A FRAMEWORK FOR LINKING SUSTAINABILITY PERFORMANCE TO SUSTAINABILITY REPORTING: USING REGULATION AS A COMPLIANCE MECHANISM

by

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ABSTRACT

The concept of sustainability in the mining sector is still debatable, considering the social and environmental impacts of the industry. Regrettably, South African mining companies reportedly omit the negative impacts of mining in their reports, despite progressive laws and regulations. The research focuses on greenwashing using sustainability reporting to conceal negative externalities. Meanwhile, society has no practical instrument for discerning greenwashing nor the means to authenticate sustainability information reported by mining companies. This research aims to develop a framework for linking sustainability performance to sustainability reporting using regulation as a compliance mechanism. The study's objectives are to explore the factors affecting sustainability in a regulated mining sector and to investigate the perceived gap between sustainability performance and sustainability reporting from the regulators' perspective. A multi-theory approach provides a panoramic view of greenwashing; however, the study contributes significantly to legitimacy theory. Positivist philosophy guided this quantitative study. Probability random sampling generated a sample of 150 from a population of 512 Department of Mineral Resources employees who are regulators of the mining industry. Descriptive statistics, exploratory factor analysis (EFA), comparative pairwise differences, and covariance-based structural equation model (CB-SEM) are used to analyse data. EFA results uncovered 10 sustainability factors: local enterprise development; local infrastructure development; skills development; housing and living conditions; occupational health and safety; labour practices, diversity, and inclusion; employment equity; environmental management; environmental leadership; and environmental responsibility. Pairwise results revealed greenwashing in occupational health and safety; labour practices, diversity and inclusion; employment equity; environmental management; and environmental leadership. The results indicate that its well-meaning regulation is not the solution for greenwashing. Future researchers may explore other gap-bridging solutions beyond regulation between sustainability performance and sustainability reporting. CB-SEM shows that at a 5% confidence level, all structural path coefficients are statistically significant, indicating that from the regulators' perspective, there is a strong relationship between sustainability performance and sustainability reporting. Future researchers can investigate greenwashing in mining from a multi-stakeholder perspective using mixed research methods to offer

triangulation. A longitudinal study can follow-up on this cross-sectional study conducted in 2019.

Keywords: Agency theory, government regulation, greenwashing, impression management theory, institutional theory, legitimacy theory, stakeholder accountability theory, sustainability, sustainability performance, sustainability reporting, sustainable development, voluntary disclosure theory.

MANWELEDZO

Muṱalukanyo wa u sa nyeṱha kha sekithara ya zwa migodi u kha ḓivha khangala khanganyise, ho sedzwa masiandaitwa a matshilisano na a vhupo. Zwi a ṱungufhadza uri khamphani dza zwa migodi Afrika Tshipembe a dzi kateli masiandaitwa mavhi a zwa u bwa migodi kha mivhigo yadzo, naho hu na milayo na ndaulo dzi bvelaho phanḓa. Ṱhoḓisiso iyi yo sedza u dzumbetshedza mafhungo a vhupo hu tshi khou shumiswa u vhiga hu sa nyeṱhi u itela u dzumba zwivhi. Naho zwo ralo, tshitshavha a tshi na tshishumiswa tshi fareaho tsha u hanedzana na mivhigo iyi kana nḓila ya u khwaṱhisedza mafhungo a u sa nyeṱha a vhigwaho nga khamphani dza migodi. Ṱhoḓisiso iyi yo pika u bveledza muhanga wa u ṱumanya kushumele ku sa nyeṱhi na kuvhigele ku sa nyeṱhi nga u shumisa ndaulo sa nḓila ya u tevhedza. Zwipikwa zwa ngudo ndi u sedza zwivhumbi zwine zwa kwama u sa nyeṱha kha sekhithara ya zwa migodo i langwaho na u ṱoḓisisa tshikhala tsho vhonalaho vhukati ha kushumele ku sa nyeṱhi na kuvhigele ku sa nyeṱhi nga kuvhonele kwa mulanguli. Kuitele kwa thyeori dzo vhalaho hu ṋekedza mbonelonyangaredzi ya u dzumbetshedza, fhedzi, ngudo i a shela mulenzhe zwihulwane kha thyeori ya u vha mulayoni. Fiḽosofi ya mbonelombuya ndi yone yo endedzaho ngudo iyi ya khwanthithethivi. U ita tsumbo nanguludzwa dza tshayandivhiswa ho sedzwa khonadzeo zwo bveledzwa tsumbonanguludzwa dza 150 u bva kha tshitshavha tsha 512 tsha vhashumi vha Muhasho wa Zwiko na Minerala vha re vhalangi vha nḓowetshumo ya zwa migodi. Mbalombalo ṱhalutshedzwa, musaukanyo ya tshivhumbi wa tsedzuluso (EFA), phambano mbambedza nga zwivhili, na tshiedziswa tsha murekanyo wa tshivhumbeo wo ḓisekaho nga vhushaka ha zwivhili (CB-SEM) zwi shumiswa u saukanya data. Mvelelo dza EFA dzo dzumbulula zwivhumbi zwa 10 zwa u sa nyeṱha: mveledziso ya vhuramabindu vhapo, mveledziso ya themamveledziso yapo, mveledziso ya zwikili, nyimele dza dzinnḓu na kutshilele, mutakalo na tsireledzo mushumoni, maitele a kushumele na u katela; ndinganyiso ya kutholele, ndangulo ya vhupo, vhurangaphanḓa ha vhupo na vhuḓifhinduleli ha vhupo. mvelelo dza vhushaka ha zwivhili dzo bvisela khagala u dzumbetshedza kha mutakalalo mishumoni na tsireledzo, maitele a kushumlee, phambano na u katela; ndinganyiso ya kutholele, ndangulo ya vhupo na vhurangaphanḓa ha vhupo. mvelelo dzo sumbedza uri ndaulo ine ya vha na ṱhalutshedzo i pfadzaho a si thasululo ya u dzumbetshedza. Vhaṱoḓisisi vha tshifhingani tshi ḓaho vha nga sedza dziṅwe thasululo dza u vala mavhaka nga

murahu ha ndaulo vhukati ha kushumele ku sa nyeṱhi na kuvhigele ku sa nyeṱhi. CB-SEM i sumbedza uri 5% ya ḽevele ya vhuḓifulufhelu, zwivhumbi dza nḓila ya tshivhumbeo zwoṱhe ndi zwa ndeme kha mbalombalo, zwi sumbedzaho uri u bva kha kuvhonele kwa mulanguli, hu na vhushaka vhuhulwane vhukati ha kushumele ku sa nyeṱhi na kuvhigele ku sa nyeṱhi. Vhaṱoḓisisi vha tshifhingani tshi ḓaho vha nga sedza zwa u dzumbetshedza kha zwa migodi u bva kha kuvhonele kwa vhashumisani vhanzhi nga u shumisa ngona dza ṱhoḓisiso dzo ṱanganelaho u khwaṱhisedza u khwaṱha ha mawanwa. Hu nga tevhedzwa nga ṱhoḓisiso munavha kha ngudo buḓa dzo itwaho nga 2019.

Maipfi a ndeme: Thyeori ya zhendedzi, ndaulo ya muvhuso, u dzumbetshedza, thyeori ya ndangulo ya kuvhonele, thyeori ya tshiimiswa, thyeori ya u vha mulayoni, thyeori ya vhuḓifhinduleli ha vhashumisani, u sa nyeṱha, kushumele kwa u sa nyeṱha, kuvhigele kwa u sa nyeṱha, mveledziso dzi sa nyeṱhu, thyeori ya u bvisela khagala nga u tou funa.

OPSOMMING

Gesien die maatskaplike en omgewingsinvloed van die mynbedryf, heers meningsverskille oor die begrip “volhoubaarheid” in hierdie sektor. Ondanks progressiewe wetgewing en regulasies verswyg mynmaatskappye na bewering die skade van hulle werksaamhede jammer genoeg in hulle verslagdoening. Hierdie navorsing ondersoek groen aansprake wat in volhoubaarheidsverslagdoening gemaak word om die skadelike gevolge van mynbou te verdoesel. Aangesien geen instrument bestaan om die geldigheid van mynmaatskappye se groen aansprake of volhoubaarheidsverslagdoening te toets nie, poog hierdie navorsing om ’n raamwerk daar te stel aan die hand waarvan volhoubaarheidsprestasie en volhoubaarheidsverslagdoening vergelyk kan word, en waarvolgens regulering as ’n voldoeningsmeganisme dien. Die oogmerke van hierdie studie is enersyds om die faktore te verken wat volhoubaarheid in ’n gereguleerde mynbedryf bepaal, en andersyds om die beweerde verskil tussen volhoubaarheidsprestasie en volhoubaarheidsverslagdoening uit die reguleerder se oogpunt te ondersoek. ’n Meertoeriebenadering bied ’n oorsig van groen aansprake. Hierdie studie lewer egter ’n wesenlike bydrae tot die legitimiteitsteorie. ’n Positivistiese filosofie het hierdie kwantitatiewe studie bepaal. Ewekansige waarskynlikheidsteekproefneming het ’n steekproef opgelewer van 150 uit 512 werknemers van die Departement van Minerale Hulpbronne wat as reguleerders van die mynbedryf optree. Die data is ontleed met behulp van beskrywende statistiek, ’n verkennende faktoranalise (VFA), vergelykende paarsgewyse verskille, en ’n kovariansie gegronde struktuurvergelykingsmodel (KG-SVM). Volgens die VFA is daar 10 volhoubaarheidsfaktore, te wete ontwikkeling van plaaslike ondernemings; ontwikkeling van plaaslike infrastruktuur; vaardigheidsontwikkeling; behuising en huisvesting; beroepsgesondheid en -veiligheid; arbeidspraktyke, diversiteit en insluiting; gelyke indiensneming; omgewingsbestuur; omgewingsleierskap; en omgewingsverantwoordelikheid. Die paarsgewyse resultate het aangetoon dat groen aansprake gemaak is ten opsigte van beroepsgesondheid en -veiligheid; arbeidspraktyke, diversiteit en insluiting; gelyke indiensneming; omgewingsbestuur; en omgewingsleierskap. Die resultate het aangedui dat goed bedoelde regulering geen oplossing vir groen aansprake bied nie. Navorsers kan in die toekoms met ander oplossings as regulasies vorendag kom om die verskil tussen volhoubaarheidsprestasie en volhoubaarheidsverslagdoening uit die

weg te ruim. Die KG-SVM dui aan dat as die vertrouensvlak op 5% staan, alle strukturele padkoëffisiënte statisties beduidend is. Dit beteken dat daar uit die reguleerder se oogpunt ’n sterk verwantskap tussen volhoubaarheidsprestasie en volhoubaarheidsverslagdoening bestaan. Toekomstige navorsers kan met behulp van gemengde navorsingsmetodes groen aansprake in die mynbedryf uit die oogpunt van verskeie belanghebbendes ondersoek om triangulering aan te bied. ’n Longitudinale studie kan hierdie deursnitstudie, wat in 2019 onderneem is, aanvul.

Kernbegrippe: Bemiddelingsteorie, regeringsregulering, groen aansprake, indrukbestuursteorie, institusionele teorie, legitimiteitsteorie, belanghebberaanspreeklikheidsteorie, volhoubaarheid, volhoubaarheidsprestasie, volhoubaarheidsverslagdoening, volhoubare ontwikkeling, vrywilligeopenbaringsteorie.

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LIST OF ABBREVIATIONS

Abbreviation	Description
AMD	Acid Mine Drainage
AIC	Akaike Information Criterion
AU	African Union
BEE	Black Economic Empowerment
B1P	Local enterprise development – Sustainability Performance
B1R	Local enterprise development – Sustainability Reporting
B2P	Infrastructure Development – Sustainability Performance
B2R	Infrastructure Development – Sustainability Reporting
B3P	Skills development – Sustainability Performance
B3R	Skills development – Sustainability Reporting
B4P	Housing and living conditions – Sustainability Performance
B4R	Housing and living conditions – Sustainability Reporting
BIC	Bayesian Information Criterion
C1P	Occupational Health and Safety – Sustainability Performance
C1R	Occupational Health and Safety – Sustainability Reporting
C2P	Labour Practices, Diversity and Inclusion – Sustainability Performance
C2R	Labour Practices, Diversity and Inclusion – Sustainability Reporting
C3P	Employment equity– Sustainability Performance
C3R	Employment equity– Sustainability Reporting
CCD	Climate change related disclosure
CEOs	Chief Executive Officers
CEP	Council on Economic Priorities
CFA	Confirmatory Factor Analysis

Abbreviation	Description
CFI	Comparative Fit Index
CMB	Common Method Bias
CmP	Community Development– Sustainability Performance
CmR	Community Development– Sustainability Reporting
CMV	Common Method Variance
CSA	Corporate Sustainability Assessment
CSR	Corporate social responsibility
CB-SEM	Covariance -Based Structural Equation Model
D1P	Environmental Management – Sustainability Performance
D1R	Environmental Management – Sustainability Reporting
D2P	Environmental Leadership – Sustainability Performance
D2R	Environmental Leadership – Sustainability Reporting
D3P	Environmental Responsibility – Sustainability Performance
D3R	Environmental Responsibility – Sustainability Reporting
DMR	Department of Mineral Resources
EFA	Exploratory Factor Analysis
EIA	Environmental Impact Assessment
EITI	Extractive Industries Transparency Initiative
EmP	Employee Welfare– Sustainability Performance
EmR	Employee Welfare– Sustainability Reporting
EMS	Environmental management system
EnP	Environmental protection– Sustainability Performance
EnR	Environmental protection– Sustainability Reporting
EPD	Environmental product declarations
ESG	Environmental, social and governance

Abbreviation	Description
ET	Economic Times
EXCO	Executive committee
FIFR	Fatal-Injury Frequency Rate
FP	Financial performance
FTSE	Financial Times Stock Exchange
HLCS	Housing and Living Conditions Standard 2019
GHG	Greenhouse Gas
GRI	Global Reporting Initiative
IIRF	International Integrated Reporting Framework
ILO	International Labour Organisation
IR	Integrated Reporting
IRC	Integrated Reporting Committee
ISE	Indice de Sustentabilidade Empresarial
JSE	Johannesburg Stock Exchange
MBG	Mining and Biodiversity Guidelines
MHSA	Mine Health and safety Act
MNC	Multinational companies
MPRDA	Mineral and Petroleum Resources Development Act
NEMA	National Environmental Management Act
NGERS	National Greenhouse and Energy Reporting Scheme
NPI	National Pollutant Inventory
NSE	National Stock Exchange of India
OECD	Organisation for Economic Co-operation and Development
OHS	Occupational Health and Safety
PGM	Platinum Group Metals

Abbreviation	Description
POPI	Protection of Personal Information
POPIA	Protection of Personal Information Act
RDAP	Reactive-Defensive-Accommodative-Proactive
RMSEA	Root Mean Square Error of Approximation
SDG	Sustainable development goals
SEBI	Securities and Exchange Board of India
SEM	Structural Equation Model
SLO	Social Licence to Operate
SLP	Social Labour Plans
SME	Small and Medium Enterprises
SMME	Small, Medium and Micro Enterprise
SO_2	Sulphur Dioxide
SRI	Social Responsibility Index
SRMSR	Standardized Root Mean Square Residual
SP	Sustainability Performance
SR	Sustainability Reporting
SRMR	Standardised Root Mean Square Residual
SSDI	SME Sustainability Disclosure Index
SSE	Shanghai Stock Exchange
SZSE	Shenzhen Stock Exchange
TLI	Tucker-Lewis Index
UN	United Nations
UNGC	United Nations Global Compact
UNISA	University of South Africa
WCED	World Commission on Environment and Development

CHAPTER 1: INTRODUCTION AND BACKGROUND

1.1. BACKGROUND OF THE STUDY

There has been a significant increase in the number of sustainability reports being published (Crous, Owen, Marais, Khanyile & Kemp, 2021; Du, Zeng & Zhang, 2021; Wedari, Jubb & Moradi-Motlagh, 2021; de Silva Lokuwaduge & de Silva, 2022; Nemes, Scanlan, Smith, Smith, Aronczyk, Hill, Lewis, Montgomery, Francesco Tubiello & Stabinsky, 2022). However, the credibility of information contained in these reports has become questionable to stakeholders due to the greenwashing phenomenon (Macellari, Yuriev, Testa & Boiral, 2021; de Silva Lokuwaduge & de Silva, 2022; Nemes et al., 2022).

In the main, empirical research shows that sustainability reports are being criticised for the facilitation and diffusion of greenwashing (Uyar, Karaman & Kilic, 2020; Munir & Mohan, 2022; Ruiz-Blanco, Romero & Fernandez-Feijoo, 2022; Seele & Schultz, 2022; Zhang, Jiang, Li, Zhang, Yuan & Guo, 2020). It is posited that the proliferation of greenwashing is being enabled through unregulated sustainability approaches (Pizzetti, Gatti & Seele, 2019).

South African mining companies reportedly omit the negative impacts of mining in their reports (Cole & Broadhurst, 2021), selectively reporting positive environmental and societal performance whilst concealing negative performance (Ackers & Grobbelaar, 2021). It is further alleged that such reporting is driven by the motive to secure the mining license to operate, without which the legitimacy of mining companies is threatened (Ackers & Grobbelaar, 2021). Furthermore, it is postulated that much of the content of mining companies' sustainability reports appears to external service demand while simultaneously concealing internal information about the social impacts of mine closure (Crous et al., 2021). In this sense, South African mining companies seem to have adopted a reporting approach that does not build trust (Crous et al., 2021). These continual claims of greenwashing in the mining sector require further empirical investigation.

The layout of the chapter is as follows: Section 1.1 provides the background of the study, Section 1.2 presents the research problem, followed by the thesis statement in Section 1.3. Section 1.4 deals with the research purpose, while the research

objectives are discussed in Section 1.5. The research questions are listed in Section 1.6, whereas the significance of the study is explained in Section 1.7. The methodology is outlined in Section 1.8. The assumptions of the study are in Section 1.9. This is followed by Section 1.10, which defines the scope and delimitation of the study. Section 1.11 deals with the definition of key terms. The thesis layout is in Section 1.12, whereas the chapter summary is in Section 1.13.

1.2. RESEARCH PROBLEM

South African mining companies are reportedly using sustainability reports to conceal the negative externalities of mining operations (Ackers & Grobbelaar, 2021; Crous et al., 2021), a form of greenwashing. Companies conceal unsustainable business operations to influence the perceptions of stakeholders to regard the company favourably (du Toit & Esterhuyse, 2021; Du et al., 2021; Macellari et al., 2021; Nemes et al., 2022).

Greenwashing emerged and proliferated as sustainability's 'evil twin' (de Jong, Harkink & Barth, 2018). According to de Freitas Netto, Sobral, Ribeiro and da Luz Soares (2020), greenwashing is growing substantially and is common in modern business. The rampant increase in the prevalence of greenwashing (Du et al., 2021) casts doubt and scepticism on bona fide sustainability reports, undermining the very essence of sustainable development (de Jong et al., 2018). This is a major concern.

In its very nature, greenwashing is counter-sustainability since society is misled into supporting unsustainable business practices camouflaged as green, compromising the sustainable development agenda (Fonseca, McAllister & Fitzpatrick, 2014). In this regard, greenwashing robs society due to its illusion of sustainable development, resulting in serious implications and consequences for the company, stakeholders, society, and the environment (Gatti, Seele & Rademacher, 2019; Pizzetti et al., 2019). A mere suspicion of greenwashing tendencies undermines the moral legitimacy of a company (Seele & Gatti, 2017).

According to Ruiz-Blanco et al. (2022), greenwashing can be curbed through regulation due to its dissuasive effect. Regulatory mechanisms such as government penalties (fines and licence revocation) and sustainability incentives (subsidies and tax rebates) have fostered sustainable development in developed and developing countries. However, they are only effective when regulatory capacity exists (He, Wang,

Wang, Xie & Chen, 2022). Insufficient government regulatory capacity is cited as one of the triggers for greenwashing, which thrives when there is a legal void (He et al., 2022).

Firstly, it should be noted that there are no legally binding penalties for impressive reporting or greenwashing in South Africa (Denhere, 2022). According to Denhere (2022), the Johannesburg Stock Exchange (JSE) played its part by mandating listed companies to adopt integrated reporting. However, the companies' discretion remains to report what they want to portray (Denhere, 2022). In some instances, companies have leeway to cheat, commit fraud or indulge in greenwashing activities and get away with it (Denhere, 2022; Dzomonda & Fatoki, 2020). According to Kennedy, Dela, Sibeko, Lötter, Ishmael and Serongoane (2022), no anti-greenwashing law or guideline exists in South Africa. Therefore, the government should close the legal void to drive sustainability in South Africa (Denhere, 2022). Secondly, greenwashing has different shades and forms (de Jong et al., 2019; Nemes et al., 2022; Ruiz-Blanco et al., 2022). Thirdly, the literature is not yet mature enough to have identified all its forms (Nemes et al., 2022). In this respect, greenwashing is proving to have abstract complex indicators with different parameters (Pimonenko, Bilan, Horák, Starchenko & Gajda, 2020). Moreover, no practical instrument is available to discern greenwashing in mining, hence the study.

