a government of one country cannot dictate to another country about the governance of the country.

Further, there is currently a lack of international courts with jurisdiction to preside over international environmental law disputes. Further, scholars are also of the view that international environmental law has failed because there are no strict enforcement mechanisms to bind countries and to force compliance. According to empirical studies, international environmental law should include sufficient dispute-resolution mechanisms as well as procedures and capacity-building mechanisms to ensure that all member countries assist each other regarding the interpretation and understanding of multinational environmental agreements.

The literature review also reveals that various theories dealing with non-compliance have been developed in the past. However, these theories focus on human behaviour and fell short of identifying all other factors that may contribute to non-compliance to South African environmental legislation by coal mining companies. There is thus a gap in the literature in understanding why mining companies fail to comply with the respective environmental laws.

From the literature review, a frontline approach to regulatory non-compliance and compliance needs to be adopted to trace the grassroots of the functioning of the compliance process from individuals to regulators. The frontline approach will assist in closing the gap in current literature when exploring the factors that contribute to non-compliance with environmental laws as it not only focuses on the organisation and its processes and employees but extends to regulators and how they contribute towards non-compliance to environmental legislation by mining companies.

Chapter 3: Research Methodology

3.1. Introduction

Chapter 2 dealt with a review of the literature relevant to this study. This chapter provides an explanation of the research methodology and design used to explore the factors that contribute to non-compliance with South African environmental legislation. This chapter outlines the research design, philosophy, population, and sampling strategy. Further, this chapter also outlines the data collection instruments used and data analysis, the pilot study, the study limitations, the ethical considerations, and a conclusion of the chapter.

The research methodology followed in this study is a multi-method qualitative method. A multi-method qualitative methodology utilises multiple forms of qualitative data, such as interviews and case studies (Mik-Meyer, 2020; Vivek & Nanthagopan, 2021). In undertaking this qualitative study, the researcher recognises that the study participants have first-hand experience of the coal mining environment and are thus able to provide insight based on their experiences of the factors that contribute to non-compliance by a coal mine with environmental laws. This will enable the researcher to obtain relevant information relating to the study. The researcher collected data through interviews, and relevant document reviews that include environmental audit reports, environmental compliance notices issued by government authorities' environmental incidents as well as monitoring reports issued to government authorities and focus groups (Aspers & Corte, 2019). The various methods of collecting data aim to ensure that the data to be analysed is trustworthy, credible, and coherent (Dufour & Richard, 2019). Further, all participation by the study participants was voluntary.

3.2. Research Design

A research design is a roadmap that details how data will be collected and analysed to address a research problem (Dawadi, Shrestha & Giri, 2021). This design determines the kinds of analysis to be made by the researcher to attain the desired results. It enables research to be undertaken validly and successfully (Asenahabi,

2019, p. 78). The various research designs include the quantitative, qualitative, and mixed-method research designs (Asenahabi, 2019).

A quantitative research design is analytical and is aimed at providing answers to questions like what, who, where, and how much. It is usually deductive in nature. A qualitative research design aims to explore and understand the meaning that people attach to a certain human or social problem. It aims to answer questions such as why and how something happened and is usually inductive in nature. A mixed-method design is a combination the quantitative and qualitative designs (Thakur, 2021). The qualitative design also includes case studies, narrative research, phenomenological research, grounded theory, ethnography, and action research designs of inquiry (Asenahabi, 2019).

In this study, a case study design was utilised to explore the factors contributing to a coal mining company's non-compliance with South African environmental laws. The coal mining company forming part of the study has its coal mining operations in Limpopo and Mpumalanga. A case study provides the tools for a researcher to study a complex phenomenon within its context using various sources. It offers the advantage that the phenomena are not only explored through one lens but a variety of lenses. This allows for other elements of the phenomena to be uncovered and understood. A case study addresses the full complexity of a research problem (Asenahabi, 2019).

Further, a case study design is suitable where interviews are conducted to gather data (Tomaszewski, Zarestky & Gonzalez, 2020). The case study design to be utilised in this study will be supported by the multi-method qualitative method that will be utilised in the data collection process. This will involve document analysis, interviews, and focus groups. Using a case study design in this research will enable the researcher to understand the phenomenon through the lived experience of the participants, within its context and to undertake an in-depth investigation of the phenomenon. The document analysis process will involve the researcher reviewing various relevant

documents issued by the coal mining company forming part of the study as well as environmental audit reports, environmental compliance notices issued by government authorities, environmental incidents, and monitoring reports issued to government authorities.

Thakur (2021) distinguishes between exploratory, descriptive, and explanatory studies. An exploratory study seeks to establish new insights about a phenomenon and is useful to study a phenomenon where limited prior knowledge exists (Saka, Osademe & Ononokpono, 2023). This study adopted an exploratory approach to explore the factors that contribute to non-compliance with South African environmental laws by a coal mining company. The use of an exploratory design enabled the researcher to obtain different perspectives from the research participants on what they perceive as contributing to non-compliance with environmental legislation by a coal mining company, based on their experience in coal mines.

3.3. Research Philosophy

“Research philosophy” refers to a system of beliefs and assumptions about the development of knowledge (Turyahikayo, 2021). Research philosophies provide theories about the nature of the reality of what is being investigated (ontology) and about how the knowledge of reality is produced (epistemology) (Al-Ababneh, 2020). As previously stated, a discussion of the ontological, epistemological, and axiological assumptions is important as these assumptions make up the philosophical position of the researcher (Poucher, Tamminen, Caron & Sweet, 2019).

“Ontology” refers to what exists and to a system of belief that reflects an interpretation by an individual about what constitutes a fact (Al-Ababneh, 2020; Ylönen & Aven, 2023). According to Khatri (2020), ontology refers to assumptions and beliefs that guide our thinking. The researcher in this study has seven years’ experience as a legal advisor and experience in auditing coal mines in Limpopo and Mpumalanga in relation to their compliance with South African environmental laws. The researcher’s

interactions with the various mine workers and their different environments and circumstances present an opportunity to explore the factors that contribute to non-compliance to environmental legislation by a coal mining company with operations in the Limpopo and Mpumalanga Provinces.

An ontological relativism approach applies to this study. According to relativist ontology, it is believed that reality is a subjective experience developed socially and experientially, and that there is no absolute truth (Rassokha, 2021). A relativist ontology provides that the truth is always relative to some reference, such as culture, and is dependent on those interpreting it (Poucher, *et al*., 2019). Accordingly, the factors contributing to non-compliance with South African environmental legislation may be perceived differently by the interviewees based on their different work environments and the circumstances in those environments. The interviewees may have observed certain factors that the researcher may not have experienced or observed during his interactions with the coal mining companies. From a philosophical perspective, the researcher is an ethical relativist.

Epistemology focuses on the nature, limitations, and the justification of human knowledge (Al-Ababneh, 2020). It is a manner of understanding and explaining how we know what we know. It is thus concerned with the nature of objects and knowledge development (Moon, *et al*., 2021). Based on the ontological position outlined in this research paper, the researcher regards himself as an interpretivist. Interpretivism denotes a method of research which adopts the position that people's knowledge of reality is a social construction by human actors (Junjie & Yingxin, 2022). The researcher, thus, sought to experience and consider different interpretations of a particular social context to gain further understanding. Interpretivists follow a qualitative methodology (Junjie & Yingxin, 2022). An interpretive method was thus appropriate for this study and in that it enabled the researcher to understand the phenomena from the constructed knowledge of the study participants who have experience in the coal mining sector.

“Axiology” primarily refers to the aims of the research (Kryukov, *et al*., 2021). The axiology of interpretivism is followed in this study. According to the axiology of interpretivism, research is value bound and the researcher is part of what is being researched and so the research will be subjective (Kryukov *et al*., 2021). The researcher believes that values are an essential part of society and that the values of each group are equally important. The researcher has taken the participants' interpretations of the phenomenon in this research study as evidence. The researcher acted as a participating observer during the research.

Based on the above, an interpretive paradigm was followed to develop knowledge of the factors that contribute to non-compliance to the South African environmental legislation by a coal mining company. Interpretivism is a social science paradigm which asserts that reality is subjective and emphasises understanding the phenomena from the perspective of individuals (Bonache & Festing, 2020). A document analysis process was undertaken to look at environmental audit reports, environmental compliance notices issued by government authorities, environmental incidents, and monitoring reports issued to government authorities relating to a coal mining company with coal mines in Limpopo and Mpumalanga. An interview process with mine personnel was undertaken. Lastly, a focus group interview process was also followed. The focus group session was undertaken to clarify certain issues which emerged from the individual interviews and which were not clear to the researcher. The interpretive paradigm followed enabled the researcher to understand the factors contributing to non-compliance with South African environmental legislation from the participants' perspectives and their experiences in coal mining.