The main research problem is suspicions of the greenwashing phenomenon and using sustainability reports to conceal the negative impacts of mining activities in South Africa.

1.3. THESIS STATEMENT

Government laws and industry-specific regulatory mechanisms are required to obligate mining companies to conduct business sustainably, reduce negative externalities caused by business operations, carry out societal responsibilities to improve sustainability performance and act responsibly when accounting to diverse stakeholders.

1.4. RESEARCH PURPOSE

This research aimed to develop a framework to link sustainability performance with sustainability reporting using regulation as a compliance mechanism. The developed

framework should contribute towards regulatory and policy reforms to enforce improved sustainability performance that can be measured and verified by both internal and external stakeholders.

Key to the study was the collection of primary data directly from the regulators of mining activities in South Africa to investigate the perceived gap between sustainability performance and sustainability reporting from the regulators' perspective. The study endeavours to enhance the relationship between business and society by mainstreaming sustainability through regulation and stakeholder-centric approaches that promote responsible business practices which underlie good corporate citizenship.

Currently, there is no study, according to the researcher, soliciting the views of regulators who are intrinsically involved in the regulatory process of the South African mining industry. Regulators are interested in the companies' sustainability performance and can influence the company's sustainability reporting decisions, as posited by Tadros, Magnan and Boulianne (2020). The researcher argues that regulators also occupy a position of authority as they formulate policies, grant mining rights, and inspect and enforce compliance with laws and regulations. In this regard, their views on the sustainability practices of the mining companies and the industry they regulate cannot be ignored further.

The study will provide important insights into policy shifts required to assist regulators in reducing negative externalities caused by mining operations. Regulators should be empowered to assess and restrain greenwashing practices by holding companies accountable for exploitive unsustainability practices.

1.5. RESEARCH OBJECTIVES

The research purpose will be achieved through the attainment of the following objectives, namely:

RO1: Explore the factors affecting sustainability in a regulated mining sector from the regulators' perspective.

RO2: Investigate the perceived gap between sustainability performance and sustainability reporting from the regulators' perspective.

1.6. RESEARCH QUESTIONS

The following are the research questions to be answered:

RQ1: From the regulators' perspective, what factors affect sustainability within a regulated mining sector?

RQ2: From the regulators' perspective, is there a relationship between sustainability performance and sustainability reporting?

1.7. SIGNIFICANCE OF THE STUDY

The researcher was motivated to investigate greenwashing in the highly regulated mining industry by soliciting the views of regulators of the industry on the sustainability practices of mining companies. While empirical research provides sound concepts for sustainable development and its evil twin, greenwashing, literature appears to have overlooked the views of regulators responsible for ensuring sustainable mining. Moreover, there has been an overreliance on companies' sustainability reports with limited means to evaluate greenwashing using data not controlled by reporting companies (Macellari et al., 2021).

Taking cognisance of different stakeholders' views improves the completeness and credibility of sustainability reporting (Hörisch, Schaltegger & Freeman, 2020). Therefore, Research-based solutions are required to foster sustainable development and inform policy decisions aimed at restraining unsustainable practices by holding businesses accountable (Ferretti, Zolin & Ferraro, 2020; Sikka & Stittle, 2019).

To the best of the researcher's knowledge, empirical research has not explored factors affecting sustainability practices within a highly regulated mining industry from the viewpoint of mining industry regulators. There is a shortage of empirical research on the regulation of sustainability practices in the context of the South African mining industry and from the perspective of industry regulators. According to the researcher, there is no empirical evidence suggesting that any scholar has investigated greenwashing from the perspective of mining-industry regulators. Lastly, extant literature has not investigated regulators' perceptions regarding the effect of government regulation on sustainability.

Regarding methodological orientations, most studies on sustainability have focused on qualitative research and used either one or two theories as suitable explanations

for sustainability practices, particularly greenwashing. To fill this gap, a multi-theory approach using quantitative research methods is applied to provide a holistic view of greenwashing in the South African mining context based on the regulators' perceptions.

The theoretical landscape on the subject matter is also complex and evolving. Thus, varied theoretical lenses have been used to explain the greenwashing phenomenon. These theories are complementary to each other. This study is constructed from a multi-theory perspective to provide a holistic picture of greenwashing from different frames of reference. The researcher applies the stakeholder accountability, legitimacy, organisational, institutional, agency and impression management theories to understand greenwashing in the context of South African mining companies. The researcher draws upon these theories to conceptualise this study because of their relevance, applicability, and complementary elements in addressing greenwashing. However, legitimacy theory is identified as the dominant and most suitable theory upon which the study is favourably premised. Therefore, the study significantly contributes to the legitimacy theory.

This research focuses on regulators as primary participants in the study. The researcher believes that regulators are key role players in exerting compliance and enforcement of laws and regulations governing sustainability practices by South African mining companies. Therefore, understanding regulators' views would assist in finding a win-win solution for both businesses and society as they strive to compel mining companies through regulation to scale back on the negative externalities they create. Companies need a scientifically well-grounded framework to mainstream sustainability into functions, business processes and operations effectively.

Premised on the positivist paradigm and multiple theories, the valuable original contribution of this study is that regulators are a relevant point of reference in curbing greenwashing as they have the authority to develop and enforce regulations. Based on this study, a framework to link sustainability performance and sustainability reporting is developed from regulators' perspectives. The developed framework will enable regulators to embed sustainability within the mining industry of South Africa using stakeholder-centric approaches.

The framework should also assist mining regulators in assessing the actual sustainability performance presented by companies in sustainability reports. The study provides a useful tool for regulators to hold South African mining companies accountable for unsustainable business practices based on a scientific instrument. The study, therefore, adds to the streamlining of sustainable development in mining using regulation as a compliance mechanism.

The developed framework is important as regulators will have a basis to prioritise focus on sustainability dimensions that require urgent attention due to the high prevalence of greenwashing. The framework allows the regulators and the regulatees (mining companies) to collaborate to achieve distinct sustainability performance levels and curb the diffusion of greenwashing tendencies. Moreover, strategic responses can be jointly developed to bridge the gap between sustainability performance and sustainability reporting.

At a practical level, the framework can facilitate stakeholder dialogues on perceived performance gaps, including setting sustainability performance targets and developing strategies, processes and programmes that align with the sustainable development agenda. In turn, mining companies would be empowered to incorporate the regulators' views in decision-making processes concerning sustainability.

The study also contributes practically by introducing a missing link in the accountability chain. Regulators will have an enabling tool to measure greenwashing and to hold managers accountable for the negative externalities caused by mining operations. More practically, this study also engages sustainability advocates, forcing companies to revisit business models and accountability stances to stakeholders. The study also contributes to shaping mining legislation and policies which ultimately regulate the business operations of mining companies.

This knowledge will be instrumental in eliciting a shift in assessing South African mining companies' interactions with employees, communities, and the environment. If society is informed about companies' sustainability orientation, it can inform public debate and influence regulatory policy development.

1.8. METHODOLOGY

Quantitative methods were used to conduct the study and to answer the research questions. Robust statistical methods were applied from data collection, analysis and interpretation to arrive at a more empirical conclusion.

1.8.1. Research design

The study employed an exploratory quantitative method to answer the research questions and to achieve research objectives. In this respect, a questionnaire was used to collect primary data from the Department of Mineral Resources (DMR) employees directly involved in regulating the South African mining companies (regulators). The regulators' perspectives on sustainability performance and sustainability reporting were quantitatively examined to understand whether South African mining companies' greenwashing tendencies were prevalent.

1.8.2. Philosophical stance

The ontological stance is that one objective truth is independent of the researcher. The epistemological theoretical framework was constructed from a positivist premise. Epistemologically, the researcher was detached from the unit of the study to maintain independence and objectivity throughout. The positivist philosophy guided the study to address the research questions, analysis and interpretation of the quantitative results (Gill & Johnson, 1991; Pathirage, Amaratunga & Haigh, 2008). Because of its ontological basis, a logical thinking process was followed to interactively link sustainability performance and sustainability reporting based on initial research and theoretical considerations. A deductive approach was employed, leading to the use of quantitative methods.

1.8.3. Unit of analysis

The unit of analysis was the DMR employees who are directly involved in regulating South African mining companies. DMR employees as regulators were selected as respondents in this study. Furthermore, companies and governments need to work together to tackle sustainability issues (Steurer, 2006). According to Steurer (2006),

governments develop sustainable development policies, while companies have management systems to implement policies.

1.8.4. Data collection

In the following sub-sections, the researcher outlines the data collection process.

1.8.4.1. Population and sampling

The population comprised 512 Department of Mineral Resources employees who are regulators of the mining industry and the unit of analysis. South African mining companies are highly regulated and governed by the Minerals and Petroleum Resources Development Act 28 of 2002 (MPRDA) (RSA, 2002), The National Environmental Management Act 107 of 1998 (NEMA) (RSA, 1998), The Mine Health and Safety Act (MHSA), Act 29 of 1996 (b), associated regulations, guidelines, code of practice as well as the Mining Charter. The DMR as a regulator of all mining houses in South Africa, has the competency to regulate the sector, analyse reports provided by South African mining companies and provide a perspective on the sustainability practices of these companies.

1.8.4.2. Sampling method

The researcher employed a probability random sampling method using a cross-sectional sample of 150 DMR employees involved in regulatory issues in various divisions. The population comprised 512 DMR employees eligible to participate in this study due to the regulatory nature of their work. These employees represent three (3) divisions of the DMR involved in regulatory issues affecting sustainability, namely, mine health and safety; mineral regulation; and mineral policy and promotion. In this respect, the e-questionnaire was distributed to DMR employees who are regulators of the mining industry, of which 150 responded to the e-questionnaire.

1.8.4.3. Methods of data collection

A questionnaire was developed to collect data from the participants of the study. The questionnaire addressed the research objectives and relevance of data to the research questions to be answered. A five (5) point Likert scale was used for respondents to classify their responses.

1.8.4.4. Respondents

The intended respondents were employees of the DMR that were responsible for policy development, regulation, enforcement and compliance thereof.

1.8.5. Data analysis

The researcher used Lavaan 0.6-6 Package R to analyse descriptive statistics, Exploratory factor analysis (EFA), Comparative Pairwise T-test, Covariance-based Structural Equation Model (CB-SEM) and Cohen's D. Statistical inferences were used to determine the outcomes of the study. Descriptive statistics were used to analyse the data, while exploratory factor analysis (EFA) was employed to uncover the underlying factor structure of sustainability. The pairwise t-test investigated the perceived gap between sustainability performance and sustainability reporting variables. CB-SEM was employed to measure the relationship between sustainability performance and sustainability reporting, whilst Cohen's D was used to quantify the magnitude of the differences between sustainability performance and sustainability reporting.

1.8.6. Reliability

Due to the deductive reasoning approach, this quantitative study relied on the descriptive aspects of the theory to assure reliability. Moreover, the literature guided this systematic process in a structured way, and the research instrument was also structured around the literature review. The researcher also applied a systematic data collection process, analysis and interpretation. Importantly, this study used a common heuristic for internal consistency. As such, a Cronbach's alpha (α) of ≥ 0.9 was deemed as excellent; $0.9 > \alpha \geq 0.8$ was deemed good; $0.8 > \alpha \geq 0.7$ considered acceptable; $0.7 > \alpha \geq 0.6$ is questionable; $0.6 > \alpha \geq 0.5$ is poor and $0.5 > \alpha$ unacceptable (Flo, Landmark, Hatlevik & Fagerström, 2018).

1.8.7. Validity

Both pre-and post hoc validity measures were established in the study. Prior to data collection, validity was achieved by referring to literature and theory. This facilitated the operationalisation of measures of sustainability areas under investigation.

Moreover, experts were roped in to individually inspect potential problems in the measurement instrument to ensure the preliminary validity of the questionnaire. The instrument's validity was empirically supported in content, criterion-related, construct, and discriminant validity.

EFA was used to determine the underlying structure of the interrelationships among the variables into a set of common dimensions (Murmura, Bravi & Palazzi, 2017). EFA establishes items answered most similarly by the participants, aiming to reduce the dimensionality of a data set comprising many interrelated items while retaining as much variation as possible in the data (Kuhil, 2013). This reduction is achieved by transforming variables into a new set of variables called factors. The factor structures for measuring sustainability were successfully validated, focusing on community development, employee welfare, and environmental protection.

1.9. ASSUMPTIONS OF THE STUDY

The following assumptions were made:

- Companies as good corporate citizens ought to co-exist with society by increasing their handprint (net positive impact) since their life, operation and success are intrinsically linked to sustainable development and societal progress (Costa & Menichini, 2013; Fagerström, 2016; Patala, 2016; Carini, Rocca, Veneziani & Teodori, 2021).
- Business leadership plays a major role towards sustainable development (Jariko, Børsen & Jhatial, 2016).
- It is a societal duty for companies to disclose truthful information about the overall performance of a company to stakeholders (Orazalin & Mahmood, 2019).
- Governments play a significant role through legislative power that pressures companies to be sustainable (Zametica & Johansson, 2019; Nishitani, Unerman & Kokubu, 2021).
- Governments significantly reduce greenwashing using regulation (Banerjee, 2020; Jain, 2020; Singh, Chakraborty, Roy &Tripathi, 2020).
- Regulators' intervention to mitigate the effects of greenwashing on society is necessary (Yang, Nguyen, Nguyen, Nguyen & Cao, 2020).
- Sustainability leadership is required to imbed sustainability in mining (Visser & Courtice, 2011).

1.10. SCOPE AND DELIMITATION OF THE STUDY

The setting of this research is South Africa, a developing country that has globally championed and pioneered sustainability reporting with regulatory and governance frameworks at the forefront worldwide (Cheruiyot-Koech & Reddy, 2022). Therefore, the scope of this research is confined to investigating the regulators' perceptions of sustainability performance and sustainability reporting practices of South African mining companies in the context of a highly regulated mining industry.

Although there are other pieces of legislation in South Africa, this study is delimited to government regulation as contemplated in the Mineral and Petroleum Resources Development Act 28 of 2002 (MPRDA) (RSA, 2002), The National Environmental Management Act 107 of 1998 (NEMA), (RSA, 1998), The Mine Health and Safety Act (MHSA), Act 29 of 1996 (b) and associated regulations, guidelines, code of practice as well as the Mining Charter.

The current legislative framework of the South African mining industry and a suite of mining regulations are aimed at guaranteeing sustainable development (Cole & Broadhurst, 2021). The MPRDA, NEMA, MHSA, and associated regulations and guidelines address all 17 Sustainable Development Goals (SDGs). As a result, South Africa is well-poised to pioneer sustainability in the mining industry (Cole & Broadhurst, 2021). South Africa is the appropriate research setting to conduct this study by exploiting regulatory reform and policy development issues in the context of sustainability in a highly regulated mining industry. The study, therefore, is delimited to South African mining regulations as they pertain to sustainable development within the highly regulated mining industry.

While there are other regulators, such as the stock exchange, this study is delimited to government regulators who are designated employees from three (3) divisions of the Department of Mineral Resources, namely, Mine Health and Safety Inspectorate, Mineral Regulation Branch, and Mineral Policy and Promotion branch who deal directly with the South African mining companies. The regulators' perspectives as key stakeholders on the sustainability practices of South African mining companies are quantitatively examined using a deductive research approach associated with positivism. The study is concerned about whether the purported performance in

sustainability reports of South African mining companies is linked with actual sustainability performance on the ground.

In this cross-sectional study, primary data was collected from mining regulators in 2019, six months after the promulgation of the 2018 Mining Charter. The study contributes significantly to legitimacy theory.

1.11. DEFINITION OF KEY TERMS

The following key terms are important for this study:

- **Sustainability:** Derived from the term sustainable development, sustainability refers to "human ability to make development sustainable to ensure that it meets the needs of the present without compromising the ability of future generations to meet own needs" (World Commission on Environment and Development (WCED, 1987:24).
- **Sustainability leadership: "**Sustainability leadership refers to inspiring and supporting action that contributes towards achieving sustainable development goals" (Ngorima, 2019).
- **A sustainability report** "is a report published by companies to report the impact of daily operational activities in economic, social, and environmental terms, also highlighting commitment towards sustainable development" (Vitale, Cupertino, Rinaldi & Riccaboni, 2019:4).
- **Sustainability performance** refers to the company's observable outcomes and tangible progress on sustainability activities aimed at the achievement of the Sustainable Development Goals (SDGs) while improving the quality of life of employees, local communities, and society at large with due care for the environment (Ruf, Muralidhar, Brown, Janney & Paul, 2001).
- **Sustainability reporting** refers to companies communicating their social, environmental and governance issues.
- **Sustainability practices:** This term encompasses both sustainability performance and sustainability reporting activities as defined above.
- **Greenwashing** refers to inconsistencies between a company's sustainability performance and sustainability reporting (Matakanye & van der Poll, 2021).

- **Regulators:** Employees of the Department of Mineral Resources in the Mine Health and Safety Inspectorate, Mineral Regulation Branch, and Mineral Policy and Promotion Branch who are directly involved in regulating South African mining companies.
- **Regulatees:** South African mining companies.
- **Regulatory mechanisms** refer to South African mining legislation and regulations, namely, The Mineral and Petroleum Resources Development Act 28 of 2002 (MPRDA) (RSA, 2002), The National Environmental Management Act 107 of 1998 (NEMA) (RSA, 1998), The Mine Health and Safety Act (MHSA), Act 29 of 1996 (RSA, 1996b), and associated regulations, guidelines, code of practice and Mining Charter.
- **Negative externalities:** Consequences of a company's business operations that cause an indirect cost to other stakeholders without being internalised through standards and market mechanisms (Liebowitz & Margolis, 1995).
- **Black People:** A generic term which means African, Coloureds and Indians (a) who are citizens of the Republic of South Africa by birth or descent; or (b) who became citizens of the Republic of South Africa by naturalisation - (i) before 27 April 1994; (ii) on or after 27 April 1994 and who would have been entitled to acquire citizenship by naturalisation prior to that date (RSA, 2003).

1.12. LAYOUT OF THE THESIS

The study is structured as follows:

Chapter 1: Introduction and Background

The first chapter provides the introductory background of the study in the context of sustainability. The aim and objective of this chapter are to introduce the major elements of the study, including the statement of thesis, research problem, the aim of the study, research questions, design and methodology.

Chapter 2: Literature Review

The chapter focuses on the context of the study, the theoretical lens and literature findings on sustainability and related topics. Theoretical considerations provided the researcher with insight and the opportunity to locate this study within the theoretical discourse while distinguishing its unique contribution to the body of knowledge. A

critical review of sustainability performance and sustainability reporting literature is evaluated to delineate and focus the study. A broader view of sustainability is explored and grounded in academic literature.

Chapter 3: Research Methodology and Design

This chapter focuses on more practical issues of the research design and methodology chosen for the empirical analysis. The chapter explains methods used to achieve the objectives of the study and how information and data were gathered, analysed and used to answer posed research questions.

Chapter 4: Results and Analysis

This chapter details the key results of the empirical research and links it back to the literature. The results from Exploratory Factor Analysis (EFA), Comparative Pairwise Differences, Structural Equation Model and Cohen's D are sequentially presented to answer the research question and achieve the research objectives.

Chapter 5: Conclusions and Recommendations

The research results were synthesised and presented in the previous chapter. Based on robust statistical analysis, the researcher concludes each research question and demonstrates attaining each research objective. The chapter also presents study recommendations.

1.13. SUMMARY

The chapter provided the introduction and orientation of the study. The main research objectives were identified, and the problem statement and research questions were presented. This was followed by an outline of the methodology, definition of key terms, limitations and delimitations of the scope. The chapter also sketched the roadmap for the research. In the next chapter, the literature review is undertaken to appreciate theoretical aspects that form the research's basis and facilitate a full conceptualisation of the study.

CHAPTER 2: LITERATURE REVIEW

2.1. INTRODUCTION

The previous chapter provided the introductory background and orientation of the study. The chapter introduced the major elements of the study, including the statement of thesis, research problem, the aim of the study, research questions, design and methodology. This chapter focuses on the context of the study, the theoretical lens and literature findings on sustainability and related topics.

Theoretical considerations provided the researcher with insight and the opportunity to locate this study within the theoretical discourse while distinguishing its unique contribution to the body of knowledge. A critical review of sustainability performance and sustainability reporting literature is evaluated to delineate and focus the study. A broader view of sustainability is explored, grounded in academic literature seeking to mainstream sustainability issues into business models and recent developments.

The layout of the rest of this chapter is as follows: Section 2.2 introduces the concept of sustainability, whilst Section 2.3 describes the greenwashing concept. In Section 2.4, the theoretical underpinnings of the study are discussed. Section 2.5 deals with sustainability regulation, followed by Section 2.6, where sustainability is discussed in the context of developing countries. Section 2.7 deals with the legislative framework regulating sustainability practices in the South African mining industry. Section 2.8 discusses the legislative requirements regulating reporting in the South African mining industry. Section 2.9 provides empirical evidence on the application of South African mining regulations. In Section 2.10, sustainability in the context of mining is discussed. Section 2.11 identifies and discusses gaps in the literature, whereas Section 2.12 summarises this chapter.

2.2. THE CONCEPT OF SUSTAINABILITY

The concept of sustainable development emerged after 1960 to resolve and restore ecological balance to the environment, which had sadly been neglected in the rush to develop after the Second World War. The gap between developed and developing economies became more visible after the Second World War (Heyns & Mostert, 2018). However, sustainable development gained momentum in 1987 when the United Nations (UN) published the report of the World Commission on Environment and

Development titled “Our common future” (WECD, 1987). The report is called the Brundtland Report after the Chairperson Gro Harlem Brundtland. The Brundtland Commission defined sustainable development as the “human ability to make development sustainable to ensure that it meets the needs of the present without compromising the ability of future generations to meet own needs” (WCED, 1987:24). The Brundtland Report contemplates sustainable development as an ongoing process of radical change (WCED, 1987). Whereas the link between sustainability performance and sustainability reporting remains an open question in academic discourse (Uyar et al., 2020), companies as corporate citizens are expected to contribute meaningfully towards sustainable development (Carini et al., 2021).

2.2.1. The Global Reporting Initiative (GRI)

The GRI is an independent international organisation that has pioneered sustainability reporting since 1997 (GRI, 2011). The GRI reporting standards are multi-stakeholder-oriented with vested public interests. The GRI collaborates with governments, the UNGC, OECD and the United Nations (UN) Working Group on Business and Human Rights. The GRI standards assist companies and governments in understanding and communicating externalities of business operations on critical sustainability issues. The accompanying reporting guidelines of the GRI are universally applicable and cover a wide range of stakeholder interests (GRI, 2011). Companies worldwide have also widely adopted the GRI (Ortiz & Marín Hernández, 2014). GRI indicators have been used as a proxy to represent sustainability aspects (Junior, Galleli, Gallardo-Vázquez & Sánchez-Hernández, 2017; Sampong, Song, Boahene & Wadie, 2018; Ackers & Grobbelaar, 2021; Cheruiyot-Koech & Reddy, 2022). The GRI standards are said to facilitate greenwashing.

2.2.2. The United Nations Global Compact (UNGC)

In 1999, the UNGC was introduced by the then UN general secretary Kofi-Annan to mainstream responsible business conduct concerning human rights, labour standards, environmental stewardship and anticorruption (Zeyen, Beckmann & Wolters, 2016). “UNGC is the largest corporate citizenship and sustainability initiative in the world” (UNGC, 2019). Governments and companies have used the UNGC principles to mainstream sustainability into operations and policies (Isaksson & Steimle, 2009).

Embedding the UNGC principles into corporate practice assists companies in upholding fundamental basic responsibilities to people and the planet, thereby contributing to sustainability (Isaksson & Steimle, 2009). The UNGC is among the most noted sustainability initiatives (Rahdari & Rostamy, 2015). However, parallel to companies that practise greenwashing, the UNGC often has been regarded as a public relations exercise and has since been termed the 'blue-washing' strategy (Rahdari & Rostamy, 2015).

2.2.3. Agenda 2063 -The Africa We Want

In 2013, the African Union (AU), during its golden jubilee summit, adopted the *Agenda 2063 -The Africa We Want* document, which is a master plan that looks forward to its centenary in 2063, 50 years from its promulgation (AU Watch, 2020). This document is an ambitious blueprint for ensuring sustainable development. *Agenda 2063* is a product of stakeholder engagement across the African continent and diaspora (Addaney, 2017). Agenda 2063 calls for global citizenry to regard sustainable development as a moral and ethical matter which goes beyond drivers of economic, environmental, and social aspects (Addaney, 2017). South Africa is one of the countries committed to Agenda 2063. Appendix A shows a summary of the goals and priorities of Agenda 2063.

2.2.4. The Sustainable Development Goals

In 2015, world leaders representing all 195 sovereign states (193 member states and two observer states) of the United Nations (UN) agreed on 17 Sustainable Development Goals (SDGs) for a better world by 2030 to speed up sustainable development. The SDGs were adopted as a blueprint to frame a better and more sustainable future for all (Elalfy, Weber & Geobey, 2020; Nazneen, Hong, Din & Jamil, 2021; Yamane & Kaneko, 2021). The SDGs have been used to develop targets for stakeholders' needs (Isaksson, 2021). South Africa is one of the states implementing SDGs, and the country's SDG Index score is 63.7 out of 100. South Africa ranks 106 out of the 165 countries rated on the 17 SDGs (Cheruiyot-Koech & Reddy, 2022). The country is one of the top performers on the African Continent (Cheruiyot-Koech & Reddy, 2022).

2.2.5. The current landscape

To this end, there is no universally accepted standard that can be applied in sustainability reporting consistently across the globe. Sustainability is currently dominated by international standards, such as the GRI (Yang, Orzes, Jia & Chen, 2021; Gaudencio, de Oliveira, Curi, Santana, Silva & Meira, 2020; Orazalin & Mahmood, 2019) and Environmental, Social and Governance (ESG) reporting (Gyönyörová, Stachoň & Stašek, 2021; Hughes, Urban & Wójcik, 2021). These are critical instruments to foster and embed sustainability into business strategies, policies, and decision-making processes to transparently advance the sustainable development agenda (Mori, Fien & Horne, 2019). Regardless, companies esteemed as sustainability leaders are still found wanting as they are not free from significant greenwashing tendencies (Macellari et al., 2021).

Ackers and Eccles (2015) argue that the absence of a standard stimulates the desire to beat the system to address pressure from stakeholders to operate companies sustainably.

2.3. THE GREENWASHING CONCEPT

Greenwashing is an umbrella term characterising superficial and misleading sustainability information (Testa, Boiral & Iraldo, 2018; Nemes et al., 2022). Greenwashing broadly refers to activities aimed at concealing negative externalities and questionable corporate practices through unsubstantiated self-laudatory claims to mislead stakeholders instead of performing sustainability activities that would reduce the negative impact on society (Dienes, Sassen & Fischer, 2016; Lukinović & Jovanović, 2019).

Worthy of note is that there is no generally accepted definition of greenwashing in the literature (Gatti et al., 2019; Pizzetti et al., 2019). Greenwashing means different things to different people and is in the eye of the beholder (Gatti et al., 2019; Pizzetti et al., 2019). In this respect, the greenwashing phenomenon is only perceived by the observer or the accuser (Gatti et al., 2019; Pizzetti et al., 2019; Sampong et al., 2018).

Some scholars consider only environmental issues when talking about greenwashing, distinguishing it from the term blue-washing, which normally stands for social or human rights issues, or pink-washing for health issues, whereas other researchers consider

greenwashing a social and environmental phenomenon (de Freitas Netto et al., 2020). For example, de Freitas Netto et al. (2020) perceive greenwashing as a multifaceted phenomenon which involves inconsistencies between companies' environmental claims and the actual environmental performance to reap the benefits of being green without behaving accordingly. Delmas and Burbano (2011) saw greenwashing as combining companies' poor environmental performance masked by positive communication. Munir and Mohan (2022) found greenwashing at the intersection of two (2) contrasting behaviours, where a company that displays poor environmental performance simultaneously shows positive communication about environmental performance.

Jones (2019) suggests that greenwashing emerges only when sustainability claims are contradicted by a company's actual environmental performance record of accomplishment. Yang et al. (2020) view greenwashing as a decoupling strategy for compliance and legitimacy without conforming to stakeholders' expectations, whereas Walker and Wan (2012) perceive greenwashing as the gap between symbolic and actual corporate social actions. According to Macellari et al. (2021), greenwashing happens when companies emphasise the economic benefits and downplay externalities by using rhetoric in companies' sustainability reports for impression management purposes. There is a need, therefore, to truly embed sustainability into business operations to show commitment to the sustainable development agenda (Shahzad, Qu, Javed, Zafar & Rehman, 2020).

2.4. THEORETICAL UNDERPINNINGS OF THE STUDY

Various theories have shaped the evolution of sustainability and sustainability reporting. From the positivist philosophy, this study adopts a multi-theory approach (Kumar, Kumari, Poonia & Kumar, 2021; Ruiz-Blanco et al., 2022). Hence, a single theoretical framework can no longer be used to analyse companies' sustainability reporting (Herbert & Graham, 2022). The researcher, therefore, involves the voluntary disclosure, stakeholder, stakeholder accountability, institutional, signalling, legitimacy, impression management and agency theories to understand the sustainability practices of South African mining companies. The researcher draws from these theories to conceptualise this study due to their relevance, applicability, and complementary elements in addressing the greenwashing phenomenon.

2.4.1. Voluntary disclosure theory

Voluntary disclosure theorists follow the premise that companies will provide favourable information (good news) to increase the share price and withhold unfavourable information (bad news) that decreases market value (Nishitani et al., 2021). Therefore, companies implementing financially impactful sustainability performance will report more sustainability information that cannot be mimicked by poor performers with no distinct performance levels (Nishitani et al., 2021). Voluntary disclosure theory predicts a positive relationship between sustainability performance and sustainability reporting (Hummel & Schlick, 2016; Lu & Wang, 2021; Mnif & Kchaou,2021; Nishitani et al., 2021).

2.4.2. Stakeholder theory

Freeman's (1994) seminal work pioneered the stakeholder theory. The protagonists of stakeholder theory believe that managers and directors have multi-fiduciary obligations to stakeholders. Stakeholders exert implicit and explicit pressures on companies to act ethically and morally as expected (Freeman, 1994) and to reduce negative externalities and increase positive externalities (Schrippe & Ribeiro, 2019). The theory postulates that companies should behave as good corporate citizens and sustainability performers. In this regard, stakeholder theory predicts that good sustainability performers will, on average, disclose more information to stakeholders concerning their sustainability performance (Herbohn, Walker & Loo, 2014; Zhu, Liu & Lai, 2016).

2.4.3. Stakeholder accountability theory

Stakeholder-accountability theorists view companies as quasi-public institutions accountable to society (Brown & Fraser, 2006). The theorists believe that companies wield corporate power, as such interests of other stakeholders need to be protected through various forms of legislation to safeguard against potential corporate abuse (Brown & Fraser, 2006). The theorists argue that appropriate regulation is essential to ensure true accountability since regulation enables more balanced sustainability reporting covering both bad and good news (Tamvada, 2020). The theorists advocate a more open, transparent and democratic society with multiple stakeholder

participation than monologic perceptions, which provide no multi-perspectival environment (Brown & Fraser, 2006).

Proponents of the theory believe that market forces alone cannot be relied upon to secure stakeholder accountability in the face of information asymmetry (Tamvada, 2020). Stakeholder-accountability theorists have criticised sustainability reporting for contradictions between companies' reporting rhetoric and performance evidence from external sources (Brown & Fraser, 2006). According to Brown and Fraser (2006), companies are more interested in advancing their image rather than being truly accountable to society by giving substance to corporate citizenship and sustainable development. In this regard, stakeholder-accountability theorists view sustainability reporting as a symbolic stakeholder management gimmick (Brown & Fraser, 2006). The theorists believe that accountability needs to be regulated and not be left to the voluntary discretion of reporting companies (Tamvada, 2020).

2.4.4. Signalling theory

Signalling theory is an economic theory which explains why sustainability reporting is a legitimacy tool (Ruiz-Blanco et al., 2022). The theory extends the voluntary reporting theory (Ching & Gerab, 2017). Companies over-disclose sustainability performance by reducing the principal-agent problem of information asymmetry with stakeholders through increased transparency (Acar & Temiz, 2020; Gupta & Gupta, 2020; Ruiz-Blanco et al., 2022). In this regard, good corporate citizens issue sustainability reports to signal a superior commitment to sustainability and to reap benefits from their actions (Ching & Gerab, 2017). Superior companies signal their high-quality disclosures to distinguish them from poor-performing companies and highlight accountability to stakeholders (Braam, uit de Weerd, Hauck & Huijbregts, 2016; Lu & Wang, 2021). A sequence of signals is sent to external stakeholders to convey a positive yet unobservable managerial commitment to implement sustainability (Brower, Kashmiri & Mahajan, 2017).

Good sustainability performers publish sustainability reports to emphasise good efforts for signalling purposes. Furthermore, such companies reduce greenwashing by reporting good news (Uyar et al., 2020; Zhang, Pan & Janardhanan, 2022). Companies with poor sustainability performance are more likely to engage in sustainability reporting to change stakeholder perceptions about their sustainability

performance for greenwashing purposes (Barkemeyer, Comyns, Figge & Napolitan, 2014; Uyar et al., 2020). Companies that use sustainability reports to communicate sustainability performance for signalling are expected to be less prone to engage in greenwashing activities (Braam et al., 2016; Uyar et al., 2020). Companies with better sustainability performance are more predisposed to reducing greenwashing, the better the performance, the lower the chances of greenwashing (Zhang et al., 2022).

2.4.5. Legitimacy theory

Legitimacy theory is one of the prevailing theoretical foundations used in the literature of sustainability reporting (Ali, Lodhia & Narayan, 2020; Lambrechts, Son-Turan, Reis & Semeijn, 2019; Raimo, Vitolla, Nicolò & Polcin, 2021; Zhang et al., 2022). Legitimacy refers to the universal perception that a company's activities are congruent with a society based on a social contract (Ali et al., 2020; Kumar et al., 2021; Rajagopal, Dyaram & Ganuthula, 2016). Any such incongruence is called a legitimacy gap (Dong & Xu, 2016). If the company breaches the terms of the social contract, its survival in society is threatened (Nishitani et al., 2021). Similarly, if companies ignore their social responsibility to communities, society can penalise them (Ortas, Gallego-Alvarez & Álvarez Etxeberria, 2015). Therefore, companies should fulfil the legitimacy gap between social expectations and business operations (Lambrechts et al., 2019). Failure to comply with social norms and values of society is a threat to legitimacy (Kumar et al., 2021). This theory deals with companies' response to society's expectations (Nishitani et al., 2021).

Legitimacy theory predicts a negative relationship between sustainability performance and sustainability reports (Hummel & Schlick, 2016; Lu & Wang, 2021; Zhang et al., 2022). Poor performers increase sustainability reporting when their legitimacy is questioned (Nishitani et al., 2021). Poorly performing companies use sustainability reporting as a legitimation tactic to favourably sway stakeholders' perceptions regarding their sustainability practices (Hummel & Schlick, 2016) without contributing significant financial investments to improve actual sustainability performance (Lai, Melloni & Stacchezzini, 2016; Loh, Deegan & Inglis, 2015). Legitimacy theorists justify sustainability reporting as a mechanism to manage legitimacy and reputation, thereby misleading key stakeholders to mistakenly believe in the company's commitment to societal obligations (de Freitas Netto et al., 2020), which leads to greenwashing (de

Silva Lokuwaduge & de Silva, 2022). Greenwashing is therefore used as one of the legitimisation tactics to deliberately deceive stakeholders into preserving legitimacy (Nemes et al., 2022). According to Zhang et al. (2022), the worst sustainability performers are more inclined to greenwashing tendencies.

2.4.6. Institutional theory

The institutional theory assumes that a company's success is determined by its ability to conform to coercive, mimetic and normative institutional pressures (Famiyeh, Opoku, Kwarteng & Asante-Darko, 2021). The selection of sustainability practices and why certain sustainability activities are more entrenched in the business world are explained by the institutional theory (Cheruiyot-Koech & Reddy, 2022). When companies encounter coercive pressure from a powerful institution, they are more likely to comply with regulations uncertainty (Dawkins & Ngunjiri, 2008). According to Zhang et al. (2022), institutional theory, institutional environment, and institutional isomorphism bring legitimacy to the company. Dong and Xu (2016) posit that institutional theory complements legitimacy theory because companies tend to incorporate laws, regulations, and institutionalised norms to gain legitimacy. As such, any change in laws, regulations and institutional norms and values affects the behaviour of a company (Dong & Xu, 2016). The theory posits that companies adapt to pressures to gain or maintain legitimacy, with government regulation being the most fundamental institutional element (He et al., 2022). However, weak government regulation elicits most deceptive behaviours; from this perspective, regulation shapes greenwashing behaviour (He et al., 2022).

2.4.7. Impression management theory

Impression management theory articulates that managers use sustainability reports to disclose information that benefits the company and themselves selectively and not to benefit stakeholders per se (du Toit & Esterhuyse, 2021). In this respect, they use a narrative to promote the image the company wants to portray (du Toit & Esterhuyse, 2021), consciously or unconsciously (Haji & Hossain, 2016). Companies adopt symbolic sustainability reporting to construct a favourable image through impression management approaches (Haji & Anifowose, 2016; Haji & Hossain, 2016). Impression management tactics involve obfuscation, concealment, or omission through minimal

narrative disclosure (du Toit & Esterhuyse, 2021). Companies employ impression management strategies to obtain legitimacy due to stakeholder pressures (du Toit & Esterhuyse, 2021). The theory explains how companies exaggerate positive outcomes whilst ignoring negative externalities and their impacts (Haji & Anifowose, 2016; Haji & Hossain, 2016). Companies make proclamations about their sustainability performance to portray the "best-in-class image". However, self-proclaimed sustainability leadership for impression management is not free from greenwashing (Macellari et al., 2021).

2.4.8. Agency theory

Agency theory explains and resolves information asymmetry between agents and principals to enhance moral legitimacy (Lu & Wang, 2021). Agency theory is used to explain and resolve claims that there is information asymmetry between agents and principals using sustainability reports to enhance their moral legitimacy and self-serving behaviour (Lu & Wang, 2021). Sustainability reports mitigate information asymmetry and agency costs provided the communication is transparent (Corvino, Doni & Martini, 2020; Kumar et al., 2021).

2.5. SUSTAINABILITY REGULATION

Firstly, society expects companies as corporate citizens to conduct business within the laws and regulations promulgated by the government as ground rules to operate to fulfil the social contract between business and society (Carroll, 1991; 2016). The laws, regulations, institutionalised norms, and societal values are contract terms (Dong & Xu, 2016). In this regard, companies' business orientation ought to be approached to the letter and spirit of the law as a minimal ethical requirement to operate even well above what the law mandates (Carroll, 1991). Furthermore, companies' activities should be confined to sound legal and ethical precepts through regulation (Carroll, 1991). However, it has been noted that despite existing regulatory interventions, some companies neglect society's welfare and escape societal obligations and sustainability commitments in pursuit of profit maximisation from unsustainable sources (Dzomonda & Fatoki, 2020). In doing so, they will likely implement strategies that benefit only a few and cause substantial net harm when considering stakeholders (Price & Sun, 2017).

It is also well-documented that some companies externalise harms and societal costs to primary stakeholders who become immediate risk bearers as financial stakeholders are arguably in pursuit of profit. Suppose unregulated companies will likely implement strategies that benefit only a few and cause substantial net harm when considering stakeholders (Price & Sun, 2017). Living in a society where shareholders have invested, communities become indirect owners of these risks (Ferrero, Hoffman & McNulty, 2014).

Moreover, mining companies can generate disastrous social and environmental outcomes for local communities, however, economic and environmental issues are the most contentious and worst reported, with no credible data to support sustainability performance considering stakeholders' pertinent issues (Murguía & Böhling, 2013). Mostly, communities bear the social and environmental burden by default while the financial benefits accrue to foreign metropolitan centres that have no encounter with the negative externalities of the business operations (O'Faircheallaigh, 2015). Without proper regulations, negative externalities are passed on to vulnerable stakeholders, primarily host communities, who are not partakers in the immediate return on shareholders' investment (Ferrero et al., 2014).

Mitchell, Weaver, Agle, Bailey and Carlson (2016) noted that private companies could not fully resolve negative externalities. In addition, managers are not experts in solving societal problems as they are inclined to focus narrowly on a company's performance and profits, which are the main criteria through which they are judged and compensated (Mitchell et al., 2016). Therefore, relying on constrained managers (Mitchell et al., 2016) to solve the negative impact of business on its environment will not yield the expected outcomes (Ferrero et al., 2014). Ferrero et al. (2014) further argue that there is no free market solution for negative externalities, as such, market failures should be effectively resolved through appropriate government interventions. Consequently, governments are being drawn in as part of the solution mix to correct negative externalities such as greenwashing (Agle, Donaldson, Freeman, Jensen, Mitchell & Wood, 2008).