3.4. Population and Sampling

A “population” refers to a complete set of units with specified characteristics, while a sample is a subset of the population (Casteel *et al*., 2021). The researcher identified the population in this study based on the interpretation of Thacker (2019, p. 3), who identifies two kinds of populations: the target population and the accessible population. The target population is identified as the population, that is individuals, who the

researcher is interested in (Willie, 2022). The accessible population, on the other hand, is the portion of the target population accessible to the researcher (Fetzer, 2020, p. 447). This study's target population is coal mining companies in South Africa. As outlined previously, there are 383 registered and operating coal mines in South Africa (Department of Mineral Resources and Energy, 2017). The accessible population is a coal mining company with two coal mining operations located in Limpopo and Mpumalanga. The coal mining company owns 100 percent shares and fully controls the operations in the Limpopo and Mpumalanga Provinces. All policies and standard operating procedures relating to environmental management are the same for both operations. The environmental management departments of the two operations each consist of one environmental manager and two environmental specialists. The Limpopo operation has an area of 263.25 square kilometres and the Mpumalanga operation is 234.94 square kilometres in size. This made it easy from a comparison perspective to do sampling as each operation has the same number of personnel in the environmental management departments.

“Sampling” is a process used to select a sample from a population (Bhardwaj, 2019). It is understood by the researcher that there is a distinction between two types of sampling, namely, probability and non-probability sampling (Wiśniowski, Sakshaug, Ruiz & Blom, 2020). Probability sampling is used when the population is highly homogenous and there is a high chance of each member being selected. Non-probability sampling is used where each member of the population does not have a known probability of being selected (Bhardwaj, 2019). The researcher has adopted non-probability sampling, particularly purposive sampling, for this study. In purposive sampling, members of the sample are collected according to the purpose of the study. The aim of purposive sampling is for the researcher to collect in-depth perceptions and descriptions of targeted populations (Bhardwaj, 2019). Non-probability sampling, and in particular purposive sampling, benefitted this study in that it enabled the researcher to choose the sample based on the researcher’s knowledge about the population, and the study itself. Further, it enabled the researcher to comply with the time and budget constraints of the research (Stratton, 2021). The purposive sampling method adopted in this study enabled the researcher to choose the participants based on their experience in the coal mining industry and their capacity to provide relevant

information relating to the phenomena. All participation by the study participants was voluntary.

In exploring the factors that contribute to non-compliance with South African environmental legislation by a coal mining company, the sample that best enabled the researcher to answer the research questions are the environmental managers, specialists, practitioners, and operational employees of two respective coal mine operations in Limpopo and Mpumalanga.

As provided in Chapter 1, a small sample may be used in qualitative research for an in-depth analysis to answer the research questions (Daniela, 2020; Shaheen, Pradhan & Ranajeeet, 2019). As mentioned previously, the main aim of focusing on the coal mine operations in the Limpopo Province and Mpumalanga Province is that the two provinces have the highest concentration of coal resources in the country and the coal mine operations in question are contributors to the South African national energy grid (Wang, 2023; Watson & Olande, 2019). Further, the participants in the study have relevant experience in the coal mining sector and were able to provide the researcher with relevant information to answer the research questions. All participation by the study participants was voluntary.

The interview processes conducted in this study took place for each of the two coal mining operations forming the sample and involved one environmental manager, two environmental specialists, and seven operational employees. The focus group interviews were limited to three operational employees, one environmental manager, and one environmental specialist for each of the two operations. The participants in the focus group interviews were the same participants of the individual in-depth interviews. The sample for both the interviews and focus group interviews was informed by the researcher's knowledge of the population as well as the capabilities of the study participants to provide knowledgeable information to enable the researcher to answer the research questions. The time constraint of the study was also a factor which was considered (Zhao, 2021).

In selecting participants for this study, the researcher also considered saturation. “Saturation” refers to a point in the research process where the incoming data produces no new information to address the research question and signifies that an adequate sample size is reached (Guest, Namey & Chen, 2020). Thus, saturation is an important indicator that the sample is adequate in relation to the phenomenon studied and supports the rigour of the qualitative samples.

Further, saturation in qualitative research may be reached using a small sample size (Hennink & Kaiser, 2022). The document analysis inquiry of the study was also based on each of the two respective coal mining operations based in Limpopo and Mpumalanga. The main aim of focusing on the coal mine operations in Limpopo and Mpumalanga is that the two provinces have the highest concentration of coal resources in the country and the coal mines in question are contributors to the South African national energy grid (Wang, 2023; Watson & Olande, 2019). In this study, the researcher was able to reach saturation in relation to the two mining operations, using ten study participants. Table 3.1 outlines the sample of the study.

Table 3.1: Study Sample

Limpopo Operations			
Designation	**Total**	**Sampled**	**Justification**
Environmental managers	1	1	Only one sustainability manager is assigned per operation
Environment specialists	2	2	Two environmental specialists are assigned per operation
Operational employees	3 000	7	Number of operational employees is limited owing to time constraints of the study. Further, the number of operational employees chosen is based on the researcher’s knowledge of the participants and their ability to provide valuable and relevant information. Consideration was given that a small sample may be used in qualitative research for an in-depth analysis to

			answer the research questions (Daniela, 2020; Shaheen, Pradhan & Ranajee, 2019)
Total	**3 003**	**n=10**	
Mpumalanga Operations			
Designation	**Total**	**Sampled**	**Justification**
Environmental managers	1	1	Only one sustainability manager is assigned per operation
Environment specialists	2	2	Two environmental specialists are assigned per operation
Operational employees	2 300	7	Number of operational employees is limited owing to time constraints of the study. Further, the number of operational employees chosen is based on the researcher's knowledge of the participants and their ability to provide valuable and relevant information. Consideration was given that a small sample may be used in qualitative research for an in-depth analysis to answer the research questions (Daniela, 2020; Shaheen, Pradhan & Ranajee, 2019)
Total	**2 303**	**n=10**	

3.5. Data Collection Instruments

A “research instrument” is a tool that is used to collect, measure, and analyse data (Utibe, 2020). A research instrument should be tied to the study methodology (Busetto *et al*., 2020). Various instruments may be used to collect qualitative data. These include individual interviews, focus groups, and observations (Taherdoost, 2021).

In exploring the factors contributing to non-compliance to environmental legislation by a coal mining company with coal mining operations in the Limpopo Province and Mpumalanga Province, the researcher followed a document analysis process, an interview process, and a focus group process. The document analysis process followed an intense scrutinisation of relevant documentation prepared by the respective coal mines relevant to the research questions and the phenomenon under study. The documents reviewed by the researcher were environmental audit reports, environmental compliance notices issued by government authorities, environmental incidents, and monitoring reports issued to government authorities.

The interview process followed was semi-structured. The open-ended questions defined the topic under investigation and allowed the interviewees to go into detail regarding the phenomenon. The semi-structured interview questions were guided by the research objectives and the research questions of the study. Topic guides were used for the focus group interviews to keep the discussion relevant to the research questions. No more than five participants formed part of the focus group consisting of environmental managers and specialists.

The investigation process was focused on creating alignment between the research questions, data collection, analysis, and results (Stenfors, Kajamaa & Bennett, 2020). The researcher conducted individual in-depth interviews before the focus group interviews. This enabled the researcher to explore any further issues from the in-depth interviews in the focus groups. The interview schedule used for the individual

interviews was amended and adjusted for the focus groups given the issues that required further exploration as emanating from the in-depth interviews.

3.6. Data Collection Technique and data Analysis Procedure

This study followed a qualitative approach. The analysis of qualitative data involved collecting, interpreting, and structuring data to understand what it represents (Ravindran, 2019). Data analysis involved an interactive, iterative process where data was systematically searched and analysed to understand the phenomena (Busetto *et al*., 2020). Two forms of data analysis processes are identified in the literature. These include the deductive and inductive analysis processes. A deductive analysis approach tests theory while an inductive approach aims to generate a new theory.

With a deductive approach the researcher starts with a general theory or idea and then develops specific hypotheses based on that theory. A deductive approach is often used in quantitative research. Using the inductive approach, the researcher begins with specific observations and then works towards more general theories and conclusions (Vears & Gillam, 2022). The data analysis method used in this study was an inductive analysis process, which is also best where the study is exploratory and where the researcher wishes to draw inferences from specific observable phenomena to expand knowledge (Casula, Rangarajan & Shields, 2020).

A document analysis process, an interview process, and a focus group process were followed by the researcher in exploring the factors that contribute to non-compliance with South African environmental legislation by a coal mining company with coal mining operations in the Limpopo and Mpumalanga Provinces. The document analysis process followed an intense scrutinisation of all relevant documentation prepared by the respective coal mines relevant to the research questions and the phenomenon under study. The documentation reviewed by the researcher included environmental audit reports, environmental compliance notices issued by government authorities, environmental incidents and monitoring reports issued to government authorities. The

interview process followed was semi-structured. The open-ended questions were used to define the topic under investigation and allowed the interviewees to go into detail regarding the phenomenon. Owing to the challenge of managing focus group interviews, topic guides were used for the focus group interviews to keep the discussions relevant to the research questions.

Furthermore, a thematic content analysis approach was followed as part of the inductive analysis. Thematic analysis is best applied where the data collection process uses interviews and focus groups as it requires the free flow of data (Roberts, Dowell & Jing-Nie, 2019). The thematic analysis process in this study involved the researcher analysing all data and information received from the document review, interview sessions, and focus groups. The researcher then followed a coding of the information received by highlighting key points within the text that linked to one other and assigned labels to the highlighted information. The researcher then arranged the information meaningfully and looked for common themes and patterns. The themes were then analysed in the context of all the information received and used to address the research questions.

The researcher has promised to keep the names of the participants in this study confidential. This also assisted in ensuring that the participants were free to express their views about the subject of the study.

3.7. Trustworthiness of the Study

A researcher following a qualitative research approach must establish the research's trustworthiness. Trustworthiness in qualitative research means that “when readers interpret the written work, they need to have confidence in what the researcher has reported” (Stahl & King, 2020). Trustworthiness in qualitative research has four components: credibility, transferability, dependability, and confirmability. “The credibility of qualitative research may be demonstrated by whether the findings are consistent with reality” (Junjie *et al*., 2022, p.12). To ensure the credibility of this study,

the researcher used triangulation. This means that data was collected from multiple sources, such as document reviews, observations, and interviews (Busetto *et al*., 2020). Thus, a multi-method qualitative methodology was followed.

“Transferability’ refers to the extent to which research findings may apply to other contexts and situations. Transferability will be satisfied where thick descriptions of the participant’s circumstances and phenomena are provided (Stahl *et al*., 2020, p. 27). Broad and thick descriptions were used in this study. The intent was to enable the reader to extend the findings of this research to other similar contexts and situations (Roller, 2019). “Dependability” relates to the reliability of the research and the degree to which research procedures are documented to allow other people to review the processes followed. It, therefore, relates to the consistency of the inquiry over time (Enworo, 2023). Dependability is achieved in this study by using overlapping methods, such as focus groups and individual interviews. “Confirmability” relates to the extent to which the research findings are based on the participants' narratives rather than the researcher's biases. Triangulation was used to achieve confirmability (Stahl *et al*., 2020). In undertaking the research, the researcher ensured that all the views of each study participant were considered, despite the employment position and experience of the participant.

3.8. Pilot Study

A pilot study is a small-scale preliminary study used to evaluate a full-scale study. It involves selecting a small group of people and trying out the study on them. It can assist the researcher in identifying ambiguities and problems relating to the full-scale study (Malmqvist, Hellberg, Möllås, Rose & Shevlin, 2019). The researcher has conducted a pilot study with participants who meet the selected sample criteria. The researcher has used two operational employees from each of the two coal mine operations in Limpopo and Mpumalanga. The pilot study aimed to test and refine the interview questions. Furthermore, it aimed to identify any challenges that may arise during the interviews and focus groups in terms of the participant's willingness to disclose information and to test the duration of the interviews and focus groups. The

pilot study revealed that the participants were comfortable in answering the questions and could understand the questions and provide relevant responses.

3.9. Ethical Considerations

“Ethical considerations” are the principles guiding the research process (Kaewkungwal & Adams, 2019). In undertaking the research and reaching conclusions, the researcher has complied with the ethical standards of honesty, objectivity, integrity, and confidentiality. In ensuring honesty, the researcher has not fabricated, falsified, or misrepresented any information or data. Further, the researcher has not participated in any deceptive conduct. Regarding objectivity, the researcher has taken measures to avoid bias in analysing and interpreting data. Further, the researcher has ensured that integrity and confidentiality are achieved by fulfilling all promises to the research participants in terms of keeping their names confidential and protecting any information disclosed in confidence.

3.10. Elimination of Bias

As mentioned above, triangulation was used in this study to achieve confirmability (Stahl *et al.*, 2020). In undertaking the research, the researcher used multiple data collection instruments to confirm the integrity of the data received from the study participants. Further, the researcher ensured that all the views of each study participant was considered despite the employment position and experience of the participant. The researcher was always aware of treating all study participants equally and not to undermine any views from a particular participant.

3.11. Conclusion

This chapter explained the research methodology and design used in the study to explore the factors that contribute to non-compliance with South African environmental legislation by a coal mining company. This chapter also outlined the research philosophy, the population, and the sampling strategy used in the study. Further, the

chapter provided an outline of the data collection instruments and data analysis methods used, the pilot study, the study limitations, and the ethical considerations relating to the study.

Chapter 4: Research Findings and Discussion

4.1. Introduction

This chapter provides the research findings of the data collection process. The findings are also analysed and discussed in this chapter. This chapter also discusses the applicability of the Da Vinci TIPS Managerial Leadership Framework (TIPS Framework) to the study.

The study aimed to explore the factors contributing to non-compliance with South African environmental legislation by a coal mining company with coal mining operations in the Limpopo and Mpumalanga Provinces. Further, the study aimed to provide recommendations on how the coal mining company can address the factors contributing to non-compliance with environmental laws. The objectives that guided the study are as follows:

i. To explore the factors that hinder compliance with environmental laws in a coal mine.
ii. To determine reasons for the failure in the measures currently employed by coal mining companies to ensure compliance with environmental laws.
iii. To determine the measures used to address repetitive environmental incidents and non-compliance occurring at a coal mine.
iv. To recommend how the coal mining company can comply with environmental legislation.

The following secondary questions research questions emanated from the research objectives:

i. What factors hinder compliance with environmental laws in a coal mine?
ii. Why do measures currently employed to ensure compliance with environmental laws fail?
iii. How are the repetitive environmental incidents and non-compliance at a coal mine addressed?

iv. What recommendations may be made to a coal mining company to ensure compliance with environmental legislation?

As outlined previously, the data collection methods used in this study included a document review process of relevant documents relating to compliance and non-compliance with environmental laws. These documents were furnished to the researcher by the two mining operations and included environmental audit reports, compliance notices issued by government authorities, as well as incident and monitoring reports issued to government authorities. The researcher also used a semi-structured interview process. Open-ended questions were used to define the topic under investigation and allowed the research participants to go into detail regarding the phenomenon. The researcher also used focus group interviews to explore the factors contributing to non-compliance with environmental laws by a coal mining company with coal mining operations in Limpopo and Mpumalanga. Topic guides were used for the focus group interviews to keep the discussion relevant to the research questions.

Before the commencement of the individual interviews and the focus group interviews, the researcher obtained the informed consent of the study participants. The information gathered from the interviews and focus group interviews was recorded in writing by the researcher as and when the study participants responded to the open-ended interview questions. The length of the interview sessions was one hour to one hour and thirty minutes. The duration of the focus group interviews was two hours for each of the respective business operations. Microsoft Teams was used by the researcher to facilitate the individual interviews and focus group interviews. Non-probability purposive sampling was used by the researcher to identify the study participants based on the purpose of the study and the experience of the research participants in the coal mining industry. The interview processes conducted in this study for each of the coal mining operations involved one environmental manager, two environmental specialists, and seven operational employees at each coal mining operation. The focus group interviews were limited to three operational employees, one environmental manager, and one environmental specialist for each of the two

operations. The participants of the focus group interviews were the same participants of the individual in-depth interviews. The participants each have more than five years of experience in the coal mining industry which was sufficient to enable the study participants to provide significant input about the study. The consideration of the experience of research participants is critical to guide the manner of engagement with the participants and is also an important factor in relation to the informed responses they may provide to questions to enable the researcher to answer the research questions (Wan, 2019). The employment position of each of the participants is outlined in Table 4.1.

Table 4.1: Research Participant Position and Experience

Limpopo Operations		
Research Participant (RP)	**Employment Position**	**Years of Experience**
RP1	Environmental Manager	21 years
RP2	Environmental Specialist	14 years
RP3	Environmental Specialist	12 years
RP4	Operational Employee	10 years
RP5	Operational Employee	10 years
RP6	Operational Employee	8 years
RP7	Operational Employee	7 years
RP8	Operational Employee	6 years
RP9	Operational Employee	6 years
RP10	Operational Employee	6 years
Mpumalanga Operations		
Research Participant (RP)	**Employment Position**	**Years of Experience**

RP1	Environmental Manager	20 years
RP2	Environmental Specialist	15 years
RP3	Environmental Specialist	15 years
RP4	Operational Employee	11 years
RP5	Operational Employee	10 years
RP6	Operational Employee	8 years
RP7	Operational Employee	8 years
RP8	Operational Employee	6 years
RP9	Operational Employee	6 years
RP10	Operational Employee	6 years

A thematic analysis of the data collected was followed by the researcher. This involved the researcher analysing all data and information received from the document review, interview sessions, and focus groups. The researcher then followed a coding of the information received by highlighting key points within the text that linked to one other and assigning labels to the highlighted information. The researcher then arranged the information meaningfully and looked for common themes and patterns. The themes were then analysed in the context of all the information received and used to address the research questions.

4.2. Research Findings

The primary research question of the study is “What factors contribute to non-compliance with South African environmental legislation by a coal mining company with coal mining operations in the Limpopo and Mpumalanga Provinces?” The research findings from the study indicate that various factors contribute to a coal mining company not complying with South African environmental laws. These factors include human behaviour, operational requirements, leadership and management style, financial constraints, and the lack of adequate monitoring. The findings of the document review process will be discussed first. This will then be followed by a

discussion of the in-depth interviews and subsequently, the focus group interviews conducted in relation to each mining operation.

4.2.1. Document Review Findings

The document review process involved the researcher undertaking an analysis of the various environmental audit reports, environmental compliance notices issued by government authorities, environmental incidents and monitoring reports issued to government authorities. This was done for each of the coal mining operations. The review of the documentation provided by the respective coal mining operations was guided by the research objectives and questions. Common non-compliance findings were revealed through the document analysis. The common themes from the document review are outlined in Table 4.2. A detailed discussion of the document review findings and themes then follows Table 4.2.