Companies face increasing stakeholder pressure to reduce negative externalities and justify their social license to operate and earn profits (Schrippe & Ribeiro, 2019; Orazalin & Mahmood, 2019). In response, they publish sustainability reports to society to communicate to stakeholders their contribution to sustainable development by

reducing externalities to legitimise their continual existence in society (Orazalin & Mahmood, 2019; Kumar et al., 2021). However, as indicated, sustainability reporting has been criticised for facilitating greenwashing practices to justify a company's legitimacy in society (Dissanayake, Tilt & Xydias-Lobo, 2016; Nishitani et al., 2021).

To this end, governments and other active stakeholders have developed a series of regulatory mechanisms to reduce the proliferation of greenwashing (de Jong, Huluba & Beldad, 2019; Ginder, Kwon & Byun, 2019; Nguyen, Yang, Nguyen, Cao & Johnson, 2019; Pizzetti et al., 2019; Torelli, Balluchi & Lazzini, 2020). The question, however, is whether regulatory mechanisms contribute to the reduction of greenwashing as deliberated in literature (Dienes et al., 2016; Gatti et al., 2019; Nazari, Hrazdil & Mahmoudian, 2017; Pérez-López, Moreno-Romero & Barkemeyer, 2015; Smith & Rönnegard, 2016; Wang & Sarkis, 2017).

Gatti et al. (2019) found that government regulation can reduce and prevent the diffusion of greenwashing activities. Sun and Zhang (2019) conceded that though most governments' regulatory laws are insufficient, they have an excellent inhibitory effect on greenwashing practices. According to Sun and Zhang (2019), government regulations effectively control greenwashing. Although mandatory requirements can induce passive compliance, strict regulation is still the key to accountability and transparency (Dong & Xu, 2016).

According to Diouf and Boiral (2017), when sustainability reporting is not regulated, companies explore opportunities to withhold bad news from the market, while others employ impression management strategies to project selective self-laudatory corporate achievements. The other view is that greenwashing practices are likely to be worsened by weak regulations and accounting standards (Barbu, Dumontier, Feleagă & Feleagă, 2014). Regulatory gaps create a grey zone for companies to exploit stakeholders and society at large (Gatti et al., 2019) while generating a paradox that companies that are simultaneously responsible for negative externalities are also fighting against such externalities (Montecchia, Giordano & Grieco, 2016).

According to Yang et al. (2020), greenwashing happens when international companies do not strictly adhere to ethical business practices by taking advantage of immature legal frameworks in host countries. In this regard, it is therefore important for host governments to ensure strict implementation of regulations through competent

authorities (Yang et al., 2020). Unfortunately, national and international laws' regulatory vacuum and limitations encourage negative societal externalities (Beare, Buslovich & Searcy, 2014; Buhmann, 2016; Demuijnck & Fasterling, 2016). In some instances, existing laws and regulations are not well applied to mitigate the consequences of greenwashing (Yang et al., 2020).

According to Osuji (2015), regulation occurs on a continuum between pure government regulation and pure self-regulation, using various methods and instruments (Carini et al., 2021). These regulatory mechanisms assist governments in embedding sustainability principles, thereby minimising possible negative externalities of business operations (Vitale et al., 2019). Gatti et al. (2019) argue that greenwashing could be better prevented with a combination of voluntary and mandatory aspects. Although mandatory regulation has a strong and positive influence on sustainability performance, the effects of voluntary pressures show that such regulations are also ineffective in bringing about significant changes in outcomes (Gatti et al., 2019).

Osuji (2015:271) argues that “prescriptive regulations have often instigated creative compliance measures that ultimately defeat the regulatory goals”. However, governments should not be deterred from regulating companies to mitigate some of the market failures and negative externalities (Semenova & Hassel, 2015). In this regard, the regulatory conception, which regards sustainability as a mechanism to respond to negative externalities, remains fundamental (Osuji, 2015).

2.5.1. Pure government regulation

Governments are pledging support towards sustainable development (Beare et al., 2014; Chofreh & Goni, 2017; Lee, Walker & Zeng, 2017). In this regard, governments are increasingly promulgating sustainability laws and regulations and countries enacting legislation towards sustainable development are shaping the future of sustainable societies (Renzi, 2021; Gatti et al., 2019). As such, the academic debate on government interventions in sustainability is also gaining momentum, which is evidenced by various studies on the relevance of legislative regulation in ensuring sustainability (Gallego-Álvarez & Quina-Custodio, 2017; Nekhili, Nagati, Chtioui & Rebolledo, 2017).

Empirical evidence indicates that the legal origins and systems of a country influence the degree to which companies invest in sustainability practices (Gallego-Álvarez &

Quina-Custodio, 2017; Kim, Park & Ryu, 2017; Yadava & Sinha, 2016; Zhang et al., 2020). Zhao (2017) has already found that the influence of a regulatory framework is significant if sustainability principles and elements are incorporated within common law. According to Knebel and Seele (2015), stricter regulation concerning monitoring and compliance could be more appropriate, but it is not enough for globally operating companies. However, the effect of regulation on sustainability practices has been empirically investigated with mixed research results, leaving the matter open for continuing academic debate.

Moneva and Llena (2000) found that in the wake of new regulations, the increase in sustainability reporting resulted from the evolution based on stakeholder theory and not in response to new requirements. Cowan and Deegan (2011) found that post-enactment sustainability reporting was, to an extent, reflective of actual sustainability performance, implying that regulation had limited success, as information remained incomplete, inconsistent, and incomparable. In another study, Kaur and Lodhia (2016) found a positive influence of social and environmental legislation on sustainability practices. Vaz, Fernandez-Feijoo and Ruiz (2016) also found a positive association between sustainability reporting and the existence of regulation in a country and South Africa is cited as an example of such a regulatory mechanism.

Liu, Abhayawansa, Jubb and Perera (2017) found a reduction in environmental disclosures compared to the pre-legislation period, meaning that regulation negatively impacted sustainability reporting. Baboukardos (2017) found that companies reported more extensively after introducing new regulations than before. According to Habib and Bhuiyan (2017), legislative regulation could bring unintended consequences for sustainability. Khubana, Rootman and Smith (2022) emphasise that excessive government intervention and over-regulation of the mining industry can result in unintended adverse effects on society.

It is also argued that regulatory vacuum and limitations of national and international laws lead to more negative societal externalities (Beare et al., 2014; Buhmann, 2016; Demuijnck & Fasterling, 2016). Zhao (2017) admits that while studies cannot fully confirm the effectiveness of a legal framework to ensure sustainable performance, regulatory pressure can deter corporate misconduct through its authoritative impact.

In this respect, governments should still enact policies and ensure enforcement instead of regarding regulation as an ad hoc function (Sierra-García, Zorio-Grima & García-Benau, 2015). Government regulations mitigate some of the market failures and negative externalities (Semenova & Hassel, 2015) since market forces alone have not successfully enforced optimal levels of sustainability (Osuji, 2015; Liu et al., 2017).

Empirical research shows that government regulation reduces greenwashing (Sun & Zhang, 2019). According to Sun and Zhang (2019), government regulations which include punitive mechanisms for greenwashing have an excellent inhibitory effect on greenwashing practices, whereas government tax subsidy mechanisms for green innovation companies do not curb greenwashing practices (Sun & Zhang, 2019). However, government penalties and subsidies are only effective when there is regulatory capacity since the insufficient regulatory capacity was found to trigger greenwashing (He et al., 2022).

Tamvada (2020) argues that in the absence of regulation, companies tend not to implement sustainability commitments while vulnerable stakeholders stay exposed to negative externalities arising from irresponsible company behaviour. He et al. (2022) posit that greenwashing thrives when there is a legal void, therefore, enhancement of regulations is the most effective approach to curb greenwashing. Renzi (2021) states that governments play a more active role in sustainable development. However, pure government regulation on its own is not the ultimate solution to greenwashing, therefore, complementary impacts of both mandatory and voluntary measures are necessary (Aragón-Correa, Marcus & Vogel, 2020). Other mechanisms required to supplement government regulation include mandatory stock exchange listing requirements and industry self-regulation (He et al., 2022).

2.5.2. Pure self-regulation

Literature supports the relevance of self-regulation and voluntary reporting. However, the problem with voluntary reporting is that there is a possibility of trade-offs between companies' private benefits driven by the profit motive and collective benefits. Park and Berger-Walliser, (2015) posit that trusting companies to self-regulate sustainability matters is not the best possible solution for society. The researcher argues that profitability and sustainability objectives can coexist within a regulated environment,

and economic benefits should be pursued in tandem with the needs of society at large (Kumar et al., 2021).

The empirical evidence for or against pure government regulation or self-regulation is still inconclusive. Aggarwal and Kadyan (2011) argue that regulatory bodies can ensure strict enforcement and compliance with regulations by imposing penalties for defaulters and imposing a ban on violators. There is, therefore, a compelling case to rethink how new regulatory mechanisms must be formulated and implemented to imbed sustainability while encouraging full compliance by companies (Aggarwal & Kadyan, 2011). Well-meaning regulations need to be coupled with other stakeholder-centric approaches required to manage and promote sustainability (Aggarwal & Kadyan, 2011). Although pure government regulation on its own is not the ultimate solution to greenwashing, complementary impacts of both mandatory and voluntary measures are required (Aragón-Correa et al., 2020) since regulation has a dissuasive effect of regulation greenwashing (Ruiz-Blanco et al., 2022).

2.5.3. Responsive regulation

Braithwaite's (1985) seminal work provides a pyramid of different enforcement strategies starting with persuasion, warning letters, civil penalties, criminal penalties, suspension, and revocation of licences to secure compliance through responsive regulation (Braithwaite, 2014; 2020; Braithwaite & Hong, 2015; Ivec & Braithwaite, 2015). Based on responsive regulation theory, Braithwaite provides a middle ground between pure government and self-regulation. Regulatory tools correct market failures and negative externalities (Osuji, 2015) through an effective dialogic approach based on just law and trust between regulators and regulatees (Ivec & Braithwaite, 2015).

Responsive regulation taps into the wisdom of stakeholders with vast contextual experience relating to the problem (Ivec & Braithwaite, 2015). In this regard, stakeholders are accorded an enhanced voice to participate in the collaborative and mutually engaging conversation between regulators and regulatees (Laczniak & Murphy, 2012). Both regulators and regulatees seek to contribute meaningfully to the regulatory process to foster virtuous citizenry within a regulatory framework.

Bolton, Landells and Roberts (2020) posit that stakeholder-based responsive regulation constitutes a significant mechanism whereby sustainability might be

achieved through a regulator-regulatee relationship. Furthermore, government and citizens can design better policies by optimising the interplay between private and public regulation (Bolton et al., 2020). From this angle, greenwashing can be managed through responsive regulation and stakeholder-centric mechanisms between regulators and regulatees.

2.6. SUSTAINABILITY IN THE CONTEXT OF DEVELOPING COUNTRIES

It is important for a country that wishes to become a developed nation to adhere to international regulations such as the United Nations' sustainable development goals (Khan, 2019). Consequently, developing countries have embraced the SDGs and incorporated sustainability into their legal systems by making sustainability reporting mandatory (Hossain, Alam, Hecimovic & Lema, 2016). Hossain et al. (2016) argue that without national regulations, sustainability reporting practices of companies in developing countries are simply 'eye-washing', in other words, greenwashing.

Sustainability reporting is gaining much traction in developing countries since such disclosures improve company reputation and legitimacy (Singh et al., 2020). According to Gupta and Gupta (2020), governments are increasingly devoting more attention to companies' sustainability practices in emerging countries. Ali, Frynas and Mahmood (2017) studied 76 empirical research articles to explore factors driving sustainability reporting in developed and developing countries. The study found crucial differences in the determinants of sustainability reporting between developed and developing countries. Ali et al. (2017) also found that government regulations have influenced sustainability practices in both developed and developing countries. However, differences in national contextual factors have resulted in variations in sustainability reporting due to differences in economic factors.

Since the results from developed countries are not necessarily relevant and applicable to emerging countries (Hossain et al., 2016), it is important to consider further investigation on sustainability practices in the context of developing countries (Kumar et al., 2021). The next section highlights the literature on the sustainability practices of developing countries. In this respect, China, India, Brazil, Vietnam, Ghana and South Africa are selected as representatives for developing countries.

2.6.1. China

Zhang et al. (2022) investigated the role of isomorphic forces in the greenwashing behaviour of MNCs listed in the Shanghai Stock Exchange (SSE) and Shenzhen Stock Exchange (SZSE). Zhang et al. (2022) found that moderating effects of coercive isomorphism (environmental regulation), normative isomorphism (public pressure), and mimetic isomorphism (industry pressure) are not statistically significant. Furthermore, the study found that MNCs in China tend to greenwash to increase the degree of internationalisation and to respond to legitimacy pressures from home countries (Zhang et al., 2022).

Dong and Xu (2016) examined the impact of sustainability regulations on a sample of 60 listed mining companies from the SSE and SZSE between 2007 and 2012. The study found a significant impact of government regulations on sustainability reporting (Dong & Xu, 2016). Mining companies rapidly adopted sustainability reporting in response to government pressures and demonstrated greater maturity and sustainability leadership than other sectors (Dong & Xu, 2016). However, according to Dong and Xu (2016), mining companies in developing countries are not fully accountable for their sustainability impacts. The study indicates passive compliance by mining companies without any effective change in behaviour, accountability, and transparency. Nonetheless, Dong and Xu (2016) found that strict government regulation remains key to corporate companies' accountability and transparency.

Chen, Hung and Wang (2018) investigated companies listed on the SSE and SZSE from 2006 to 2011 to examine how mandatory sustainability reporting impacted company performance and social externalities, with 2006–2008 being the pre-mandate period and 2009–2011 being the post-mandate period. The study found that cities most impacted by mandatory disclosures experienced decreased industrial wastewater and sulphur dioxide (SO_2) emission levels suggesting that mandatory sustainability reporting alters companies' behaviour and generates positive externalities at the expense of shareholders (Chen et al., 2018).

2.6.2. India

Using data obtained from the top 500 companies from the Economic Times (ET) 500 list, Mishra, Nurullah and Sarea (2021) analysed the status of the adoption of

sustainability reporting by Indian companies after the Securities and Exchange Board of India (SEBI) circular relating to the disclosure requirements for the issuance and listing of Green Debt Securities in 2017. The results show a resultant proliferation of sustainability reports. However, such reports were not concise. According to Mishra et al. (2021), the results show that regulators must provide clear guidelines about sustainability reporting requirements.

Kumar et al. (2021) investigated the Top 100 National Stock Exchange of India (NSE) listed companies to determine if the enactment of Section 135 of the Indian Companies Act of 2013 improved their sustainability practices. The study found that 2013 regulatory reforms significantly improved companies' sustainability reporting during the period 2014–2015 to 2018–2019. Kumar et al. (2021) indicate that energy and mining companies disclosed the most prolific information. However, such disclosures aimed to build a positive image and enhance legitimacy in their communities.

Singh et al. (2020) explored the sustainability practices of 29 manufacturing Small and Medium enterprises (SMEs) listed on the Bombay Stock Exchange's SME sustainability disclosure index (SSDI). The study found that companies with a high propensity towards pollution strongly favoured sustainability reporting so that they could disclose more information. Singh et al. (2020) conclude that strong government policies and regulations are required to improve the sustainability practices of SMEs in India.

Banerjee (2020) investigated companies' sustainability reports in the context of Section 135 of the Indian Companies Act of 2013 to understand how isomorphisms (coercive, normative, and mimetic) shaped sustainability reporting. The results showed that companies adjust their reports to respond to varying institutional pressures to maintain a legitimate societal position. According to Banerjee (2020), sustainability reporting is mainly driven by coercive isomorphism (government pressures) to close the expectational gap; however, companies respond to such pressures for legitimacy.

A study by Jain (2020) evaluated if it is ethical for governments to mandate companies to follow government policies on sustainable development following the introduction of the mandatory policy under the Companies Act. The study found that government

regulation is effective in reducing greenwashing in the context of India. According to Jain (2020), greenwashing is unethical due to its misleading nature.

2.6.3. Brazil

Firstly, it must be noted that Brazil has no legislation that requires mandatory disclosures of sustainability performance. Nonetheless, globally, Brazil remains one of the countries with more sustainability reports published than many other countries (Junior et al., 2017). According to Gaudencio et al. (2020), Brazil has secured third place worldwide in its publication of sustainability reports.

Gaudencio et al. (2020) investigated the sustainability practices of oil and gas companies operating in Brazil using 2015 sustainability reports. The study revealed gaps between the companies' sustainability performance reported and stakeholders' perceptions. According to Gaudencio et al. (2020), in the absence of regulation, sustainability reports are used by Brazilian oil and gas companies as tools to take benefits for their image, as such reports do not accurately reflect their sustainability management.

Junior et al. (2017) conducted a comparative case study of two oil and gas companies, Brazilian Petrobras and Spanish Repsol, using sustainability reports for 2013. According to Junior et al. (2017), both countries experience strong government intervention but different from Spain, Brazil does not have regulations governing sustainability, while companies in Spain are mandated to use sustainability reports. The results indicate differences, firstly in the length of the documents, with 253 pages of Repsol compared to 71 of Petrobras. Secondly, because of regulations, the Spanish company presented a complete and comprehensive report for each sustainability indicator. The numbers included in the reports were substantiated with examples of sustainability performance and actions taken. In comparison to Brazil (Petrobras), the Spanish (Repsol) sustainability report could not be faulted in terms of both quality and application (Junior et al., 2017).

Using a sample of 46 companies listed in Indice de Sustentabilidade Empresarial (ISE) during 2008–2012, Ching and Gerab (2017) investigated the extent to which Brazilian companies reported sustainability performance to society and their stakeholders. The study found that sustainability reporting on economic and social dimensions was better than environmental ones. Furthermore, according to Ching and Gerab (2017), the

improvement in the quality of sustainability reporting signals an attempt by Brazilian companies to gain legitimacy by reducing information asymmetry to gain support from stakeholders.

2.6.4. Vietnam

Nishitani, Nguyen, Trinh, Wu and Kokubu (2021) conducted a study to address allegations of greenwashing, or SDG-washing, following the government promulgation of a legal framework to drive the achievement of the SDGs. Greenwashing claims were unfounded in the context of Vietnamese companies; instead, the study found that government pressure is a precondition for achieving SDGs.

2.6.5. Ghana

Ghana has no comprehensive sustainability policy or law. According to Abugre and Nyuur (2015), the lack of appropriate regulation impedes progress on sustainable development, and companies appear reluctant to comply with legislation due to weak enforcement. Drawing upon institutional theory, Famiyeh et al. (2021) explored the drivers of sustainability decisions in the mining sector of Ghana. The study found that coercive (regulatory) and normative pressures significantly positively impacted companies' environmental and social sustainability practices. The study found that institutional mimetic pressures did not influence the extent to which Ghanaian companies incorporated economic sustainability activities into their operations (Famiyeh et al., 2021).

2.6.6. South Africa

The South African context is peculiar due to its apartheid past (Sampong et al., 2018). During the apartheid era, the mining industry was regulated on a racially discriminatory basis (Ramatji, 2013; Lamola, 2017). The racial laws benefited the white minority through its exclusionary policies that marginalised black people (Ramatji, 2013). In this regard, most mineral rights were granted to the white minority who owned the mining houses. Moreover, the mining industry thrived through systematic domination, oppression and segregation of migrant workers (Humby, 2016). According to Humby (2016), the legacy of the South African mining industry is stained by an uncaring attitude towards employees' health and safety, human rights violations, exploitation of

migrant labourers, neglect of local communities surrounding the mining areas, degradation of the environment and total disregard for transformation and beneficiation. Sampong et al. (2018) argue that a lack of sustainability in South Africa was apartheid-induced.

As a developing country, South Africa's economic system, matured corporate sector, strong governance, and regulatory frameworks compare well with developed economies and is well ahead of its peers (Sampong et al., 2018). The country's regulatory and governance frameworks are touted to be at the forefront worldwide and on par with the world's strongest developed countries (Cheruiyot-Koech & Reddy, 2022). As early as 2008, South African companies' sustainability reporting rate was significantly higher than that of the Fortune Global 100 regarding the frequency and level of sustainability reporting (Dawkins & Ngunjiri, 2008).

Du Toit and Esterhuyse (2021) found that South African corporate practices are similar to large US and UK international companies. Du Toit and Esterhuyse (2021) attribute these similarities to mimetic and normative institutional isomorphism flowing from King IV[1] JSE listing requirements, the common law legal system and the history of British colonial rule. However, the study found that impression management is the dominant communication style South African Chief Executive Officers (CEOs) use.

De Villiers and Alexander (2014) compared disclosure patterns of two (2) countries (Australia and South Africa) with different social issues through the lens of institutional theory. The mining company structures of both countries were found to be remarkably similar. This is attributed to mimetic, coercive, and normative isomorphism, leading to companies' convergence. According to de Villiers and Alexander (2014), mimetic isomorphism played a role due to benchmarking resulting same pattern of disclosures. Coercive isomorphism emanated from similar accounting rules, stock exchange rules, corporate governance rules, and the structure of the capital markets in the two countries. The study revealed that legislation on mining practices and disclosures in the two countries concerned regulates very similar issues and normative isomorphic

[1] King IV is the South African Code of Corporate Governance which provides guidelines for the governance structures and operation of companies in South Africa (IODSA, 2016).

pressures, thus, influencing convergence between the two countries (de Villiers & Alexander, 2014).