Table 4.2: Themes from Document Review

Research Objective	Research Question	Theme
To explore the factors that hinder compliance with environmental laws in a coal mine	What factors hinder compliance with environmental laws in a coal mine?	• Human behaviour • Operational requirements • Leadership and management style
To determine reasons for the failure in the measures currently employed to ensure compliance with environmental laws	Why do measures currently employed to ensure compliance with environmental laws fail?	• Financial constraints • Lack of adequate monitoring
To determine the measures used to address repetitive environmental incidents and non-compliance	How are the repetitive environmental incidents and non-compliance at a coal mine addressed?	• Training and awareness
To recommend how the coal mining company can comply with environmental legislation	What recommendations may be made to a coal mining company to ensure compliance with environmental legislation?	• Create an organisational culture of compliance through the management's commitment to making monitoring personnel available

4.2.1.1. What factors hinder compliance with environmental laws in a coal mine?

(i) Human behaviour

The findings from the document review process for each of the coal mining operations reveal that human behaviour is a common factor that hinders compliance with environmental laws. According to the document review, the respective coal mine operations have the same policies, standard practice instructions, awareness, and induction programmes, all of which are aimed at making sure that employees are aware of what is required of them by environmental legislation. However, it is found that the most frequent environmental non-compliances identified from the document review are related to negligent employee behaviour at both operations.

Studies by Khaile, Davids, and Khaile (2021) confirm that, in most cases, non-compliance with environmental legislation occurs in situations where there are clear rules and policies regarding compliance. People simply ignore or fail to comply with these rules and policies. The latter is said to be attributable to a lack of proper environmental ethics or people prioritising their own interests. The most frequent and common non-compliances in relation to the two mining operations, which relates to human behaviour, are outlined in Table 4.3.

Table 4.3: Non-compliances related to human behaviour

	Measure in place to ensure compliance	Human behaviour resulting in non-compliance
1.	Training on waste separation and provision of colour-coded and marked waste bins.	Employees still place hazardous waste in bins colour coded and marked for general waste.
2.	Numerous waste bins are provided in various areas to prevent littering.	Employees still dispose of litter in the environment instead of using waste bins.
3.	Oil spill kits are made available for the cleaning of oil spills and training is provided on dealing with oil spills.	Oil spillages are left uncleaned resulting in surface and groundwater contamination.
4.	Drip trays are provided for use in relation to trucks and motor vehicles with oil leaks. Training is also provided.	Oil trays are not used in relation to trucks and motor vehicles with oil leaks resulting in soil contamination and ground and surface water contamination.

5.	Stormwater infrastructure is constructed by the mining operations and training is provided for the clean-up of the stormwater infrastructure.	Those responsible for ensuring the clean-up of the stormwater infrastructure do not ensure such clean-up and, thus, resulting in contaminated water polluting the environment as the capability and capacity of the stormwater infrastructure is compromised by siltation.

(ii) Operational Requirements

From the documentary review undertaken for the two mining operations, the researcher revealed that operational requirements are a source of non-compliance. The environmental audit reports of the two operations revealed similar non-compliances relating to operational requirements as a source of non-compliance. Coal mining in its nature deals with a hazardous product that can pollute the environment, surface, and groundwater. The common non-compliances identified include the placing of hazardous material, such as coal stockpiles, and discard coal material in unauthorised areas within the mine.

Further, the lack of space at mining operations and production pressure results in improper waste management practices resulting in non-compliance with environmental laws. Studies by Carmo, Lanchotti, and Kamino (2020) show that improper waste management practices by mining companies can result in severe damage to human health and biodiversity owing to impacts on water resources. Mining companies are required to ensure that waste is classified, and all hazardous waste is disposed of at an authorised facility.

Various environmental legislation - such as the NEMA, NEMWA, and the NWA, require licences to be obtained for the placement of coal stockpiles and coal discard material in certain areas. The activity of placing discard coal material in unauthorised areas thus results in the contravention outlined in the NWA of disposing of waste in a manner that may detrimentally impact a water resource. The NWA licences of the mining

operations also contain conditions specifying that the impact of activities of the mine on groundwater will not exceed the in-stream water quality detailed in the water quality reserve for the area. However, owing to the nature of the product produced at the mines it is, in some instances, found that the latter condition is violated. Another finding from the document review which relates to contravention owing to operational requirements is the disposal of the quality of wastewater into the pollution control dams which exceeds the qualities specified in the water use licences.

(iii) Leadership and Management Style

Leadership style and management are also identified as a factor that hinders compliance with environmental laws in a coal mine. The observed leadership style and management from the document review show that the leadership and management of the coal mining operations are not strict in enforcing compliance. It is identified that where there is a case of non-compliance with environmental laws and/or environmental licences and policies, the leadership and management of the operations do not impose any strict sanctions and penalties on those responsible for the non-compliance. No records were identified of disciplinary hearings and/or subsequent dismissals of those responsible for non-compliance.

According to studies by Serang, Ramlawati, Suriyanti, Junaidi and Nurimansjah (2024), to ensure compliance with legislation the leadership and management of the organisation must have a high commitment to encouraging a culture of compliance and role model the type of behaviour they wish to see. The role modelling of ethical behaviour by the leadership and management is necessary. This means that management should not cut corners when it comes to compliance and should always act in accordance to agreed-upon standards as reflected in policies.

The leadership and management of the company should also be willing and able to take appropriate action against those responsible for non-compliance. This reinforces the ethical culture of the organisation. A study by Bwalya (2023) emphasises that

leaders and managers within the organisation need to have the ability to influence employees to behave in a certain manner. Changing the perception of how employees view compliance is said to be key in changing their actions and influencing the decisions they make regarding compliance.

4.2.1.2. Why do measures currently employed to ensure compliance with environmental laws fail?

(i) Financial constraints

The findings from the document review process for each of the coal mining operations reveal that financial constraints are the main reason why measures employed to ensure compliance with environmental laws fail. It has been identified that certain capital projects outlined as part of the measures to ensure compliance, as committed to by the mining operations in the various environmental authorisations, are not implemented. The reason for this non-implementation is the lack of financial capital to expand on these projects. The latter capital projects include the lining of stormwater channels to prevent groundwater contamination, the non-appointment of service providers to undertake the eradication of alien and invader species as required by legislation, as well as the use of ineffective dust control measures to save costs.

Furthermore, the document review has identified that the measures currently employed at the mining operations to ensure compliance fail because of a lack of maintenance. This lack of maintenance of current structures, such as the clean-up of stormwater channels and pollution control dams, is delayed or not undertaken owing to financial inabilities of hiring service providers to undertake the maintenance.

Studies by He, Ding, and Yang (2020) and Wu, Liao, Zhou, and Li (2021) show that environmental compliance is associated with capital expenditure, mainly on research and development, and implementing innovative measures, and technology aimed at ensuring compliance. Thus, to ensure compliance, the company needs to make sure

that financial resources are prioritised, and funds are allocated to implementing projects aimed at assisting with compliance. A study by Mustapha, Arogundade, Misra, Damasevicius and Maskeliunas (2020) emphasises that for an organisation to achieve compliance, necessary capital needs to be made available for the upgrading of people, business processes, and facilities to meet regulatory requirements. Further, it is noted that the cost of compliance for an entity will increase as regulations increase.

(ii) Lack of Adequate Monitoring

The document review process undertaken for the respective mining operations reveals that the lack of adequate monitoring of current measures employed to ensure compliance with environmental laws results in the failure of such measures. It has been identified that the respective mining operations have various policies and standard practice instructions and procedures to ensure compliance. However, the latter policies and procedures fail owing to a lack of adequate monitoring that is caused by insufficient qualified human resources who are competent to monitor the implementation and compliance with the policies and procedures.

Further, the monitoring of infrastructure employed to ensure compliance with environmental laws is also affected by the lack of adequate qualified human resources. The concrete surfaces established to prevent groundwater contamination, and bunding walls for confining hazardous material, need to be monitored for cracks or damage. However, no evidence could be located that this is undertaken. Studies by Khan, Zaidi, Yang, Park, and Lee (2023) indicate that monitoring is a critical component of compliance and involves both the observation of possible violations and the prediction of possible future violation areas. This enables the company to be proactive, set up necessary systems and take action to prevent future non-compliance. Furthermore, the studies show that more and more companies are increasingly moving towards utilising technology to assist with monitoring.

4.2.1.3. How are the repetitive environmental incidents and non-compliance at a coal mine addressed?

The document review findings indicate that training is provided to employees and contractors. The challenge may be the understanding of the training content, and the language used. The training material is in English. It is recommended that training material should be kept simple and deal with one topic at a time. Further, to overcome the language barrier the training material should be translated into the most common indigenous language used by workers. For the workers at the Limpopo mining operation, the most common indigenous language is Sepedi whereas for the workers at the Mpumalanga operations, the most common indigenous language is Zulu.

A study by Watts (2020) shows that it is important for companies to evaluate the effectiveness of their training programmes. This study highlights that most training programmes fail as they aim to have employees memorise rules and procedures. The study suggests that training material should refer to practical real-life situations and examples to which the employees are exposed. The latter is said to provide better understanding. Further, it is recommended for training programmes to include an element of ethics training to improve moral judgment.

4.2.1.4. What recommendations may be made for a coal mining company to ensure compliance with environmental legislation?

From the document review process, the common theme relating to the two mining operations is that the coal mining company should create an organisational culture of compliance through management commitment to making monitoring resources available. Proper monitoring can only happen where there are sufficient personnel to cover all areas of the mine to ensure that employees are doing what they are required to do. Further, the skilled personnel will also be able to demonstrate the required behaviour which may be followed by other employees. A study by Coppier, Grassetti, and Michetti (2021) outlines that the investment in additional monitoring resources assists with reducing non-compliant behaviour.

4.2.2. In-depth Interview Findings

The themes of the in-depth interviews are outlined in Table 4.4. The themes are common to both the Limpopo and Mpumalanga mining operations.

Table 4.4: Findings from the In-depth Interviews

Research Objective	Research Question	Theme	Number of Responses from Limpopo Operations	Number of Responses from Mpumalanga Operations
To explore the factors that hinder compliance with environmental laws in a coal mine	What factors hinder compliance with environmental laws in a coal mine?	• Human behaviour • Mechanical breakdown	7/10	8/10
To determine reasons for the failure in the measures currently employed to ensure compliance with environmental laws	Why do measures currently employed to ensure compliance with environmental laws fail?	• Lack of human resources capacity for monitoring	8/10	8/10
To determine the measures used to address repetitive environmental incidents and non-compliance	How are the repetitive environmental incidents and non-compliance at a coal mine addressed?	• Training	8/10	8/10
To recommend how the coal mining company can comply with environmental legislation	What recommendations may be made to a coal mining company to ensure compliance with environmental legislation?	• Increased monitoring	7/10	8/10

4.2.2.1. What factors hinder compliance with environmental laws in a coal mine?

The study participants from both the Limpopo and Mpumalanga mining operations share the common view that human behaviour is a hindrance to compliance with environmental laws at the coal mining operations. The human behaviour identified is at times negligent human behaviour, and at times, the lack of knowledge relating to

what is legally required. According to the study participants, the most common human behaviour hindering compliance is negligence.

RP1, Limpopo Operations: "*I am of the view that employees simply do what is wrong with the knowledge that what they are doing is wrong.*"

RP1, Mpumalanga Operations: "*Employees know what is required of them in relation to environmental compliance and they simply choose not to do what is required*."

The study participants at both mining operations are of the view that most of the mine employees who contravene environmental policies and rules are aware of such policies and rules but choose not to comply. According to the study participants, what motivates negligent non-compliant behaviour is the belief by perpetrators that they will not be caught and that there will not be a consequence. The latter statement by the study participants aligns with the study by Coppier, Grassetti and Michetti (2021, p.460) that highlights that "criminal action is a function of the probability of a criminal being caught and the degree of punishment he will receive when arrested".

Further, according to studies by Asfoor, Kasim, Latif, Razali, Ibrahim and Shanneb (2022, p. 276) it is argued that there are various factors that result in employees disobeying laws and company policies, these factors are outlined as "employee stress, unequal treatment by top management, and threats of punishment". In some instances, it is noted by the study participants that other forms of behaviour hindering compliance is a result of a lack of knowledge. Not all employees at the mining operations are literate and some have not seen or have not been exposed to environmental licence conditions to enable them to comply with such conditions.

Another common hindrance to compliance with environmental laws identified by the research participants at the Limpopo and Mpumalanga mining operations is the mechanical breakdown of key machinery employed to prevent environmental harm.

The breakdown in key machinery is said to be linked to the lack of financial resources to service the machinery regularly and to prevent key breakdowns resulting in the machinery being out of service for prolonged periods. The research participants are also of the view that management priority, in terms of allocating funds for the maintenance of key machinery, is lacking.

The study by Bodziony and Patyk (2024) outlines the criticality of maintaining mining equipment to prevent environmental pollution and degradation. The study highlights that the regular maintenance and servicing of haul trucks can prevent environmental pollution and degradation resulting from oil leakages. Further, the study highlights that the servicing and maintenance of haul trucks roads on which these trucks drive can reduce fuel and diesel consumption by these trucks and, thus, reduce greenhouse gas emissions. A study by Bahrun, Yusoff, Said and Hassan (2021) indicates that the breakdown of conveyor belts owing to lack of maintenance and servicing can lead to environmental harm in the form of pollution of clean soil, water pollution, and noise pollution. Conveyor belts require regular servicing and maintenance as they are sensitive to sunlight. Prolonged exposure to sunlight damages the rubber in the conveyor belts resulting in their breakdown and leading to coal spillages. Further, the mechanical breakdown of a conveyor belt results in huge costs for mining companies because of double handling of coal necessitated by clean-ups that must follow.

4.2.2.2. Why do measures currently employed to ensure compliance with environmental laws fail?

According to the interview sessions conducted with the research participants, the common theme which emerged regarding reasons for the failure of current measures employed to achieve compliance is the lack of adequate human resources capacity.

The participants have indicated that the available environmental teams on the sites are not enough to cover the mining areas. Thus, lack of visibility by the environmental teams results in and contributes to negligent behaviour by employees as there is no

monitoring and no enforcement as a result. Further, the inadequate environmental teams on the sites also make it difficult to respond timeously to environmental incidents. The lack of adequate resources to ensure monitoring is thus also a reason why current measures employed to ensure compliance fail. Where employees are not monitored, certain employees will choose not to do the right thing. Therefore, continuous monitoring is necessary to prevent negligent behaviour.

RP2, Limpopo Operations: "*I am of the view that there is insufficient personnel capacity to ensure monitoring of behaviour*."

RP4, Mpumalanga Operations: "*There is a lack of sufficient monitoring staff within the environmental department to ensure that people do what is expected.*"

According to a study by Bwala, Yusuf, and Usman (2022), people will only comply with environmental policies and rules when these policies and rules are enforced. To enable enforcement, employee behaviour needs to be monitored. For mining operations to curb negligent behaviour, resulting in a failure of the measures employed to ensure compliance, monitoring should be a strong area of focus. Providing sufficient qualified personnel should be considered in order to increase monitoring. Further, there should also be strong enforcement measures to ensure that those found to be acting negligently are disciplined. According to Gupta and Gupta (2021), employees will comply with laws, rules, and policies where there is some incentive for them in complying. The provision of bonuses and incentives to encourage a culture of compliance may thus be introduced.

4.2.2.3. How are the repetitive environmental incidents and non-compliance at a coal mine addressed?

The research participants from both the Limpopo and Mpumalanga mining operations are of the view that a strategy to address and avoid repetitive environmental incidents is constant training. The training should be aimed at informing employees about their

responsibility towards protecting the environment and how their work and negligent behaviour can impact the environment negatively. Further, the research participants are of the view that training that is currently provided at the operations also includes training on the legal liability of the employer as contained in various environmental laws and environmental authorisations as well as how the employees may assist in achieving compliance. The research participants are of the view that most non-compliance with environmental laws occurs because of employee behaviour. It is, therefore, the view of the research participants that training on legal requirements and appropriate behaviour is best to change the behaviour of employees.

RP4, Limpopo Operations: "*The mine uses training to address repetitive environmental incidents and non-compliance. The training should be consistent and repetitive so that the legal requirements are embedded in people*."

RP3, Mpumalanga Operations: "*Training on legally required behaviour should be repetitive in order to change and influence behaviour*."

According to Dahl, Rundmo and Olsen (2022), training is an essential component of any compliance programme as it gives employees the opportunity to understand their legal and regulatory obligations and company policies. Furthermore, it is argued that training also assists in improving the ethical culture of employees and the overall compliance culture of the organisation. An ethical culture of compliance means that employees no longer see environmental compliance as a legal duty but as a moral obligation, thereby encouraging employees to perform their tasks and to act more responsibly (Lee & Oh, 2023).

4.2.2.4. What recommendations may be made to a coal mining company to ensure compliance with environmental legislation?

From the individual interview sessions, the common theme that emerged as a recommendation is increased monitoring. The study participants are of the view that increased monitoring of employees is recommended to curb negligent non-compliance behavior.

RP7, Limpopo Operations: "*The increase of monitoring personnel from the environmental department is necessary to ensure that employees are doing what is expected of them*."

RP5, Mpumalanga Operations: "*Where people know that they are being monitored they will do what is right in to avoid any consequences. Thus, increased monitoring is necessary to ensure compliance*."

According to the study participants, when employees know that they are being monitored they will do the right thing. Increased monitoring means that the mining operations need to ensure that there are sufficiently qualified personnel who are able to ensure monitoring and compliance. According to Coppier, Grassetti and Michetti (2021), increased monitoring can ensure that appropriate action is taken against those responsible for non-compliance. Where people are aware that consequences will follow non-compliant behaviour they will aim to avoid such consequences. Studies by Zhu, Liu, Zhang, and Wang (2023) show that monitoring may enable the company to uncover reasons for non-compliant behaviour and may, thus, enable the company to address these reasons. The number of monitoring personnel for each of the mining operations should be based on the size of each operation. Currently, the environmental management departments of the two operations each consist of one environmental manager and two environmental specialists. The Limpopo operation has an area of 263.25 square kilometres and the Mpumalanga operation is 234.94

square kilometres in size. The avaerage cost for an environmental specialist in South Africa is R522,447,00 (Indeed, 2024).