The GRI drives sustainability in South Africa; the King IV Code, the JSE Social Responsibility Index (SRI); the Mine Health and Safety Act of 1996 and Black Economic Empowerment (BEE) policies (Cheruiyot-Koech & Reddy, 2022). Cheruiyot-Koech and Reddy (2022) found the institutional effect of the BEE policy and that construction and mining performed relatively better than other industries. They attribute the mining performance to the influential effect of the Mining Charter in terms of mine community and rural development as well as housing and living conditions.

Haji and Anifowose (2016) examined 246 integrated reports of large South African companies after the King III "apply **or** explain" requirements became operative in South Africa. King III was the 2009 South African Code of Corporate Governance before King IV. (King IV uses an "apply **and** explain" approach). A significant increase in the extent and quality of sustainability reports was noticed; however, the reporting practice was largely ceremonial than accountable to stakeholders (Haji & Anifowose, 2016). Such reporting is punctuated with selective impression management strategies to depict the sustainability performance of South African companies in the most favourable way. Haji and Hossain (2016) attribute this to symbolic compliance with regulations to acquire organisational legitimacy.

Setia, Abhayawansa, Joshi and Huynh (2015) found that in response to regulations, JSE-listed companies used a legitimation strategy based on symbolic management when preparing sustainability reports rather than substantive management, which is more effective when managing stakeholders' perceptions. According to Setia et al. (2015), there is evidence of the impact of sustainability regulation resulting in an increase in the extent of disclosures.

2.7. LEGISLATIVE FRAMEWORKS REGULATING SUSTAINABILITY PERFORMANCE IN THE SOUTH AFRICAN MINING INDUSTRY

The democratic government elected in 1994 committed itself to sustainable development through its policies and regulations (Denhere, 2022). South Africa has since made headway in streamlining sustainable development through government regulations (Cole & Broadhurst, 2021). The new regulations are expected to redress past injustices through sustainability initiatives (Humby, 2016). Table 2-1 summarises

how SDGs are mapped into the current legislative framework of the South African mining industry.

Table 2-1: South African Mining Legislation and Regulations

Acts	Regulations
The Mineral and Petroleum Resources Development Act 28 of 2002 (MPRDA) (RSA, 2002)	The Broad-Based Black Socio-Economic Empowerment Charter for the Mining and Minerals Industry, 2018. Government Gazette (Mining Charter 2018; DMR, 2018c)
	Social and Labour Plans Guideline 2010 (SLP) (DMR, 2010)
	Housing and Living Conditions Standard 2019 (HLCS) (DMR, 2019)
The National Environmental Management Act 107 of 1998 (NEMA) (RSA, 1998)	Environmental Management Plan 2018 (EMP) (DMR, 2018a) Mining and biodiversity guideline: Mainstreaming biodiversity into the mining sector 2013 (DEA, 2013)
The Mine Health and Safety Act (MHSA), Act 29 of 1996 (RSA, 1996b)	Mandatory Code of Practice Guidelines (DMR, 2016)

Source: *Adapted from Cole and Broadhurst (2021)*

Table 2-1 shows post-apartheid legislation and a suite of regulations to guarantee a sustainable environment for mining communities (Cole & Broadhurst, 2021). Figure 2-1 illustrates how SDGs are mapped to the South African mining regulations.

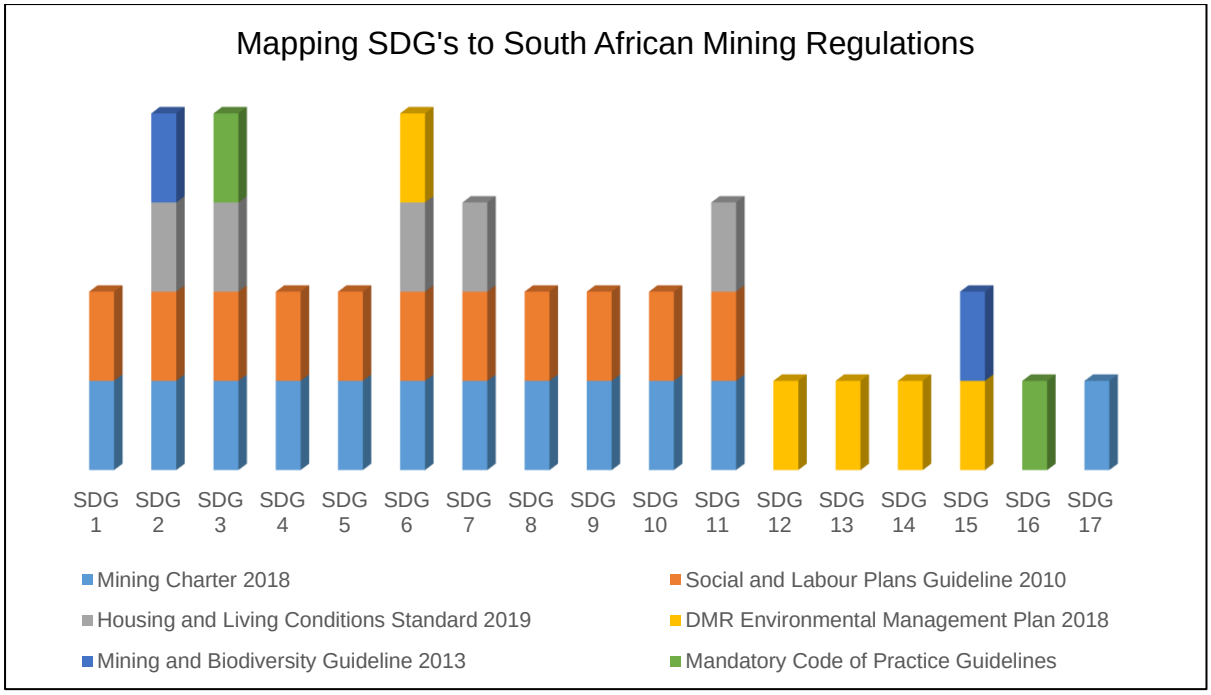

Figure 2-1: Mapping SDGs to South African Mining Regulations

Source: *Adapted from Cole and Broadhurst (2021)*

SDG1 :End poverty; SDG2: Zero Hunger; SDG3: Good Health and Wellbeing; SDG4:Quality Education; SDG5: Gender Equality; SDG6: Clean Water and Sanitation; SDG 7: Affordable and Clean Energy; SDG 8: Decent Work and Economic Growth; SDG9: Industry, innovation and Infrastructure; SDG10: Reduced Inequalities; SDG11: Sustainable Cities and Communities; SDG12: Responsible Consumption and Production; SDG 13: Climate Action; SDG14: Life Below water; SDG15 Life on Land; Peace Justice and Strong Institutions; SDG16: Peace, Justice And Strong Institutions; SDG17: Partnerships for the Goals

Figure 2-1 shows that the democratic legislative regime of South Africa embedded sustainability into the mining industry by promulgating the MPRDA and related regulations, the NEMA and its regulations, and the MHSA and its mandatory code. These three (3) Acts and associated regulations and guidelines address all 17 SDGs. In this respect, South Africa is well-poised to pioneer sustainability reporting in the mining industry (Cole & Broadhurst, 2021).

According to Cole and Broadhurst (2021), the MPRDA and the subsequent Mining Charter, the SLP, and the HLCS should have brought about significant changes in the living standards and job opportunities of mine host communities. However, not all SDG targets have been achieved, and thousands of people living in host communities still live in a state of deprivation of basic services (Cole & Broadhurst, 2021). The South African mining legislation and regulations are discussed in the next sub-sections starting with the MPRDA.

2.7.1. The Mineral and Petroleum Resources Development

The democratic government elected in 1994 sought to redress the results of past racial discrimination as mandated by the Constitution of the Republic of South Africa (RSA, 1996a). Regarding Section 25 of the Constitution, the government should reform the mining industry. As a result, the Mineral and Petroleum Resources Development Act 28 of 2002 (MPRDA) was introduced to effect the equality clause as contemplated in section 9 of the Constitution (RSA, 1996a).

The MPRDA was promulgated effectively from 1 May 2004. The purpose of the MPRDA is to make provision for equitable access to and sustainable development of the nation's mineral and petroleum resources; and to provide for matters connected therewith (RSA, 2002). In terms of Section 37 (2) of the MPRDA, "Any prospecting or mining operation must be conducted in accordance with generally accepted principles of sustainable development by integrating social, economic and environmental factors into the planning and implementation of prospecting and mining projects to ensure that exploitation of mineral resources serves present and future generations" (RSA, 2002). Bester and Groenewald (2021) regard the MPRDA as the central legislation regulating mining in South Africa, whilst the Broad-Based Socio-Economic Empowerment Charter for South African Mining serves as the government's stance towards regulation in the mining industry.

2.7.2. Broad-Based Socio-Economic Empowerment Charter for the South African Mining Industry

Regarding Section 100(2) of the MPRDA, the Minister is responsible for developing the Broad-Based Socio-Economic Empowerment Charter for the South African Mining Industry. The scorecard system is used to report performance on specific targets set in the Mining Charter and to explain the modalities of compliance. The 2018 Mining Charter comprises six (6) elements: Ownership; employment equity; human resource development; inclusive procurement, supplier, and enterprise development; mine community development and housing and living conditions. These are summarised below, starting with ownership.

2.7.3. Ownership

From the 1880s, the South African mining industry was dominated by a few white conglomerates that controlled mine assets as both colonial and apartheid laws prohibited black people from owning equity and mine assets (Kilambo, 2021). When the MPRDA came into effect in 2004, the democratic government eliminated private ownership of mineral rights and vested it in the people of South Africa under state custody (Cole & Broadhurst, 2021). Preferential policies were promulgated to address racial disparities and ensure economic transformation using mining licences as a tool (Kilambo, 2021). Regarding MPRDA and the Mining Charter, preference is given to Black people when issuing new licenses (Kilambo, 2021). This was to ensure meaningful economic participation in the mining industry by historically disadvantaged South Africans (Kilambo, 2021). However, economic transformation targets set by the MPRDA and the Mining Charter have not been met at the industry level (Kilambo, 2021).

2.7.4. Employment equity

The South African government took the legislative route to mainstream gender equity into the mining industry through the Mining Charter (Kaggwa, 2020). The Mining Charter introduced a quota system that targets women's employment and participation in the mining industry (DMR, 2018b, 2018c, 2018d). According to Kaggwa (2020), evidence showed that the number of women participating in mining activities was not increasing to meet the mining charter target, despite legislative intervention. Women in mining still face challenges in the workplace despite progressive gender-sensitive regulations (Kaggwa, 2020). The study concludes that, in general, legislation can be a useful tool to reduce gender inequality in the workplace; however, on its own, it is not a sufficient intervention (Kaggwa, 2020).

In another study by Moloi (2015), selected South African mining companies did not disclose risks related to mining charter transformation targets. According to Moloi (2015), such non-disclosure potentially distorts the true state of affairs. Nonetheless, companies are increasingly pressured to disclose employment practices in sustainability reports in response to legislative and policy initiatives that actively promote gender equality, equal employment opportunities for women and diversity in the workplace (Bradford, Earp, Showalter & Williams, 2017). Frias-Aceituno,

Rodriguez-Ariza and Garcia-Sanchez (2013) found that gender diversity was one of the most important factors contributing to companies' sustainability posture. In addition, Frias-Aceituno et al. (2013) posit that the presence of women at the senior management level was found to have a positive influence on company behaviour and its sustainability reporting practices. However, disclosure of diversity statistics such as race, sex, age, ethnicity, and other diversity initiatives information remains poor (Hossain, Hecimovic, & Lema, 2015)

2.7.5. Human resource development

The Mining Charter requires companies to invest in human resources and essential skills. To invest in "internship, apprenticeship, bursaries, literacy, and numeracy skills for employees and non-employees, research and development of solutions in exploration, mining, processing, technology, beneficiation, environmental conservation and rehabilitation" (DMR, 2018b, 2018c, 2018d, 2019). Bocken, Rana and Short (2015) see investment in community development initiatives such as education, apprenticeship, research, training programmes and supporting communities by giving people work experience as giving back to society. Through their sustainability initiatives, companies contribute to sustainable development by securing the personal development of individual community members and their families (Herbohn et al., 2014; Senigaglia, 2014). Skills development is particularly important to the country in achieving higher economic growth rates; therefore, companies could play an important role in partnership with the government and other employers to close the skills gap (Glensor, 2010).

2.7.6. Inclusive procurement, supplier and enterprise development

Inclusive procurement, supplier and enterprise development element is the highest weighted element of the 2018 Mining Charter compliance scorecard. South African mining companies should spend at least 80% of services sourced and supplied locally from BEE-compliant companies. Furthermore, at least 70% of the total mining goods budget should be spent on South African manufactured goods sourced from historically disadvantaged people, women- and youth-owned and controlled companies, and BEE-compliant companies. A 70% minimum of the total research and development budget should be spent on South African-based entities. The mining

industry is important in promoting local enterprise development (Marais & de Lange, 2021).

2.7.7. Mine community development

A mining right holder is mandated to meaningfully contribute towards Mine Community Development, in line with the social license to operate (DMR, 2018b). The Mining Charter specifically empowers mining communities through mining community development (Heyns & Mostert, 2018). The mining community development is seen as a cardinal pillar of compliance with the Mining Charter (Heyns & Mostert, 2018). However, progress in implementing the Mining Charter is more questionable from a development point of view as communities remain poor. As such, the empowerment of mine communities seems to be more poverty alleviation rhetoric than substantive change (Heyns & Mostert, 2018).

Companies should disclose their community involvement in covering developmental issues to change the quality of life for the betterment of the local community where the company operates (Romolini, Fissi & Gori, 2014). Sustainability initiatives to report on include participation in local economic development activities to ensure job creation and income generation; infrastructure development to improve their living conditions; investment in education, skills development and training partnerships; as well as lifelong learning to benefit locals and to equip communities for future job opportunities through bursaries and scholarships (Masarira, 2014; O'Faircheallaigh 2015; Ranängen & Zobel, 2014). Companies could also grant preferential access to job opportunities and offer training programmes to enhance the skills development of community members (Bocken et al., 2015; Duff, 2017; Senigaglia, 2014).

Fagerström (2016) argues that the success of companies ought to filter through to communities in which they operate such that local community development becomes indicative of the importance of successful communities in maximising shared value. According to Costa and Menichini (2013), business success depends on social welfare and vice versa.

Moreover, trust, partnership and corporation are of utmost importance if desired levels of local economic development are to be achieved (van Heerden, 2016). Van Heerden (2016) further indicated that a clear regulatory mandate is inadequate to stimulate local economic development in communities and that collaboration between the company

and its stakeholders is required. Local economic development plays a vital role in stimulating the local economy by contributing to job creation, leading to increased income for local residents and expansion of the source of taxation (Park & Choi, 2015).

2.7.8. Housing and living conditions

Housing and living conditions are the sixth element of the 2018 Mining Charter and are governed under the Housing and Living Conditions Standard 2019 (DMR, 2019). There are principles set out in the Housing and Living Conditions Standards for the Mining and Minerals Industry developed in terms of section 100 of the MPRDA (DMR, 2018b). These include “decent and affordable housing; provision for home ownership; provision for social, physical, and economically integrated human settlements; and secure tenure for mine employees in housing institutions; proper healthcare services and balanced nutrition” (DMR, 2018b). Mining companies are to provide adequate housing and decent living for mine employees, provision of basic services such as access to electricity, piped water and related amenities, sanitation, roads, healthcare schemes, sufficient nutrition and potable water, and a clean, safe and healthy environment (DMR, 2019). The Mining Charter requires 100% compliance with the Housing and Living Conditions Standard commitments (DMR, 2018b, 2018c, 2018d).

Historically, mine workers in South Africa were mainly poor black people from remote regions who were subjected to living in the notorious all-male hostel accommodation system, separated from their families (Humby, 2016). It is noteworthy that South Africa has not completely escaped its legacy as mineworkers continue to migrate to work away from their families (Cloete & Marais, 2021). South Africa remains one of the most unequal societies in the world, with varying standards of living that reflect the legacy of apartheid spatial planning, despite pro-poor legislation (Cole & Broadhurst, 2021). Unfortunately, thousands of people living in host communities remain deprived of basic services (Cole & Broadhurst, 2021). However, Pelders and Nelson (2019) found improvements in living conditions due to Mining Charter requirements and industry preferences, with 35% of the participants indicating dissatisfaction with their living conditions.

According to Mathibe (2011), the Mining Charter and global sustainability frameworks are key drivers of sustainability. However, there is a gap between the companies’ intent and sustainability performance. Mathibe (2011) argues that negative tendencies

impede sustainability, including leadership challenges, significant credibility, a trust deficit, and a fragmented approach to sustainable development. Mining companies are enjoined to work with the government to achieve Mining Charter targets (Mathibe, 2011). Bester and Groenewald (2021) argue that the Mining Charter is a worthy policy document to be reckoned with at the policy level. However, implementation thereof is weak as it has put the sustainable development agenda in the hands of mining companies. As such, the Mining Charter lacks meaning in more practical terms (Bester & Groenewald, 2021).

According to Cheruiyot-Koech and Reddy (2022), mining community development and housing and living conditions are the two most influential elements of the mining charter. The study shows that mining companies prefer providing infrastructure, supporting arts, culture, and sports activities. In terms of infrastructure development, mining companies devote their efforts towards providing housing, roads and clean water (Cheruiyot-Koech & Reddy, 2022).

2.7.9. The social and labour plan

In terms of Section 23 (1) of the MPRDA, South African mining companies are required to submit Social and Labour Plans (SLP) as a pre-requisite for the granting of a mining or production right as prescribed in regulation 46 of the MPRDA (DMR, 2010). The SLP requires “the applicants for mining and production rights to develop and implement the Human resource development plan; Mine community development plan; Housing and living conditions plan; Employment equity plan as well as processes to save jobs and manage downscaling and/or closure” (DMR, 2010). In addition, the following five plans should also be included in the SLP: the skills development plan, career path plan, mentorship plan, internship and bursary plan, and employment equity plan (DMR, 2010).

Mining companies should submit an annual report to the DMR regarding progress on implementing their SLP as per Regulation 45 of the MPRDA (Bester & Groenewald, 2021). The SLP is a blueprint of what mining companies commit to doing as part of mining community development in the next five years. According to DMR (2018c), 100% of the approved SLP commitments should be implemented within the agreed timeframe, and SLP amendments shall be approved in terms of section 102 of the MPRDA and consulted with mine communities (DMR, 2018c).

The racially discriminatory mining laws necessitated a call for the SLP system, which is being implemented in the mining industry by the new democratic dispensation (Lamola, 2017). According to Lamola (2017), the SLP is one of the regulatory mechanisms to redress inequalities deeply rooted in the mining sector, allowing South African mining companies to contribute to the socioeconomic development of mining communities. Non-compliance with SLP's mandatory obligations can lead to the suspension of mining right (Lamola, 2017). Bester and Groenewald (2021) perceive the SLP plan as the primary compliance mechanism for achieving sustainability in the mining industry and affected communities by fostering employment and the socio-economic well-being of previously disadvantaged South Africans. This policy intervention mandates the government submit SLPs before mining companies can be granted a mining right (Renzi, 2021). However, the SLP does not guide social impact assessment per se (Kung, Everingham & Vivoda, 2020).

2.7.10. Mine Health and Safety Act

The Mine Health and Safety Act (MHSA), Act 29 of 1996 was promulgated after intensive consultations between government, employers and employee representatives. According to Coulson (2018), since the promulgation of the MHSA, occupational health and safety performance in the mining sector of South Africa has improved dramatically, attributed to tightened regulation and improved occupational health and safety standards. However, the transition to the MHSA has not seen investment in the occupational health and safety capacity of labour to meet the MHSA statutory commitments (Coulson, 2018). This is a concern because regardless of size, whether large-scale industrial mining or small-scale artisanal mining, mining remains a hazardous activity requiring health and safety legislation enforcement to protect workers and communities (Stewart, 2020).

Bernard (2018) analysed how two South African companies (Gold Fields and Amplats) constructed social actors in their sustainability reports during 2011, 2012 and 2013. The study found that health and safety are reported as a prerequisite for profit maximisation (Bernard, 2018). Moreover, the sustainability reports construct an image of employees as entities, commodities and objects owned by mining companies. When mining companies sometimes report fatalities in the workplace, the deceased employees are named for statistical purposes when reporting on fatal-injury frequency

rate (FIFR). A study by Haji and Anifowose (2016) found that South African mining companies disclose incidents such as fatalities. However, negative incidents are downplayed and ignored while emphasising a positive trend (Haji & Anifowose, 2016).