4.2.3. Focus Group Interview Findings

The focus group interviews for the respective mining operations were also scheduled via Microsoft Teams. The researcher started the respective focus group interviews for the Limpopo and Mpumalanga operations by confirming the confidentiality of the research participants. To guide the group interviews and to ensure that their facilitation was orderly, the researcher ensured that all participants who were not nominated to speak at a particular time raise their hand using the Microsoft Teams application for the researcher to note. As outlined above, the researcher had difficulty managing the length of time that one participant would talk at a particular moment. The focus group interviews aimed at clarifying responses to questions received during the individual interviews. The focus group interviews were limited to three operational employees, one environmental manager, and one environmental specialist for each of the two operations. The participants of the focus group interviews are the same as those of the individual interviews. The participants of the focus group interviews are provided in Table 4.5:

Table 4.5: Participants in the Focus Group Interviews

Limpopo Operations		
Research Participant (RP)	**Employment Position**	**Years of Experience**
RP1	Environmental Manager	21 years
RP2	Environmental Specialist	14 years
RP3	Operational Employee	10 years
RP4	Operational Employee	10 years
RP5	Operational Employee	8 years
Mpumalanga Operations		
Research Participant (RP)	**Employment Position**	**Years of Experience**

RP1	Environmental Manager	20 years
RP2	Environmental Specialist	15 years
RP4	Operational Employee	11 years
RP5	Operational Employee	10 years
RP6	Operational Employee	8 years

The findings of the group interviews are outlined in Table 4.6.

Table 4.6: Findings from the Focus Group Interviews

Research Objective	Research Question	Theme	Number of Responses from Limpopo Operations	Number of Responses from Mpumalanga Operations
To explore the factors that hinder compliance with environmental laws in a coal mine	What factors hinder compliance with environmental laws in a coal mine?	• Human behaviour • Mechanical breakdown	3/5	4/5
To determine reasons for the failure in the measures currently employed to ensure compliance with environmental laws	Why do measures currently employed to ensure compliance with environmental laws fail?	• Lack of human resource capacity for monitoring	4/5	4/5
To determine the measures used to address repetitive environmental incidents and non-compliance	How are the repetitive environmental incidents and non-compliance at a coal mine addressed?	• Training	3/5	4/5
To recommend how the coal mining company can comply with environmental legislation	What recommendations may be made for a coal mining company to ensure compliance with environmental legislation?	• Increased monitoring	3/5	4/5

In relation to the question of what factors hinder compliance with environmental laws in a coal mine, the results of the focus group session for both the Limpopo and the

Mpumalanga operations show that 3 out of 5 focus group participants from the Limpopo operations and 4 out of 5 focus group participants from the Mpumalanga operations are of the view that negligent human behaviour and mechanical failures are the major hindrance to compliance with environmental laws. The research participants in the focus group sessions agree that most employees know what is expected of them but simply fail to do what is right.

The research participants in the focus groups agree that mechanical failures are also a hindrance to compliance. The breakdown in key machinery is said to be linked to the lack of financial resources for regular services of the machinery and thus preventing key breakdowns resulting in the machinery being out of service for prolonged periods. The breakdown of key machinery may also result in oil leaks causing water pollution.

As mentioned previously, a study by Asfoor *et al.* (2022, p. 276) reveals that there are a lot of factors which result in employees disobeying laws and company policies. These are outlined as “employee stress, unequal treatment by top management, and threats of punishment”. Negligent behaviour of not acting in accordance with required behaviour seems to be most prevalent, according to the focus group participants. In relation the breakdown of key machinery, the study by Bodziony and Patyk (2024) highlights the criticalness of maintaining mining equipment to prevent environmental pollution and degradation. The study highlights that the regular maintenance and servicing of haul trucks can prevent environmental pollution and degradation resulting from oil leakages.

Further, the study highlights that the servicing and maintenance of haul trucks roads on which these trucks drive can reduce fuel and diesel consumption by these trucks and, thus, reduce greenhouse gas emissions. A study by Bahrun *et al.* (2021) indicates that the breakdown of conveyor belts owing to lack of maintenance and servicing can lead to environmental harm in the form of pollution of clean soil, water pollution and noise pollution.

RP1, Limpopo Operations: "Employees know what the correct behaviour is, however, they decide not to comply."
RP2, Limpopo Operations: "The breakdown of key machinery also contributes to non-compliance. All operational machinery needs to be timeously serviced."

RP1, Mpumalanga Operations: "I believe that employees know exactly what type of behaviour is expected of them concerning environmental law compliance. They simply decide not to comply."

RP2, Mpumalanga Operations: "Operational machinery failure is a hindrance to environmental law compliance. The regular servicing of machinery is needed."

Concerning the question as to why current measures employed to ensure compliance with environmental laws fail, four out of five focus group participants for both the Limpopo and Mpumalanga operations confirmed that lack of adequate qualified personnel to ensure monitoring is the main reason why current measures employed to ensure compliance fail.

A study by Borlini (2024) reveals that monitoring is a critical component of compliance in that it provides insight into behaviour that may lead to non-compliance and will allow the mining company to take proactive measures to address such behaviour. A study by Villarreal, Habibi, and Taylor (2022) also indicates that the proper monitoring can assist with the improvement of compliance by allowing action to be taken to prevent non-compliant behaviour before it materialises.

RP3, Limpopo Operations: "I agree that the lack of adequate personnel in the sustainability department to ensure monitoring is a reason why current measures employed to ensure compliance fail".

RP3, Mpumalanga Operations: "There is a lack of qualified personnel at the mine to ensure the monitoring of environmental compliance".

Relating to the question of how repetitive environmental incidents and non-compliances are addressed, three out of five focus group participants from the Limpopo operations and four out of five focus group participants from the Mpumalanga operations agree that training is a means of addressing repetitive environmental incidents and non-compliances. A study by Deciu (2020) shows that training assists employees to understand legal requirements better and the actions required to comply with those legal requirements. Further, a study by Obong, Amadi, Ekpenyong, Harry and Edodi (2021) shows that training of employees better assists to inform employees about their role in compliance and enables an organisational culture of compliance.

RP2, Limpopo Operations: "The mine uses training as a means to address repetitive environmental incidents and non-compliances."

RP4, Mpumalanga Operations: "Training is a means to address repetitive environmental incidents and non-compliances at the mine."

Lastly, relating to the question of what recommendations may be made for a coal mining company to ensure compliance with environmental legislation, three out of five focus group participants from the Limpopo operations and four out of five participants from the Mpumalanga operations agree that increased monitoring is recommended for the coal mining company to ensure compliance with environmental legislation. It is shown in a study by Coppier *et al.* (2021) that increased monitoring can improve compliance with environmental legislation by ensuring that appropriate action is taken against those responsible for non-compliance. A study by Obong *et al.* (2021) shows that increased monitoring ensures employees act in the required manner as they are aware that they are being observed.

RP3, Limpopo Operations: "Increased monitoring is indeed recommended to ensure compliance with environmental legislation by the mine. Employees need to know that they are monitored. This will ensure a change of behaviour towards compliance."

RP2, Mpumalanga Operations: "I recommend increased monitoring to ensure compliance with environmental legislation. This will curb negligent behaviour by employees."

4.3. Discussion from the TIPS Managerial Framework Perspective

The Da Vinci TIPS Managerial Framework advocates systems-thinking and focuses on three other major components of the framework: technology management, innovation management, and people management. Systems-thinking is a way of making sense of complex issues by looking at the issue holistically by considering all the parts that make the whole. It allows for a problem to be solved by not only looking at the observable aspects of the problem but by also investigating those unobservable aspects of the problem. It involves moving from the mere observation of events or data to the identification of patterns of behaviour and the underlying issues of the problem (Budak & Ceyhan, 2023). The latter means that the mining company needs to view compliance from a holistic perspective and how different elements within the company contribute to compliance behaviour.

The systems-thinking perspective of the Da Vinci TIPS Managerial Framework requires the mining company to consider how people, technology, and innovation may be integrated to achieve compliance with environmental legislation. The achievement of coordination between technology and innovation will enable the mining company to become agile. Agility through technology and innovation will enable the mining company to respond better and comply with disruptive environmental legislation impacting the mining operations responding to environmental incidents as well as finding solutions to resolve them in a creative manner (El-Khalil & Mezher, 2020).

Currently, it was noted during the document review that the mining operations have incorporated various technologies within the various areas of operation that are aimed at preventing environmental pollution incidents and assisting in responding to incidents. According to the Da Vinci TIPS Managerial Framework, the achievement of systemic awareness of the various components affecting compliance will enable the mining company to respond with purpose to environmental law compliance.

The Tips Managerial Leadership Framework also requires cooperation between people and technology, which leads to alignment where people are not threatened by technology taking over their tasks but embrace and utilise technology to achieve intended results. Since the mine has incorporated technology in its operations to assist with environmental law compliance, people need to be trained adequately on the use of the technology to achieve compliance. Further, the mine needs to reaffirm to employees that the use of technology is not intended to replace them.

According to Mushore and Kyobe (2022), the alignment between technology and people may assist the mine with better decision-making based on information generated by the technology. This means the mining company can ensure that better decisions may be taken by employees concerning environmental law compliance where there is alignment between employees and technology. Further, the TIPS Managerial Framework requires collaboration between people and innovation.