Health and safety are stakeholder issues to be managed and incorporated into companies' sustainability agenda (Ruiz-Frutos, Pinos-Mora, Ortega-Moreno & Gómez-Salgado, 2019). However, Ruiz-Frutos et al. (2019) found that sustainability reporting on health and safety did not reflect real information on the quality of life at work. Nonetheless, government legislation and regulations remain the backbone of occupational health and safety management, despite little scientific evidence that work-related illnesses could be reduced by implementation and health management tools at hand (Ruiz-Frutos et al., 2019).

2.7.11. National Environmental Management Act

The post-apartheid mining legislation has tightened the environmental regulations to rehabilitate the environment to its pre-mining condition (Marais & de Lange, 2021). The National Environmental Management Act 107 of 1998 (RSA, 1998) is a statutory framework to enforce Section 24 of the Constitution of the Republic of South Africa (RSA, 1996a). The Act provides for cooperative environmental governance by establishing principles for decision-making on matters affecting the environment, institutions that will promote cooperative governance and procedures for co-ordinating environmental functions exercised by state organs (RSA, 1998).

Kung et al. (2020) indicate that the South African regulatory regime is particularly complex. There are weaknesses and internal limits of the legal framework that discredit the content or authority of the environmental regulatory framework, coupled with the poor implementation thereof (Kengni & Mostert, 2022). One factor impairing the effectiveness of environmental regulations is poor coordination across relevant government departments, namely, the DMR, the Department of Environment, Forestry and Fisheries, and the Department of Water and Sanitation (Kengni & Mostert, 2022). According to Kengni and Mostert (2022), cooperation between these departments is essential for enforcing environmental protection in the South African mining sector under the One Environmental System.

Generally, reporting on the environment is not free from challenges. De Villiers and Marques (2016) found that as much as managers are expected to accede to public

pressure, companies in countries prioritising SDGs and the environmental policy agenda are expected to disclose more. However, they are likely to disclose less for fear of attracting litigation and liability for environmental harm (de Villiers & Marques, 2016). In this regard, Caritte, Acha and Shah (2015) assert that in-depth awareness of regulatory frameworks and policies would reduce gaps and inconsistencies found between sustainability performance and sustainability reporting.

2.8. LEGISLATIVE REQUIREMENTS REGULATING REPORTING IN THE SOUTH AFRICAN MINING INDUSTRY

Section 2.6 dealt with the regulation of sustainability performance, in this section, the focus is given to the regulation of reporting in terms of section 28(2)(c) of the MPRDA. A study by Ackers and Eccles (2015) shows that the resources sector, of which mining is part, was already leading the drive towards increased sustainability reporting even before the issuance of the King III “apply or explain” requirement by the JSE. Ngorima (2019) explicitly attributes the quality of the mining industry’s sustainability reporting to the legal requirements of DMR’s Mining Charter and SLPs. In a separate study, Ackers and Grobbelaar (2021) provide empirical evidence that JSE-listed mining companies were already producing significant information in response to strict mining regulations, particularly the MPRDA and the Mining Charter, even before the release of the International Integrated Reporting Framework (IIRF). The researcher, therefore, argues that South African mining regulations may no longer be ignored as the compliance mechanism for sustainability reporting within the mining industry.

2.9. EMPIRICAL EVIDENCE ON THE APPLICATION OF SOUTH AFRICAN MINING REGULATIONS ON SUSTAINABILITY

Cole and Broadhurst (2021) conducted a South African case study measuring the sustainable development goals (SDGs) in mining host communities. They found that despite progressive post-apartheid laws and regulations, mining companies only highlight positive contributions towards the implementation of SDGs while omitting the negative impacts of mining in their reports (Cole & Broadhurst, 2021). They, furthermore, established a disconnect between the country’s legislative policies and sustainability performance at mining sites. The disjuncture between sustainability performance and sustainability reporting is mainly attributed to limited capabilities to

enforce regulations due to the rapid growth of mining activities and information asymmetry. According to Cole and Broadhurst (2021), there is little or no evidence that mining companies provide mine-site-level information on issues of strong public interest.

Using the enlightened stakeholder theory, Ackers and Grobbelaar (2021) evaluated sustainability indicators reported by South African mining companies listed in the JSE following the release of the IIRF. The study found that South African mining companies were already producing significant information in response to stringent mining industry regulations, particularly the MPRDA and the Mining Charter, even before the framework's release (Ackers & Grobbelaar, 2021). However, the primary motive for compliance is the need to secure the licence to operate, without which the legitimacy of mines is threatened (Ackers & Grobbelaar, 2021).

This is due to an inclusive stakeholder approach already entrenched in South African governance codes, which is in the best interest of many stakeholders (Ackers & Grobbelaar, 2021). However, the motive for this uptake is a combination of legitimacy with stakeholders to derive reputational benefits and stringent South African mining industry regulations, albeit technically in line with instrumental theory (Ackers & Grobbelaar, 2021). It is reported that companies selectively disclosed positive environmental and societal performance whilst concealing negative performance (Ackers & Grobbelaar, 2021).

Ngorima (2019) attributed the mining industry's reporting quality to the legal requirements of the Mining Charter and SLPs, indicating that the DMR mandates some of the industry's reporting. Ngorima (2019) further noted that JSE-listed mining companies performed better since the industry is under the microscope in terms of impact, social expectations, social contract, and even real issues in terms of regulatory scrutiny. As a result, JSE-listed mining companies provide more information than companies in other sectors.

Atkins and Maroun (2015) found signals of legitimacy in the sustainability reports of JSE-listed companies and the presence of harmless impression management; for example, "photographic content of a happy low-paid miner who works under hugely dangerous conditions and lives in some hostel is the happiest person on earth" is found on the front page of the report (Atkins & Maroun, 2015:211). Moreover, the length,

excessive repetition and checkbox approach to sustainability reporting demonstrated acts of compliance (Atkins & Maroun, 2015). The study found that sustainability reporting was complemented by the effect of revised regulations which required companies to increase and improve reporting on environmental, social and governance issues (Atkins & Maroun, 2015).

Moloi (2015) assessed the sustainability reports of 14 South African mining companies listed in the JSE's pre- and post- the Marikana 2012 industrial action incident reports. The study found that non-disclosure of labour relations information distorted the companies' information (Moloi, 2015). Furthermore, Moloi (2015) states that legal and regulatory compliance with MPRDA, SLPs and Mining Charter requirements were among non-disclosed risks. Moreover, the length, repetition of information, and checkbox approach to sustainability reporting detract from its usefulness (Moloi, 2015).

Using content analysis, Molate, de Klerk and Ferreira (2014) evaluated whether the extent of employee-related sustainability reporting by South African mining companies is influenced by a major legitimacy-threatening event such as Marikana. The study found that other factors influence the extent of reporting, and the reporting patterns of South African mining companies can longer be explained by legitimacy theory only. According to Molate et al. (2014), sustainability has become so institutionalised in line with the institutional theory that it is no longer a function of company-specific attributes like size or sustainability-related intentions and performance.

Using the institutional theory framework, de Villiers, Low and Samkin (2014) compared the sustainability reporting of listed South African mining companies with those of smaller companies. The study found that smaller South African mining companies disclose the same amount of environmental information as the larger South African mining companies, using the same general format, although large companies disclose more social information. De Villiers et al. (2014) found that convergence emanated from mimetic isomorphism, as most mining companies follow the GRI reporting guidelines and the Mining and Metals Sector Supplement as a framework. They also conclude that sustainability reporting in the mining industry has matured due to legislation of mining company practice which has also resulted in coercive isomorphism.

Latiff and Marimuthu (2021) analysed water-related sustainability reporting and disclosure requirements of a sample of 10 companies with high-water profiles listed on the JSE SRI comprised of five (5) South African mining and five (5) South African non-mining companies. The study found that the five (5) mining companies performed poorly compared to five (5) non-mining companies, despite acid mine drainage (AMD), which leads to water pollution and utilisation of substantial amounts of water (Latiff & Marimuthu, 2021). In this regard, greater regulatory and stakeholder supervision is required for mining companies to improve water management and stewardship (Latiff & Marimuthu, 2021).

Crous et al. (2021) studied reporting by four (4) South African mining companies on mine closure and found that mining companies have arguably adopted a self-selective approach to sustainability reporting to distract from difficult issues, with minimal value for local communities. Much of the content of mining companies' sustainability reports seems to service external demand while concealing information about the social impacts of mine closure (Crous et al., 2021). According to Crous et al. (2021), the reporting approach adopted by the four (4) mining companies does not build trust, but instead, over time, it builds scepticism, given South Africa's mine closure legacy (Crous et al., 2021).

Denhere (2022) investigated the adoption of green economy and sustainable accounting principles by South African listed companies by the top five (5) JSE-listed mining companies as of 7 January 2022. The study found rhetoric directed to stakeholders to portray a company's good standing without behaviour and attitude change. Moreover, reporting is subjective due to the lack of explicit standards and regulations guiding sustainability reporting (Denhere, 2022). The results suggest the need for legislation to drive sustainability and to promote progress in terms of attaining sustainability in South Africa (Denhere, 2022), however, with a caveat that regulatory measures do not reduce companies' discretion; instead, they guide companies' actions (Cheruiyot-Koech & Reddy, 2022; Denhere, 2022).

2.10. SUSTAINABILITY IN THE CONTEXT OF MINING

Sustainability within the mining industry is more relevant since mineral resource discovery, extraction, and processing are environmentally and socially disruptive (Jenkins & Yakovleva, 2006). The catastrophic social and environmental impacts of

mining are attributed to the failure of national industry regulators (O'Faircheallaigh, 2015). The mining industry has historically adopted a "devil-may-care" attitude towards the negative impacts of its operations (Dimmler, 2017). Though mining companies seem to be remodelling themselves as good corporate citizens, there is little evidence of how they have addressed their negative externalities (Dimmler, 2017). In this respect, regulation is necessary to manage the externalities of mining, especially where landscapes have changed because of mining or where pollutants continue to be released long after mining operations have been discontinued (O'Faircheallaigh, 2015).

Sustainability in the global mining industry context is ingrained in the industry's position on the industry's code of conduct, publication of sustainability reports, and involvement in community development initiatives such as infrastructure development, education, health, local enterprise development and agriculture (Segerstedt & Abrahamsson, 2019). Segerstedt and Abrahamsson (2019) further submit that social sustainability in mining communities can be achieved through resource distribution and access to basic services.

However, mining companies' involvement in community welfare improvement and sustainable development projects is motivated by the economic value they derive from mining rights in those communities (Dissanayake et al., 2016). As such, the effectiveness of sustainability initiatives by the mining industry is still debatable, given the industry's legacy, questionable reputation and inherent ambiguities (O'Faircheallaigh, 2015; Viveros, 2016). Because of higher dependence on mineral resources, mining companies are likely to use sustainability reporting as a legitimacy tool to gain access to such resources (Dissanayake et al., 2016).

Sustainability in mining can be achieved through economic development, social cohesion, stakeholder dialogue and environmental protection (Jenkins & Yakovleva, 2006). Moreover, a win-win scenario can be reached if the sustainability practices of mining companies are compatible with positive social factors, including employment opportunities for the local community, conducive working conditions, learning opportunities, gender equality, diversity and inclusion of cultural expressions (Segerstedt & Abrahamsson, 2019).

2.11. LITERATURE GAPS

Empirical research provides sound concepts for sustainable development. However, the literature has overlooked the views of regulators responsible for ensuring sustainable mining. Firstly, the researcher argues that regulators can influence the company's sustainability reporting policy. Secondly, empirical research also shows gaps in the literature as far as greenwashing in mining is concerned. Moreover, prior studies that theoretically studied greenwashing have not proven validity in the relationship between sustainability performance and sustainability reporting based on South African mining industry-specific regulated sustainability factors. The researcher uses EFA, Pairwise T-tests and CB-SEM techniques to analyse primary data collected from regulators of the mining industry of South Africa.

Table 2-2 summarises the literature review, and in the next sub-sections, literature gaps are linked with the study objectives.

Table 2-2: Literature review findings

Author	Aim	Sample	Method	Theory	Finding
Ackers and Grobbelaar (2021)	To investigate the extent to which the release of the International Integrated Reporting Framework has sustainability reporting of South African mining	18 mining companies with primary JSE listings incorporated in South Africa	Thematic content analysis	Enlightened shareholder theory	The framework's release does not appear to have influenced the environmental and social information disclosures. In response to stringent mining industry regulations, mining companies were already disclosing significant information before the framework's release.
Cole and Broadhurst (2021)	To operationalise the SDGs in the South African mining industry	The 95 mining host communities	Case Study	None	Despite progressive post-apartheid laws and regulations, mining companies only highlight positive contributions towards implementing SDGs while omitting the negative impacts of mining in their reports.
Crous et al. (2021)	To investigate reporting of four South African mining companies.	The four largest mining companies listed on the JSE per subsector: one each from platinum (Anglo-American Platinum (Amplats), coal (Glencore), gold (Sibanye Stillwater) and metals (BHP Billiton) industries.	Content analysis	None	On mainstream environmental and financial reporting, the four largest South African mining companies disclose little about the social aspects of mine closure and how these will be addressed. Moreover, much of the content in company sustainability reports appears to service external demands for transparency from interest.
Latiff and Marimuthu, (2021)	To analyse water-related reporting and disclosure requirements	Ten South African mining and non-mining companies with a high-water profile, listed on the JSE Socially Responsible Investment Index comprised five non-mining and five mining companies	Qualitative approach	None	Five mining companies performed poorly regarding the water disclosure framework measuring awareness, management, disclosure, and leadership. Moreover, non-mining companies displayed good water stewardship through transparency and accountability towards their stakeholders. Water and supply chain management in the mining sector was neglected.

Author	Aim	Sample	Method	Theory	Finding
Ngorima (2019)	To assess the trends in the quality of environmental sustainability reports for JSE-listed firms and to determine the drivers for SR in South Africa.	30 sustainability practitioners of JSE-listed companies	Qualitative (interpretivism) methods	Stakeholder theory	Post the introduction of mandatory requirements for integrated reporting for companies on the JSE, a strong indirect influence of legislative requirements of high-impact sectors such as resources was found. Moreover, the legal requirements of the Mining Charter and the SLPs contributed to driving sustainability.
Dube and Maroun (2017)	To examine in detail a small sample of annual and integrated reports to shed light on the operation of legitimacy theory in a South African reporting context	The JSE-listed platinum mining companies	Qualitative method: Thematic analysis	Legitimacy theory	The results provided evidence of the applicability and relevance of legitimacy theory in a South African context following the violent strike action in 2012 at Marikana.
Haji and Anifowose (2016)	To examine whether integrated reporting practice is ceremonial or substantive following the introduction of an “apply or explain” IR requirement in South Africa	246 integrated reports of large South African companies over three years (2011-2013)	Content analysis	Legitimacy theory	The results show that the reporting practice is largely ceremonial to acquire organisational legitimacy. Moreover, companies exaggerate positive “highlights” while obscuring negative “lowlights. The study found that sustainability reporting is “explained by certain aspects of legitimacy theory such as symbolic legitimacy rather than legitimacy theory as a whole.”
Haji and Hossain (2016)	To examine whether integrated reporting practice has influenced organisational reporting practice following the introduction of an “apply or explain” IR	54 organisational encompassing integrated reports, standalone sustainability reports, website contents and press/media releases of large South	Qualitative case study approach	Impression management theory	The results show that the reporting practice is generic rather than company-specific and lacks substances. Moreover, Integrated reporting did not improve the substance of organisational reports.

Author	Aim	Sample	Method	Theory	Finding
	requirement in South Africa	African companies over four years (2011-2014)			
Setia et al. (2015)	To examine whether the integrated reports prepared in accordance with the King III Code of corporate governance regulation provided the information intended for an integrated report	Top 25 JSE-listed companies for the years before (2009-2010) and after (2011-2012) the regulation of integrated reporting.	Content analysis	Legitimacy theory	South African companies adopt “a legitimation strategy based on symbolic management when preparing integrated reports.” Companies tend to report more when under scrutiny via mandatory listing requirements than under the previous voluntary disclosure system. In this respect, regulation has been successful to a certain extent as more companies disclosed more after mandatory disclosures (Setia et al., 2015).

2.11.1. Factors affecting sustainability in the South African Mining Industry

The study's first objective is to explore the factors affecting sustainability practices in a highly regulated mining industry from the regulators' perspective. Empirical research on the sustainability practices of South African mining companies (Ackers & Grobbelaar, 2021; Cole & Broadhurst, 2021; Denhere, 2022) has not explored factors affecting sustainability practices within a highly regulated mining industry and from the viewpoint of mining industry regulators.

To the researcher's knowledge, there is a shortage of empirical research on greenwashing practices in South Africa, mining, and from the perspective of industry regulators. Most of the evidence from the South African mining context is qualitative and based on secondary data (Ackers & Eccles, 2015; Ackers & Grobbelaar, 2021; Cole & Broadhurst, 2021; de Villiers & Alexander, 2014; Mathibe, 2011; Molate et al., 2014; Moloi, 2015; Ngorima, 2019). According to Lambrechts et al. (2019), analysing publicly available sustainability reports of companies could potentially lead to biased results. Therefore, quantitative studies focusing on sector-specific sustainability indicators are required to fill the literature gap. In contrast, this research is quantitative and uses primary data from regulators of the mining industry to measure the greenwashing phenomenon, which is a unique contribution to the sustainability research field, particularly greenwashing.

2.11.2. The perceived gap between sustainability performance and sustainability reporting

The second objective is to investigate the perceived gap between sustainability performance and sustainability reporting from the regulators' perspective. Currently, there is no empirical evidence suggesting that greenwashing by mining companies has been investigated from the perspective of industry regulators. Moreover, the research relied on secondary data of reporting companies from similar databases or using content analysis from self-reporting companies resulting in almost similar results. For example, literature employed sustainability reporting as an appropriate proxy and/or signal for companies' commitment to communicating values concerning sustainability performance (Dawkins & Ngunjiri, 2008; Fernandez-Feijoo, Romero & Ruiz, 2014; Goettsche, Steindl & Gietl, 2016; Junior et al., 2017; Uyar et al., 2020).

Continuing to assent to this view would be a fundamental flaw in the discourse, bearing in mind the greenwashing phenomenon. The researcher, therefore, disentangles sustainability performance from sustainability reporting and does not presuppose that sustainability reporting is an automatic measurable surrogate for sustainability performance or vice versa; therefore, none is deemed a proxy for the other.

The problem with the current discourse where sustainability reporting is seen as a proxy for sustainability performance generates a paradox that reporting companies responsible for perpetuating negative externalities are simultaneously fundamental in the fight against such externalities (Montecchia et al., 2016). Therefore, regarding sustainability reporting as a surrogate of sustainability performance facilitates further diffusion of greenwashing. This is still a grey zone that needs to be addressed (Gatti & Seele, 2014). Therefore, it is plausible to bring about a paradigm shift where sustainability performance and sustainability reporting variables are measured separately for stakeholders to detect if there are greenwashing practices in the mining context.

Moreover, empirical evidence on the relationship between sustainability performance and sustainability reporting (Alcívar, Cruz, Mero & Hidalgo-Fernández, 2020; Boiral & Heras-Saizarbitoria, 2020; Ferretti et al., 2020; Gaudencio et al., 2020; Kristensen & Mosgaard, 2020) did not solicit the views of regulators. It is, therefore, more important for regulators to air their perceptions of whether sustainability reporting is a reflection of companies' sustainability performance (Dienes et al., 2016; Lukinović & Jovanović, 2019) than to rely on unsubstantiated self-laudatory sustainability claims by regulated companies (Crilly & Hansen, 2016), with a self-serving bias for impression management (du Toit & Esterhuyse, 2021). The relationship between sustainability performance and sustainability reporting is under-theorised (Velte, Stawinoga & Lueg, 2020) and predominantly evaluated from the lens of voluntary disclosure or legitimacy theory (Deegan, 2017).

This study used the Structural Equation Model (SEM) to test the relationships between sustainability performance and sustainability reporting. The researcher evaluated two most popular approaches to SEM, namely, Partial Least Square Structural Equation Modelling (PLS-SEM), sometimes referred to as variance-based SEM and Covariance Based Structural Equation model (CB-SEM). Each approach has distinctive assumptions and aims (Hair Jr., Matthews, Matthews & Sarstedt, 2017). If the

objective of the research is theory testing and confirmation, CB-SEM is the most appropriate method, in contrast, PLS-SEM is suitable for prediction and theory development (Hair Jr. et al., 2017). CB-SEM often works well if the theory is well-established (Hair Jr. et al., 2017). Additionally, PLS-SEM is a causal modelling approach used when data is not normally distributed, whereas normality is required for CB-SEM. PLS-SEM derives its statistical power, particularly on relatively smaller sample sizes than CB-SEM, which works better for larger sample sizes, i.e., N = > 100 (Hair Jr. et al., 2017).

2.11.3. Gaps in theoretical underpinnings

Most studies focused on either one or two theories to explore the effect of regulation on sustainability practices and factors driving sustainability practices; for example, Ali et al. (2020), Banerjee (2020), Gaudencio et al. (2020), Orazalin and Mahmood (2019), Kumar et al. (2021), Lu and Wang (2021), Mishra et al. (2021), Raimo et al. (2021) and Nemes et al. (2022) used the legitimacy theory. Orazalin and Mahmood (2019), Shahzad et al. (2020) and Nishitani et al. (2021) used signalling theory, while Frynas and Yamahaki (2016), Ali et al. (2017) and Zhang et al. (2022) applied institutional theory. This study closes the gap by providing a panoramic view of greenwashing, focusing on the South African government's mining legislation. The current study adopts a positivist stance, thereby applying multiple theoretical standpoints to quantitatively understand factors influencing sustainability practices, although in a highly regulated mining setting of South Africa.

The extensive review further assisted the researcher in conceptualising how legitimacy, impression management, stakeholder, stakeholder accountability, institutional, agency and signalling theories are used to explain the greenwashing phenomenon. In this regard, a multi-dimensional theory approach is applied to provide a panoramic view of greenwashing in the South African mining context based on the mining regulators' perceptions, to the researcher's knowledge, this has never been done before. These theories are employed in this study to close the gap in the literature.

The researcher developed a theoretical framework applied in the study to understand greenwashing. A framework is defined as "a network, or a plane of interlinked concepts that together provide a comprehensive understanding of a phenomenon or

phenomena" (Jabareen, 2009:51). According to Miles and Huberman (1994:18), a framework is "a visual or written product that explains, either graphically or in narrative form, the main things to be studied, key factors, concepts, or variables and the presumed relationships among them". Figure 2-2 provides a theoretical framework to understand greenwashing using a multi-dimensional theory perspective.

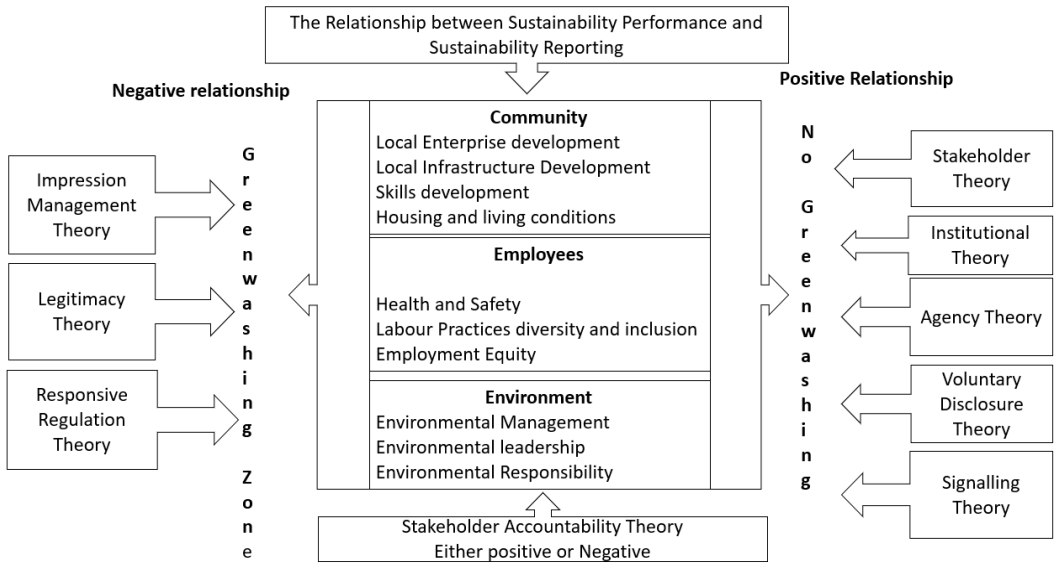

Figure 2-2: Theoretical framework to understand greenwashing using multi-dimensional theory perspective

Source: *Developed for the study*

Figure 2-2 depicts plausible theories that inform the research questions. Therefore, this study's results will be tested using different theoretical lenses. Figure 2-2 shows that the theories on the right-hand side predict a positive relationship between sustainability performance and sustainability reporting: stakeholder, agency, voluntary reporting, institutional and signalling theories. The first two theories on the left-hand side (impression management theory and legitimacy theory) predict a negative relationship between sustainability performance and sustainability reporting, whereas responsive regulation theory is operationalised as a mechanism whereby sustainability might be achieved through the regulator-regulatee relationship. However, stakeholder accountability theory produced mixed results, both positive when regulated and negative in cases where symbolic stakeholder management gimmicks are at play.

Lastly, the concept of sustainable development and its 'evil twin' greenwashing have been empirically studied and exploratory factor analysis (EFA) has been used to

determine sustainability factors from the mining regulators' perspective. The literature review revealed a dearth of empirical work on the concept of greenwashing, particularly within the highly regulated mining sector of South Africa. To the best of the researcher's knowledge, no empirical studies have been carried out to quantitatively investigate greenwashing from the regulators' perspective, which is the study's focus.

2.11.4. Application of structural equation model

The literature review in Table 2-2 shows that, according to the researcher, no prior studies relating to sustainability in the mining context applied SEM to elucidate relationships between sustainability variables. Although scholars used SEM to study greenwashing before, such studies are predominantly in the field of marketing (Chen, Huang, Wang & Chen, 2020; Fitrianingrum & Celsya, 2020; Setiawan & Yosephan, 2022) and behavioural studies (Tahir, Athar & Afzal, 2020). Moreover, according to the researcher, no study has ever applied SEM to study greenwashing using primary data gathered from South African mining regulators. To close this gap, the researcher uses SEM to evaluate the existence of greenwashing in a regulated setting of South Africa from the regulators' perspective.

SEM is a multivariate technique that can test multiple relationships simultaneously, considering the measurement error in the latent constructs (Tahir et al., 2020). Al-Qudah, Al-Okaily and Alqudah (2022) and He et al. (2022) indicate that the SEM technique is a more flexible method than the linear models for measuring observational errors because it enables the study of the relationships among latent variables through observable variables. Researchers use SEM for "its abilities to model latent variables, correct for measurement errors, specify error covariance structures, and estimate entire theories simultaneously" (Henseler, 2012:411). According to Zhang, Shao, Zhang, Li, Yin and Xu (2016), SEM is more suitable for variables measured with a single instrument.

SEM is, however, not immune to Common Method Bias (CMB), otherwise known as Common Method Variance (CMV), which is often associated with cross-sectional survey design used for data collection (Podsakoff, MacKenzie, Lee & Podsakoff, 2003). Podsakoff et al. (2003) provide remedies to reduce bias. Firstly, researchers need to guarantee response anonymity to lower the potential bias by notifying

respondents that collected data will be treated as confidential and anonymous. In this study, data was only accessible to the researchers.

However, guaranteeing anonymity does not eliminate method biases associated with a common rater and measurement context (Podsakoff et al., 2003). Therefore, the researcher needs to rely more on statistical remedies to statistically control for the effect of same-source biases by adding a single-common-method-factor or the multiple-specific-method-factors approach to the structural equation model used to test the hypothesised relationships (Podsakoff et al., 2003). Such statistical remedies have been recently applied in SEM analysis (Ernst, Gerken, Hack & Hülsbeck, 2022).

According to Nayal, Raut, Yadav, Priyadarshinee and Narkhed (2022), SEM analysis is preceded by EFA and confirmatory factor analysis (CFA). CFA is applied in this study to validate the construct structure and assess the relationship between the observed and underlying latent constructs (Nayal et al., 2022). Moreover, CFA checks the consistency of measurement by assessing the scale items (Nayal et al., 2022).

2.12. SUMMARY

In summarising this chapter, it is imperative to note that the concept of greenwashing as a field of study is still evolving and that there is room for further studies. On the back of the in-depth literature review, a formulation of the study's methodology is presented in Chapter 3, which discusses the research design, philosophical stance and methodology employed to answer research questions and to achieve the research objectives in line with the literature review findings.

CHAPTER 3: RESEARCH METHODOLOGY AND DESIGN

3.1. INTRODUCTION

The previous chapter focused on theoretical analysis and critical review of literature findings, a broader view of sustainability was explored, grounded on academic literature and recent developments. This chapter deals with the research design and methodology through which data was collected, analysed, and presented. The chapter explains how the researcher achieved the study's objectives and how data was collected to answer the posed research questions.

The layout of this chapter is as follows: Section 3.2 itemises the methodology, including the criteria used for selecting applicable literature, research design, philosophical stance, the unit of analysis, and data collection. Section 3.3 deals with hypothesis development, followed by section 3.4, which focuses on hypothesis testing. Section 3.5 deals with data and sampling. Ethical considerations are outlined in section 3.6. The chapter summary follows in Section 3.7.

3.2. METHODOLOGY

Quantitative methods were used to conduct the study and to answer the research questions. Robust statistical methods were applied from data collection, analysis and interpretation to arrive at a more empirical conclusion.

3.2.1. Criteria used for selection of applicable literature

Criteria for the literature search strategy were based on the greenwashing research problem. Therefore, the search strategy made use of keywords such as greenwashing, sustainability disclosures; sustainability reporting; integrated reporting; non-financial reporting; Environmental, Social and Governance (ESG) reporting; Corporate social reporting (CSR); corporate citizenship reporting; society reports; social responsibility reports and sustainable development reports. However, for this study, the inclusion and exclusion criteria were applied to select reviewed material and to scan titles, keywords, and abstracts. Full texts were carefully evaluated based on the relevance to the greenwashing discussion and concerning pre-determined research questions, theoretical applications, methods and identified gaps. Articles that provided irrelevant

insights into sustainability performance and sustainability reporting were excluded. A systematic review identified articles related to constructs of both sustainability performance and sustainability reporting and excluded articles that were not aligned with the purpose of the literature review. The review identified three (3) main sustainability areas: community development, employee welfare and the environment. Therefore, the research objectives, questions and strategy were informed by a critical analysis of existing knowledge.

3.2.2. Research design

The study employed an exploratory quantitative method to answer the research questions and to achieve the objectives. In this respect, a questionnaire was used to collect primary data from the DMR employees directly involved in regulating South African mining companies. The perceptions of the regulators on sustainability performance and sustainability reporting were quantitatively examined to understand whether South African mining companies' greenwashing tendencies were prevalent.

3.2.3. Philosophical stance

The ontological stance of this research is that there is one objective truth independent of the researcher. The epistemological theoretical framework was constructed from a positivist premise of objectivism. The positivist philosophy guided the study to address the research questions, analysis, and interpretation of the quantitative data. According to Kumar et al*.* (2021), positivists develop and test hypotheses based on prior theories in the field and empirical research by applying various statistical methods.

Due to the ontological basis of the current research, a logical thinking process was followed to interactively link sustainability performance and sustainability reporting based on initial research and the tenets of multiple theories. The theories considered were used to frame an objective viewpoint on the greenwashing phenomenon. In this regard, a deductive approach associated with positivism was employed, leading to quantitative methods. Moreover, epistemologically, the researcher was detached from the unit of analysis to maintain independence and objectivity throughout the study.

3.2.4. Unit of analysis

The unit of analysis was the DMR employees who are directly involved in regulating South African mining companies. DMR employees as regulators of mining activities were selected as respondents. Furthermore, companies and governments need to work together to tackle sustainability issues (Steurer, 2006). According to Steurer (2006), governments develop sustainable development policies, however, companies have management systems to implement policies.

3.2.5. Data collection

In the following sub-sections, the researcher outlines the data collection process.

3.2.5.1. Population and Sampling

The population comprised 512 employees eligible to participate in this study due to the regulatory nature of their work. These employees represent three (3) divisions of the DMR involved in regulatory issues affecting sustainability in South African mining companies, namely, mine health and safety; mineral regulation; and mineral policy and promotion. The researcher employed a probability sampling method using a cross-sectional sample of 150 employees in the three divisions dealing with mining regulatory issues. Any other DMR employee not doing regulatory work was excluded from the sample. The sample is representative of the population, and the results can be generalised to the greater population.

3.2.5.2. Methods of data collection

An e-questionnaire was developed to collect data from the participants. The questionnaire addressed the research objectives and relevance of data to the research questions to be answered. A five (5) point Likert scale was used for respondents to classify responses.

3.2.5.3. Respondents

The intended respondents were employees of the DMR that are responsible for regulation, enforcement, and compliance thereof. Macellari et al. (2021) emphasise the importance of collecting sustainability information from sources not controlled by

reporting companies to evaluate greenwashing tendencies. This study relies on primary data collected from mining regulators instead of using self- laudatory reports from reporting companies.

3.3. HYPOTHESES DEVELOPMENT

The second research objective sought to investigate the perceived gap between sustainability performance and sustainability reporting from the regulators' perspective.

The study is premised on the positivism philosophy. In this regard, the relationship between sustainability performance and sustainability reporting is hypothesised from a multi-theoretical perspective. Studies that have empirically investigated the relationship between sustainability performance and sustainability reporting practices have provided mixed results depending on the theories used, leaving the subject open to debate. Understanding the theoretical basis of the direction and significance of the relationship between sustainability performance and sustainability reporting is fundamental to navigating the greenwashing phenomenon.

The positive relationship between sustainability performance and sustainability reporting is hypothesised in line with stakeholder theory (Herbohn et al., 2014; Zhu et al., 2016), signalling theory (Acar & Temiz, 2020; Braam et al., 2016; Gupta & Gupta, 2020; Ruiz-Blanco, 2022; Zhang et al., 2022); agency theory (Corvino et al., 2020; Kumar et al., 2021; Lu & Wang, 2021); Institutional theory (Dong & Xu, 2016; Zhang et al., 2022); and voluntary theory (Nishitani et al., 2021). By implication, the positive relationship between sustainability performance and sustainability reporting dispels the existence of greenwashing. In contrast, the literature found a negative relationship between sustainability performance and sustainability reporting. The negative relationship is hypothesised in line with legitimacy theory (Dawkins & Ngunjiri, 2008; Hummel & Schlick, 2016; Lu & Wang, 2021; Zhang et al., 2022); and impression management theory (du Toit & Esterhuyse, 2021; Haji & Anifowose, 2016).

From the above, a positive relationship between sustainability performance and sustainability reporting indicates no greenwashing, whereas a negative relationship between sustainability performance and sustainability reporting denotes greenwashing. Accordingly, this study formulates the following hypotheses, as shown in Table 3-1.

Table 3-1: Hypothesised relationships between sustainability performance, sustainability reporting and a set of independent variables

Hypotheses	Independent Variables	Hypothesised relationship with sustainability performance	Hypothesised relationship with sustainability reporting
H_1	Level of Local Enterprise Development	Negative	Negative
H_2	Level of Local Infrastructure Development	Negative	Negative
H_3	Level of Skills Development	Negative	Negative
H_4	Level of Housing and Living Conditions	Negative	Negative
H_5	Level of Occupational Health and Safety	Negative	Negative
H_6	Level of Diversity and Inclusion (Labour practices)	Negative	Negative
H_7	Level of Employment Equity	Negative	Negative
H_8	Level of Environmental Management	Negative	Negative
H_9	Level of Environmental Leadership	Negative	Negative
H_{10}	Level of Environmental Responsibility	Negative	Negative

Table 3-1 shows the hypothesised relationships between sustainability performance and sustainability reporting and a set of independent variables. Understanding this relationship's theoretical basis is fundamental to navigating the greenwashing phenomenon. Therefore, Table 3-1 must be interpreted with a caveat that the correlation between sustainability performance variables and sustainability reporting variables does not automatically presuppose that one variable affects the other. The study is not interested in causal relations; therefore, phrases such as “affect”, “influence”, and “result in” should be understood in this context of correlation analysis between different independent variables. Testing these variables will provide further information on the hypothesised relationships.

- H_1 asserts that the higher the level of local enterprises development within a community, the more the likelihood of positive sustainability reporting by mining companies supporting local enterprise development initiatives. Similarly, if lower levels of local enterprise development prevail, there is a higher likelihood of greenwashing by mining companies to look good in the community.

- In terms of H_2, the researcher argues that the level of local infrastructure development, which is considered as a main sustainability driver, has an influence on both sustainability performance and sustainability reporting. According to the researcher, the level of sustainability performance affects the way in which mining companies report local infrastructure development. Thus, if mining companies invest in communities through higher levels of infrastructure development, there would be positive reporting. Conversely, lower levels of mining companies' involvement in local infrastructure development will result in a higher likelihood of greenwashing.
- H_3 posits that where communities are highly skilled due to interventions by mining companies as legally mandated, the likelihood of positive reporting by mining companies would be much higher. In contrast, if mining companies are not involved in improving the skills profile of communities, chances are that mining companies would embark on greenwashing to secure their licence to operate in the community.
- H_4 states that where mining companies are not meeting their sustainability performance targets for Housing and Living Conditions, there will be higher levels of greenwashing, whereas the propensity to greenwash will be lower in regions where mining companies are doing well in terms of housing and living conditions levels.
- As far as H_5 is concerned, it is hypothesised that depending on the prevailing level of occupational health and safety incidents, sustainability reporting of mining companies would be either negative or positive concerning actual performance. Sustainability reporting will be positive if occupational health and safety incidents are lower than anticipated. The converse is also true.
- H_6 states that both sustainability performance and sustainability reporting are affected by the level of Diversity and Inclusion (labour practices). Mining companies are susceptible to greenwashing when the level of diversity and inclusion is lower than expected or is not on par with the mining licence to operate. Greenwashing is likely to occur if there is a sub-standard performance by mining companies when it comes to meeting labour diversity targets. The opposite also holds.

- Concerning H_7, it is hypothesised that the level of Employment Equity at mining companies is likely to have a positive relationship with sustainability reporting. As such, it can be postulated that if employment equity targets are met, mining companies are likely to report positive sustainability outcomes.
- Regarding H_8, it is hypothesised that good environmental management practices are likely to have a positive relationship with sustainability performance as well as sustainability reporting. It is highly likely that a positive relationship will be established if environmental management targets are achieved by mining companies, whereas a negative relationship will exist if environmental management is not effectively carried out, resulting in a higher propensity to greenwashing.
- Concerning H_9 it is hypothesised that environmental leadership displayed by the mining companies is likely to have a positive relationship with sustainability performance as well as sustainability reporting.
- In H_{10} it is argued that the higher the level of environmental responsibility, the more the likelihood of positive sustainability reporting by mining companies. If there is good sustainability reporting emanating from a high level of environmental responsibility, it usually leads to high sustainability performance. Under such circumstances, the likelihood of greenwashing is expected to be low.

3.4. HYPOTHESIS TESTING

The main scope of the study has been delineated, and the objectives have been outlined. The researcher used statistical methods to test the above hypotheses. The Pairwise T-test and CB-SEM were used to test the hypothesised relationship between sustainability performance and sustainability reporting variables. CB-SEM was chosen ahead of the PLS-SEM due to the big sample size of 150 respondents and the normally distributed data in this study. As a result, the estimates are more robust from the CB-SEM as PLS-SEM works better in smaller samples. The T-test and associated p-values were the statistical inferences employed.

As a result of the factor analysis, comparative pairwise differences and CB-SEM are used to analyse the hypothesised relationships between sustainability performance and sustainability reporting. CB-SEM was also used to validate the framework to create linkages between sustainability performance and sustainability reporting using

regulation as a compliance mechanism. Figure 3-1 visually presents the planned model with its 10 hypotheses.