The TIPS Managerial Framework states that collaboration between people and innovation achieves engagement between people and idea creation. The incorporation of technology by the mining company is a way in which collaboration between employees and innovation can happen. When employees engage with technology this can result in innovative ideas and foster a culture of solving environmental non-compliances innovatively. According to Soleas (2020), encouraging innovation in the work environment can lead to better and quicker problem-solving such as environmental non-compliance.

The TIPS Managerial Framework also requires consideration of the micro, meso, exo, and macro systems as well as how compliance with environmental legislation is affected by these systems. The micro-system is defined as a pattern of activities, roles, and interpersonal relations experienced by a person in a particular setting. The meso-system is the interrelationship between two settings in which an individual actively participates. The exo-system is the settings that does not involve the developing person as an active participant. The macro-system is the systems that exists at the level of culture or belief systems (The Da Vinci Institute for Technology Management (Pty) Ltd, 2020).

Given the above, it is important for the mining company to assess continuously and consider which environment in which it finds itself relating to environmental non-compliance. The company should then aim to apply the correct strategy to solve the issue of non-compliance. Understanding all systems will allow management to understand various factors which may contribute to non-compliance, such as the demographics of employees, how employees interact with one another and how they influence each other, the need to tailor more specific job descriptions to ensure that suitably qualified personnel are employed to oversee compliance, as well as the type of leadership required to establish an organisational culture of compliance with environmental legislation.

4.4. Conclusion

A conclusion of the research findings of this study is presented according to the research objectives as follows:

Objective 1: To explore the factors that hinder compliance with environmental laws in a coal mine.

The document review has revealed that human behaviour, operational requirements, leadership and management style to be factors that hinder compliance with environmental laws in a coal mine. The individual interviews and focus group

interviews also revealed that mechanical breakdowns are a cause of non-compliance with environmental laws by a coal mine.

Objective 2: To determine reasons for the failure in the measures currently employed to ensure compliance with environmental laws.

The document review process identified financial constraints and the lack of adequate monitoring as the reasons why measures currently employed to ensure compliance with environmental laws fail. The individual interviews and focus group interviews revealed that the lack of human resource capacity for monitoring as a reason for the failure in the measures currently employed to ensure compliance with environmental laws.

Objective 3: To determine the measures used to address repetitive environmental incidents and non-compliance.

The document analysis process revealed that both operations use training and awareness to address repetitive environmental incidents and non-compliance. The individual interviews and focus group interviews confirmed that training is utilised to address repetitive environmental incidents and non-compliance.

Objective 4: To recommend how the coal mining company can comply with environmental legislation.

The recommendation made from the document analysis process is for both operations to create an organisational culture of compliance through the management's commitment to making monitoring personnel available. From the individual interviews and focus group interviews, the recommendation made is that increased monitoring is indeed required at the operations.

Chapter 5: Conclusion and Recommendations

5.1. Introduction

This chapter presents a summary of the main findings, the study's conclusions against the research questions, the return on investment, the limitations of the study, the study recommendations, and recommendations for future research. As stated previously, the study aimed to identify factors contributing to non-compliance with environmental legislation by a coal mine with coal operations in the Limpopo and Mpumalanga Provinces.

5.2. Summary of the Main Findings

The main findings from the research are summarised according to themes in Table 5.1.

Table 5.1: Summary of Findings

Research Objective	Research Question	Data Collection Method	Theme
To explore the factors that hinder compliance with environmental laws in a coal mine	What factors hinder compliance with environmental laws in a coal mine?	• Document review • Individual in-depth interviews • Focus group interviews	• Human behaviour • Operational requirements • Leadership and management style • Mechanical breakdown
To determine reasons for the failure in the measures currently employed to ensure compliance with environmental laws	Why do measures currently employed to ensure compliance with environmental laws fail?	• Document review • Individual in-depth interviews • Focus group interviews	• Financial constraints • Lack of human resource capacity for monitoring
To determine the measures used to address repetitive	How are the repetitive environmental incidents	• Document review • Individual in-depth interviews	• Training

environmental incidents and non-compliance.	and non-compliance at a coal mine addressed?	• Focus group interviews	
To recommend how the coal mining company can comply with environmental legislation	What recommendations may be made for a coal mining company to ensure compliance with environmental legislation?	• Document review • Individual in-depth interviews Focus group interviews	• Increased monitoring • Create an organisational culture of compliance through management commitment

5.3. Conclusions Against Research Questions

The primary research question of the study was “What factors contribute to a coal mining company's non-compliance with South African environmental laws?” The conclusion reached about the primary research question is that various factors contribute to a coal mining company’s non-compliance with South African environmental laws. The findings in relation to each coal mining operation in the Limpopo and Mpumalanga Province indicate that the factors contributing to non-compliance with environmental laws include negligent human behaviour, operational requirements, leadership and management style, financial constraints, and the lack of adequate monitoring.

The below conclusions were reached about the research questions which were aimed at addressing the research objectives.

i. What factors hinder compliance with environmental laws in a coal mine?

The findings from the document review process, the individual in-depth interviews, and focus group interviews reveal that the factors which hinder compliance with environmental laws in a coal mine include human behaviour, mechanical breakdowns, operational requirements as well as and leadership and management style. The

human behaviour identified is at times negligent human behaviour and, at times, the lack of knowledge relating to what is legally required. A study by Khaile, Davids, and Khaile (2021) confirms that, in most cases, non-compliance with environmental legislation occurs in situations where there are clear rules and policies regarding compliance and people simply ignore or fail to comply with these rules and policies. The self-interests of people as opposed to the organisational interests is said to be a motivating cause.

In relation to mechanical breakdowns, the study has revealed that mechanical breakdowns of key machinery aimed to ensure compliance result from the lack of regular servicing of the machinery. Studies by Bodziony and Patyk (2024) show the criticality of maintaining mining equipment to prevent environmental pollution and degradation. The studies highlight that the regular maintenance and servicing of haul trucks can prevent environmental pollution and degradation resulting from oil leakages. Further, the studies highlight that the servicing and maintenance of haul trucks roads on which these trucks drive can reduce fuel and diesel consumption by these trucks and, thus, reduce greenhouse gas emissions. Studies by Bahrun *et al.* (2021) show that the breakdown of conveyor belts owing to lack of maintenance and servicing can lead to environmental harm in the form of pollution of clean soil, water pollution, and noise pollution.

The study has shown that operational requirements also result in various non-compliances such as placing hazardous material in unauthorised areas within the mining operations. Studies by Carmo *et al.* (2020) show that the lack of space and production pressures at mines may result in unauthorised action including improper waste management practices.

It has also been revealed by the study that the leadership style and management of the operations also hinder compliance with environmental legislation in that the leadership and management of the coal mining operations are not strict in enforcing compliance. Studies by Bwalya (2023) provide that leaders and managers within the

organisation need to have the ability to influence employees to behave in a certain manner, and that changing the perception of how employees view compliance is key in changing their actions and influencing the decisions they make regarding compliance.

ii. Why do measures currently employed to ensure compliance with environmental laws fail?

The findings from the document review, individual in-depth interviews, and focus group interviews for the mining operations in the Limpopo and Mpumalanga Provinces reveal that current measures employed to ensure compliance with environmental laws fail because of financial constraints on the part of the mining operations as well as the lack of adequate human resources capacity to ensure monitoring.

It has been identified that certain capital projects outlined as part of the measures to ensure compliance, as committed to by the mining operations in the various environmental authorisations, are not implemented. The reason for the non-implementation of these projects is the lack of financial capital to expand on these projects. Studies by He, Ding, and Yang (2020) and Wu, Liao, Zhou, and Li (2021) confirms that environmental compliance is associated with capital expenditure, mainly on research and development, and implementing innovative measures, and technology aimed at ensuring compliance. Mustapha, Arogundade, Misra, Damasevicius and Maskeliunas (2020) also confirms that for an organisation to achieve compliance, necessary capital needs to be made available for the upgrading of people, business processes, and facilities to meet regulatory requirements. Further, it is noted that the cost of compliance for an entity will increase as regulations increase.

Another conclusion from the study is that where monitoring of behaviour is not adequate, employees fail to do what they are required to do and that which is right. Studies by Khan, Zaidi, Yang, Park, and Lee (2023) indicate that monitoring is a critical

component of compliance and involves both the observation of possible violations and the prediction of possible future violation areas. This enables the company to be proactive, set up necessary systems and take action to prevent future non-compliance. Furthermore, the studies show that more and more companies are increasingly moving towards utilising technology to assist with monitoring.

iii. How are the repetitive environmental incidents and non-compliance at a coal mine addressed?

The conclusion from the study is that training is a means used to address repetitive environmental incidents and non-compliance by both mining operations. It is recommended by the study participants that the training needs to be constant and aimed at informing employees about their responsibility towards protecting the environment and how their work and negligent behaviour can impact the environment negatively. A study by Deciu (2020) shows that training assists employees to understand legal requirements better and the actions required to comply with those legal requirements. Further, a study by Obong *et al.* (2021) shows that training of employees better assists to inform employees about their role in compliance and enables an organisational culture of compliance.

iv. What recommendations may be made for a coal mining company to ensure compliance with environmental legislation?

The conclusions from the study recommend increased monitoring by the coal mining company as a means of ensuring compliance with environmental legislation. Proper monitoring can only happen where there are sufficient personnel to cover all areas of the mine to ensure that employees are doing what they are required to do. Increased monitoring will enable the mining company to act proactively against behaviour resulting in non-compliance. Further, it is recommended that the organisation should create an organisational culture of compliance through management's commitment to ensuring available resources for monitoring. The number of resources required to

ensure increased monitoring depends on the size of each mining operation. Currently, the Limpopo operation has an area of 263.25 square kilometres and the Mpumalanga operation is 234.94 square kilometres in size and the environmental management departments of the two operations each consist of one environmental manager and two environmental specialists. The average cost of an environmental specialist in South Africa is R522,447,00 (Indeed, 2024). It is shown in a study by Coppier *et al.* (2021) that increased monitoring can improve compliance with environmental legislation by ensuring that appropriate action is taken against those responsible for non-compliance. A study by Obong *et al.* (2021) also shows that increased monitoring ensures that employees act in the required manner as they are aware that they are being observed.

5.4. Return on Investment

Non-compliance with environmental legislation impacts the environment negatively in various ways, which include air and water pollution. Environmental pollution also impacts the health and well-being of mining communities and ecosystems as well as the biodiversity within those ecosystems. Furthermore, non-compliance with environmental legislation by a coal mining company also impacts the coal mining company itself. Financial penalties may be imposed against the mining company. It may also suffer reputational harm and lose stakeholder support. The loss of stakeholder support may make it difficult for the mining company to obtain various licences and authorisations required to continue operations. The loss of stakeholder support may also result in the loss of investment in the mining company by stakeholders. The latter may ultimately result in the closure of the mining company and loss of employment.

It is against the above backdrop that the researcher has embarked on this study to assist the coal mining company forming part of this study to be able to identify the factors that contribute to non-compliance with South African environmental legislation and to recommend how the coal mining company can comply with environmental legislation. Further, the factors that contribute to non-compliance with environmental

legislation identified in this study may also apply to other mining companies and the recommendations of this study may also benefit those mining companies.

The return on investment also extends to mining communities in that non-compliance with environmental legislation impacts the health and well-being of those communities and also impacts their ecosystems. Further, the return on investment extends to the employees of the mine and the general economy of South Africa in that the mining company is a large employer and thus contributes towards the economic development of South Africa. The researcher intends to discuss the findings of this study with the leadership and management of the coal mining company and obtain a commitment that the recommendations of the study will be implemented.

5.5. Delimitations of the Study

The study focused on non-compliance with South African environmental laws and particularly the factors contributing to non-compliance by a coal mining company. Owing to the topic's sensitivity, the participants were reluctant to disclose their personal experiences fully to the researcher. This resulted in the researcher having to emphasise the confidentiality of the study to the participants constantly.

5.6. Recommendations

The recommendations of the study are based on findings from the research question: “What recommendations may be made for a coal mining company to ensure compliance with environmental legislation?” From the findings, it is recommended that the coal mine should ensure the increased monitoring of compliance with environmental legislation. Increased monitoring will ensure behaviour that results in non-compliance with environmental legislation is sufficiently monitored, and that appropriate action is taken to address the behaviour. The number of resources required to ensure increased monitoring depends on the size of each mining operation.

Currently, the Limpopo operation has an area of 263.25 square kilometres and the Mpumalanga operation is 234.94 square kilometres in size. The average cost of an environmental specialist in South Africa is R522,447,00 (Indeed, 2024).

Another recommendation from the findings is that the mining company should create an organisational culture of compliance through management commitment. The management commitment outlined is that the coal mining company should ensure that adequate skilled personnel is available to ensure increased monitoring. Proper monitoring can only happen where there are sufficient personnel to cover all areas of the mine to ensure that employees are doing what they are required to do. Further, the skilled personnel will also be able to demonstrate the required behaviour that may be followed by other employees.

5.7. Recommendations for Future Research

As stated above, this study was limited to exploring the factors contributing to South African environmental law non-compliance by a coal mining company. The data collection process was limited to a coal mining company with respective coal mine operations in the Limpopo and Mpumalanga Provinces and did not extend to other industries and mining companies in South Africa. Given the impact of non-compliance with environmental legislation on human health, ecosystems, and biodiversity, and for those companies found to be non-compliant, it is recommended that research be undertaken in other industries to explore the factors that contribute to non-compliance with South African environmental legislation.

5.8. Conclusion

The aim of this study was to explore the factors that contribute to non-compliance by a coal mining company with coal mining operations in the Limpopo and Mpumalanga Provinces. This chapter provides a summary of the findings and conclusions of the

study, the return on investment, the limitations of the study, recommendations, and future research recommendations.

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Appendix A: Ethical Clearance letter

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THE DAVINCI INSTITUTE
for technology management

Reference: 01424

Date: 17 May 2024

Ethical Declaration

I, the undersigned, hereby declare that the Master's Research of the student named below has received ethical clearance from The Da Vinci Institute Ethics Committee. The student and supervisor will be expected to continue to uphold the Da Vinci Institute's Research Ethics Policy as indicated during the application.

Proposed Title: Exploring the Factors Contributing to Non-Compliance to Environmental Laws by a Coal Mining Company Operating in the Limpopo and Mpumalanga Provinces

Student Name: Kabeng Andries Andy

Student Number: 16604

Supervisor: Dr C Mukonza

Co-Supervisor: N/A

Period: Ethics approval is granted from 2024/05/17 to 2026/03/30

Chairperson: Research & Ethics Committee

Prof Paul Singh

Appendix B: Permission to Conduct Studies

Exxaro Resources Limited

263B West Avenue

Die Hoewes

Centurion

0157

PERMISSION TO CONDUCT RESEARCH STUDIES

Dear Sir

My name is Andries Andy Kabeng. I am currently studying with the Da Vinci Institute for Technology Management (Pty) Ltd. I am pursuing a degree in Master of Business Leadership ("MBL"). As part of the requirements of the MBL, I am required to submit a research paper. The research I wish to conduct involves exploring the factors which contribute to non-compliance with environmental laws by coal mining companies. The latter will involve individual interviews and focus group interviews with mine personnel to share their experience of what they deem to be the factors which may lead to non-compliance with environmental laws by coal mining companies. No entity names or names of participants will be disclosed in the study.

I hereby humbly request the consent of Exxaro Resources Limited to undertake the study at two of its mines, namely Grootegeluk Coal Mine and Matla Coal Mine. A copy of the proposal accompanies this letter and also includes the consent declarations which participants will need to sign and issues relating to ethical considerations and confidentiality.

Consent declaration:

I LESEGO RAYI as the duly appointed Legal & Risk Manager

of Exxaro Resources Limited, hereby grant Andries Andy Kabeng permission to undertake the

abovementioned study as outlined above.

Signed at Johannesburg (place) on this 13 day of October (month) 2023.

Signed by:Lesego Rayi
Signed at:2023-10-13 08:54:51 +02:00
Reason:I approve this document

Lesego Rayi

Appendix C: Participant Informed Consent Form

Title of Research
Exploring the Factors Contributing to Non-Compliance to Environmental Laws by Coal Mining Companies in the Limpopo and Mpumalanga Provinces.

Purpose of Study
The purpose of this study is to explore the factors that contribute to non-compliance to South African environmental legislation by coal mining companies in Limpopo and Mpumalanga Provinces. The aim of this study is to assist a coal mining company to be able to identify the factors that contribute to non-compliance with environmental laws so that these factors may be addressed by the mining company and thus prevent financial penalties from being imposed against the mining company.

Extent of Participation
Each participant will be required to voluntarily share their knowledge and experiences of what they deem to contribute to non-compliance with South African environmental legislation by coal mining companies.

Confidentiality
The researcher hereby confirms that the name of the participant will be kept confidential and will not be disclosed to any third party.

I ……. (Name and surname of participant) hereby confirm that I voluntarily consent to participate in the above-mentioned study.

Signed at …….. (place) on this ……. day of

……. (month) 202..

……. (Signature of participant)

Appendix D: Interview Guide/Questions

Interview Questions

(a) **Background Information of Participant**

Position: …….
Years of experience: …….
Number of years in organisation: …….
What are your responsibilities: …….

(b) **Questions relating to factors contributing to non-compliance to environmental laws.**

- What are the forms of pollution that likely occur in the mine?
- What are the causes that lead to pollution occurring?
- What are the constraints to environmental law compliance from a mining company perspective?
- What forms of measures and procedures may be put in place to ensure that pollution is prevented?
- Why do current measures aimed at preventing pollution fail?
- What forms of institutional support exist to support compliance and discourage non-compliance to environmental laws both internally and externally?
- Are people aware of the need to protect the environment and of the need to comply with environmental laws?
- Are the penalties included in the various environmental laws sufficient to deter non-compliance to environmental laws?
- What is the organisational culture at the mine in relation to environmental law compliance and non-compliance?
- How do employees respond to initiatives aimed at environmental law compliance at the mine?
- Are monitoring measures from the various regulators sufficient to encourage compliance with environmental laws?
- How often do environmental compliance regulators visit the mine?
- What recommendations do environmental regulators make in relation to compliance with environmental laws, and are the recommendations practical?