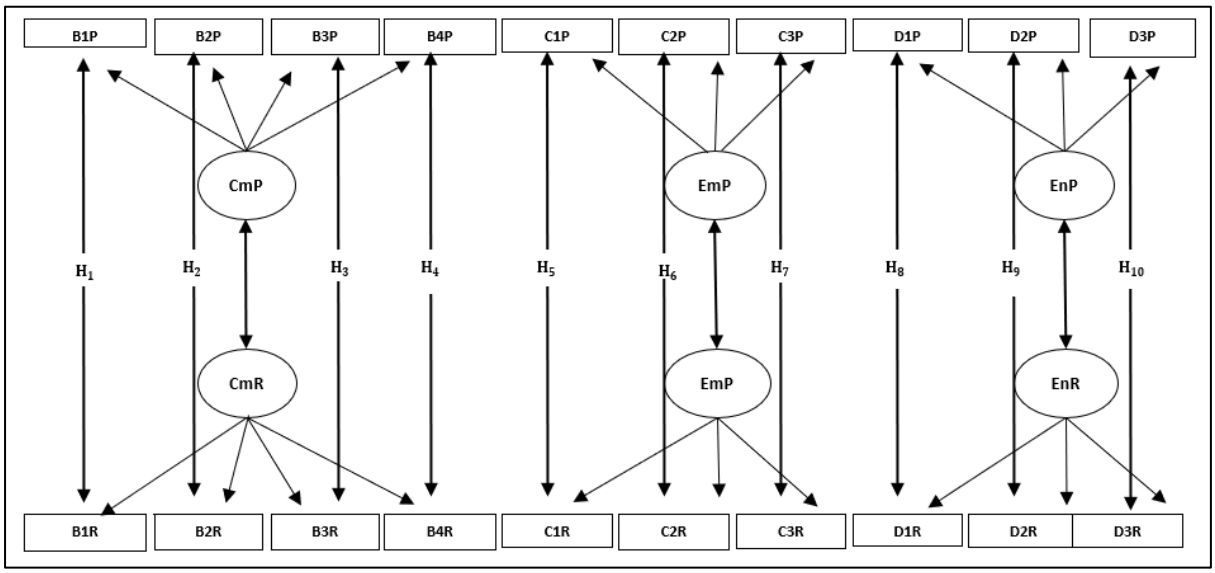

Figure 3-1: The visual presentation of the planned CB-SEM

Notes*: CmP = Community Development-Sustainability Performance, CmR = Community Development-Sustainability Reporting; EmP = Employee Welfare-Sustainability Performance; EmR = Employee Welfare-Sustainability Reporting; EnP =Environmental Protection-Sustainability Performance; EnR = Environmental Protection- Sustainability Reporting; B1P = Local enterprise development-Sustainability Performance; B2P = Local Infrastructure development- Sustainability Performance; B3P = Skills development- Sustainability Performance; B4P = Housing and living conditions- Sustainability Performance; C1P = Occupational Health and Safety-Sustainability Performance; C2P = Labour practices, diversity and inclusion- Sustainability Performance; C3P = Employment Equity-Sustainability Performance; D1P = Environmental management- Sustainability Performance;D2P = Environmental Leadership-Sustainability Performance; D3P = Environmental responsibility-Sustainability Performance; B1R = Local enterprise development- Sustainability Reporting; B2R = Local infrastructure development- Sustainability Reporting; B3R = Skills development- Sustainability Reporting; B4R = Housing and living conditions- Sustainability Reporting; C1R = Occupational Health and Safety- Sustainability Reporting; C2R = Labour practices, diversity and inclusion- Sustainability Reporting; C3R = Employment equity-Sustainability Reporting; D1R = SR-environmental management- Sustainability Reporting; D2R = Environmental leadership- Sustainability Reporting; D3R = SR-environmental responsibility- Sustainability Reporting*

Source: *Developed for the study*

Figure 3-1 shows the visual presentation of the planned CB-SEM. The proposed model will measure the relationship between sustainability performance and sustainability reporting using regulation as a compliance mechanism. The framework's core is understood within the following parameters as proposed by (Matakanye & van der Poll, 2021).

- If SR ≥ SP and the associated p-value is ≤ 0.05, there is strong evidence of inconsistencies between sustainability performance and sustainability reporting signalling to greenwash (the negative difference between sustainability performance and sustainability reporting mean scores).

- If SP ≥ SR and the associated p-value is ≤ 0.05, there is weak evidence of inconsistencies between sustainability performance and sustainability reporting, signalling that there is no greenwashing (the positive difference between Sustainability performance and sustainability reporting mean scores).
- If SR ≤ SP and the associated p-value is ≥ 0.05, then there is no greenwashing (the positive difference between sustainability performance and sustainability reporting mean scores).
- If SP ≤ SR and the associated p-value is ≥ 0.05, then there is no greenwashing (the difference between sustainability performance and sustainability reporting mean scores).

By conversion, the interpretation of the framework is based on selected parameters. A *p*-value less than 0.05 signals greenwashing, while a *p*-value greater than 0.05 signals the absence of greenwashing.

3.5. DATA AND SAMPLING

The researcher employed the probability sampling method on a cross-sectional sample of DMR employees involved in regulatory issues. The study quantitatively analysed sustainability performance and sustainability reporting data to solicit the regulators' perceptions of South African mining companies' sustainability practices. Primary data was sourced from employees of the DMR responsible for enforcing regulations as the unit of analysis. In this context, regulatory powers vested in the sampled DMR employees (of which the majority were field-based) offer a balanced perspective on South African mining companies' sustainability performance and sustainability reporting practices. For this reason, only DMR employees most knowledgeable about the sustainability practices of South African mining companies qualified to participate.

The study employed an exploratory quantitative method to meet the research objectives. This deductive research required quantitative methods to conceptualise the research problem and to test the relationships between sustainability performance and sustainability reporting based on theory. Because of the deductive reasoning approach, this exploratory quantitative research relied on the descriptive aspects of the theory. A systematic process of data collection, analysis, and interpretation followed this. It was therefore expected that if sustainability were being reported

correctly within the mining sector, the actual sustainability performance indicators would favourably compare with the reported outcomes.

3.5.1. Instrument development

The study is anchored on economic theories emphasising regulators' perceptions about South African mining companies' sustainability practices. The investigation focused on the link between sustainability performance and sustainability reporting of South African mining companies. The researcher developed an e-questionnaire to collect quantitative data from the respondents. An e-questionnaire as a research instrument is justified and designed to achieve the research objectives and answer the research questions. It was, therefore, befitting to collect data from regulators, the DMR employees in South Africa, to account for informed perspectives on regulated sustainability areas within the mining industry.

The research design was shaped by the research questions it sought to answer. Because of the complexity of the subject, this research used a questionnaire (Appendix C) to solicit the quantitative data necessary to answer the research questions. Participants rated South African mining companies on sustainability performance and sustainability reporting focusing on the three (3) sustainability dimensions: Community development, Employee welfare and environmental protection. The research objectives played a major role in the actual design of the instrument constructed from a multi-theory approach.

McNeil (1985) defined a questionnaire as a list of statements used to measure respondents' attitudes, opinions, experiences and behaviour. The statements as the main source of the quantitative data were developed for practical relevance to the respondents (regulators) so that an original contribution to the body of knowledge could be provided. Therefore, these statements were carefully crafted based on prior literature to solicit the regulators' perceptions about sustainability practices by South African mining companies.

The research operationalised the stakeholder, legitimacy, voluntary disclosure, signalling, legitimacy, institutional, impression management theories and sustainability concepts to construct greenwashing measurements developed from the perspective of mining regulators. A deductive approach was used to generate multi-item measurement scales for sustainability indicators under investigation. In this regard,

the e-questionnaire presented several statements to respondents. Every item was ranked on a five-point Likert scale ranging from “Strongly Disagree” to “Strongly Agree.”

The questionnaire was divided into four (4) sections. Section A of the questionnaire had close-ended questions aimed at collecting demographic data of DMR employees, including:

- Designation of the respondent.
- Years of experience within the mining industry.
- Location of the office where the respondent is based (whether at a regional or head office).
- The sub-programme they belong to, for example, mineral regulation; mineral policy and promotion; mine health and safety; or mine environmental management.
- The regulatory tools available to respondents to enforce regulatory compliance.

Section B dealt with the community development area, which had 34 statements (sustainability indicators), of which 16 measured infrastructure investments and local community development; four (4) measured local employment and job creation; six (6) measured skills development and training for future job opportunities; two (2) measured local enterprise development initiatives; and six (6) measured local procurement and supplier development initiatives.

Section C focused on the employee welfare area, which consisted of 78 statements (sustainability indicators), of which two (2) sustainability indicators measured fair labour practices; two (2) measured the right to freedom of association; two (2) measured the right to collective bargaining; two (2) measured equal job opportunities; six (6) measured equal benefits; four (4) measured employee development; 32 measured diversity; transformation and non-transformation and employment equity; while 28 statements measured employee health and safety.

Section D of the questionnaire investigated the environmental protection area featuring 42 statements (sustainability indicators), of which six (6) measured environmental management, two (2) measured emission reduction, two (2) measured conservation of natural resources; eight (8) measured pollution reduction and prevention; two (2) measured waste generation; four (4) measured climate change;

six (6) measured diffusion of environmental-friendly technologies; and 12 measured responsible use of natural resources.

Lastly, the researcher also used a research consistency matrix to determine sustainability items necessary for developing a measurement instrument used in the research methods. Moreover, literature was consulted to ensure adequate information about the topic under investigation was thoroughly covered, as depicted in the research consistency matrix. Table 3-2 shows the Research Consistency Matrix for the study.

Table 3-2: The research consistency matrix assisted in assuring logical coherence in the research project

Theory	Research Objectives	Research Questions	Research Variables	Variable Type	Data Analysis Techniques
Voluntary disclosure theory Stakeholder Theory Stakeholder Accountability Theory Signalling Theory Legitimacy Theory Institutional Theory Impression management theory Agency theory	To explore the factors affecting sustainability in a regulated mining sector from the regulators' perspective.	From the regulators' perspective, what factors affect sustainability within a regulated mining sector?	**Sustainability Performance: Community Development** B1, B3, B5, B7, B9, B11, B13, B15, B17, B19, B21, B23, B25, B27, B29, B31, B33 **Sustainability Reporting: Community Development** B2, B4, B6, B8, B10, B12, B14, B16, B18, B20, B22, B24, B26, B28, B30, B32, B34, **Sustainability Performance: Employee Welfare** C1, C3, C5, C7, C9, C11, C13, C15, C17, C19, C21, C23, C25, C27, C29, C31, C33, C35, C37, C39, C41, C43, C45, C47, C49, C51, C53, C55, C57, C59, C61, C63, C65, C67, C69, C71, C73, C75, C77 **Sustainability Reporting: Employee Welfare** C2, C4, C6, C8, C10, C12, C14, C16, C18, C20, C22, C24, C26, C28, C30, C32, C34, C36, C38, C40, C42, C44, C46, C48, C50, C52, C54, C56, C58, C60, C62, C64, C66, C68, C70, C72, C74, C76, C78 **Sustainability Performance: Environmental Protection** D1, D3, D5 D7, D9, D11, D13, D15, D17, D19, D21, D23, D25, D27, D29, D31, D33, D35, D37, D39, D41 **Sustainability Reporting: Environmental protection** D2, D4, D6, D8, D10, D12, D14, D16, D18, D20, D22, D24, D26, D28, D30, D32, D34, D36, D38, D40, D42	Continuous	Exploratory Factor Analysis
Voluntary disclosure theory Stakeholder Theory Stakeholder Accountability Theory Signalling Theory Legitimacy Theory Institutional Theory Impression management theory Agency theory	To investigate the perceived gap between sustainability performance and sustainability reporting from the regulators' perspective.	From the regulators' perspective, is there a relationship between sustainability performance and sustainability reporting?	**Sustainability Performance: Community Development** B1, B3, B5, B7, B9, B11, B13, B15, B17, B19, B21, B23, B25, B27, B29, B31, B33 **Sustainability Reporting: Community Development** B2, B4, B6, B8, B10, B12, B14, B16, B18, B20, B22, B24, B26, B28, B30, B32, B34, B36, B38, B40, B42 **Sustainability Performance: Employee Welfare** C1, C3, C5, C7, C9, C11, C13, C15, C17, C19, C21, C23, C25, C27, C29, C31, C33, C35, C37, C39, C41, C43, C45, C47, C49, C51, C53, C55, C57, C59, C61, C63, C65, C67, C69, C71, C73, C75, C77 **Sustainability Reporting: Employee Welfare** C2, C4, C6, C8, C10, C12, C14, C16, C18, C20, C22, C24, C26, C28, C30, C32, C34, C36, C38, C40, C42, C44, C46, C48, C50, C52, C54, C56, C58, C60, C62, C64, C66, C68, C70, C72, C74, C76, C78 **Sustainability Performance: Environmental Protection** D1, D3, D5 D7, D9, D11, D13, D15, D17, D19, D21, D23, D25, D27, D29, D31, D33, D35, D37, D39, D41 **Sustainability Reporting: Environmental protection** D2, D4, D6, D8, D10, D12, D14, D16, D18, D20, D22, D24, D26, D28, D30, D32, D34, D36, D38, D40, D42	Continuous	Comparative Pairwise differences, Structural Equation Model and Cohen's D
			Sustainability Performance: Community Development	Continuous	Cohen's D

Theory	Research Objectives	Research Questions	Research Variables	Variable Type	Data Analysis Techniques
			B1, B3, B5, B7, B9, B11, B13, B15, B17, B19, B21, B23, B25, B27, B29, B31, B33 **Sustainability Reporting: Community Development** B2, B4, B6, B8, B10, B12, B14, B16, B18, B20, B22, B24, B26, B28, B30, B32, B34, B36, B38, B40, B42 **Sustainability Performance: Employee Welfare** C1, C3, C5, C7, C9, C11, C13, C15, C17, C19, C21, C23, C25, C27, C29, C31, C33, C35, C37, C39, C41, C43, C45, C47, C49, C51, C53, C55, C57, C59, C61, C63, C65, C67, C69, C71, C73, C75, C77 **Sustainability Reporting: Employee Welfare** C2, C4, C6, C8, C10, C12, C14, C16, C18, C20, C22, C24, C26, C28, C30, C32, C34, C36, C38, C40, C42, C44, C46, C48, C50, C52, C54, C56, C58, C60, C62, C64, C66, C68, C70, C72, C74, C76, C78 **Sustainability Performance: Environmental Protection** D1, D3, D5 D7, D9, D11, D13, D15, D17, D19, D21, D23, D25, D27, D29, D31, D33, D35, D37, D39, D41 **Sustainability Reporting: Environmental protection** D2, D4, D6, D8, D10, D12, D14, D16, D18, D20, D22, D24, D26, D28, D30, D32, D34, D36, D38, D40, D42		

Table 3-2 shows the research consistency matrix to demonstrate how the theories were operationalised. The table encapsulates the research flow to ensure that this research's main aim was fulfilled. The first column of the research matrix table shows the theories applicable to this study that have been used to generate research hypotheses. The second column depicts research objectives linked to the hypotheses, followed by the associated research questions column adjacent to a column showing research variables. The next column shows the variables to be measured in the study. The last column shows data analysis techniques that were employed. Therefore, The matrix was systematically constructed to empirically determine the extent to which items on the data collection instrument measured sustainability performance and sustainability reporting constructs. Table 3-3 shows the South African mining laws and regulations about measured variables and international standards applicable to South African mining companies. Table 3-3 expands the research matrix by adding articles that informed the research instrument questions, the South African mining laws and regulations about measured variables, and international standards applicable to South African mining companies.

Table 3-3: Research Consistency Matrix (Expanded)

Articles	South African Mining Laws and Regulations informing research instrument questions or items	The GRI standard informing research instrument questions or items	UNGC Principle informing research instrument questions or items	Research instrument questions or items	Variable Type	Analysis
(Dimmler, 2017; Heyns & Mostert, 2018; Pelders & Nelson, 2019; Segerstedt & Abrahamsson, 2019; Stewart, 2020; Cloete & Marais, 2021; Cole & Broadhurst, 2021; Marais & de Lange, 2021; Atkins & Maroun, 2015; de Villiers & Alexander, 2014; Humby, 2016; Crous et al., 2021; Cheruiyot-Koech & Reddy, 2022)	MPRDA, MPRDA regulations Mining Charter, and SLP	203-1		B1. Mining companies undertake effective housing infrastructure projects to improve living conditions of employees.	Ordinal	Descriptive
		203-1		B2. Mining companies report on the effectiveness of housing infrastructure projects undertaken to improve living conditions of employees.	Ordinal	Descriptive
		203-1		B3. Mining companies undertake effective housing infrastructure projects to improve living conditions in host communities.	Ordinal	Descriptive
		203-1		B4. Mining companies report on the effectiveness of Housing infrastructure projects undertaken to improve living conditions in host communities.	Ordinal	Descriptive
		203-1		B5. Mining companies undertake effective housing infrastructure projects to improve living conditions in labour-sending areas.	Ordinal	Descriptive
		203-1		B6. Mining companies report on the effectiveness of Housing infrastructure projects undertaken to improve living conditions in labour-sending areas.	Ordinal	Descriptive
(Heyns & Mostert, 2018; Segerstedt & Abrahamsson, 2019; Bester & Groenewald, 2021; Cloete & Marais, 2021; Dissanayake, Tilt & Xydias-Lobo, 2016; Romolini et al., 2014; O'Faircheallaigh, 2015; Crous et al., (2021); Cheruiyot-Koech & Reddy, 2022	MPRDA, MPRDA regulations, Mining Charter & SLP	203-1		B7. Mining companies effectively contribute in educational infrastructure projects as part of community development.	Ordinal	Descriptive
		203-1		B8. Mining companies report on the effectiveness of contribution towards educational infrastructure projects as part of community development.	Ordinal	Descriptive
		203-1		B9. Mining companies effectively participate in road infrastructure projects in host communities.	Ordinal	Descriptive
		203-1		B10. Mining companies report on the effectiveness of participation in road infrastructure projects in host communities.	Ordinal	Descriptive
		203-1		B11. Mining companies effectively participate in Water and sanitation infrastructure as part of community development.	Ordinal	Descriptive
		203-1		B12. Mining companies report on the effectiveness of participation in Water and Sanitation infrastructure as part of community development.	Ordinal	Descriptive
		203-1		B13. Mining companies effectively participate in health infrastructure projects in host communities.	Ordinal	Descriptive

Articles	South African Mining Laws and Regulations informing research instrument questions or items	The GRI standard informing research instrument questions or items	UNGC Principle informing research instrument questions or items	Research instrument questions or items	Variable Type	Analysis
		203-1		B14. Mining companies report on the effectiveness of participation in health infrastructure projects in host communities.	Ordinal	Descriptive
		203-1		B15. Mining companies effectively participate in Sports and Recreation infrastructure projects as part of community development.	Ordinal	Descriptive
		203-1		B16. Mining companies report the effectiveness of involvement in Sports and Recreation infrastructure projects as part of community development.	Ordinal	Descriptive
Heyns & Mostert (2018); Segerstedt & Abrahamsson (2019); Stewart (2020); Cole & Broadhurst (2021); Bester & Groenewald (2021); Molate et al. (2014); Crous et al. (2021)	MPRDA, MPRDA regulations, Mining Charter & SLP	202-2		B17. Mining companies employ people from host communities.	Ordinal	Descriptive
		202-2		B18. Mining companies report employment from host communities.	Ordinal	Descriptive
		404-2, 404-3 & 413-1		B19. Mining companies invest in capacity development programmes for host communities in view of future job opportunities.	Ordinal	Descriptive
				B20. Mining companies report investment in capacity development programmes for host communities in view of future job opportunities.	Ordinal	Descriptive
				B21. Mining companies have learnership programmes for people in host communities.	Ordinal	Descriptive
				B22. Mining companies report learnership programmes for people in host communities.	Ordinal	Descriptive
				B23. Mining companies have internship programmes for people in host communities.	Ordinal	Descriptive
				B24. Mining companies report internship programmes for people in host communities.	Ordinal	Descriptive
				B25. Mining companies transfer skills to host communities.	Ordinal	Descriptive
				B26. Mining companies report skills transferred to host communities.	Ordinal	Descriptive
Heyns & Mostert (2018); Bester & Groenewald (2021); Cole & Broadhurst (2021) ;van Heerden	MPRDA, MPRDA regulations Mining Charter, SLP	413-1		B27. Mining companies effectively create opportunities for enterprise development initiatives for host communities.	Ordinal	Descriptive
		204-1		B28. Mining companies report the effectiveness of involvement in enterprise development opportunities for host communities.	Ordinal	Descriptive
		204-1		B29. Mining companies undertake supplier development initiatives for host communities.	Ordinal	Descriptive

Articles	South African Mining Laws and Regulations informing research instrument questions or items	The GRI standard informing research instrument questions or items	UNGC Principle informing research instrument questions or items	Research instrument questions or items	Variable Type	Analysis
(2016); Crous et al. (2021)		204-1		B30. Mining companies report the effectiveness of supplier development initiatives for host communities.	Ordinal	Descriptive
		204-1		B31. Mining companies procure goods from host communities.	Ordinal	Descriptive
		204-1		B32. Mining companies report procurement of goods from host communities.	Ordinal	Descriptive
		204-1		B33. Mining companies procure services from host communities.	Ordinal	Descriptive
		204-1		B34. Mining companies report procurement of services from host communities.	Ordinal	Descriptive
Segerstedt & Abrahamsson (2019); Kaggwa (2020); Ranängen & Zobel (2014); Crous et al. (2021); Moloi (2015)	MPRDA, MPRDA regulations Mining Charter, SLP	N/A	UNGC 3 (UNGC, 2009)	C1. Mining companies uphold fair labour relations practices.	Ordinal	Descriptive
		N/A		C2. Mining companies report that they uphold fair labour relations practices.	Ordinal	Descriptive
		407-1		C3. Mining companies uphold freedom of association for employees.	Ordinal	Descriptive
		407-1		C4. Mining companies report that freedom of association of employees is upheld.	Ordinal	Descriptive
		401-4		C5. Employees in the mining companies have the right to collective bargaining.	Ordinal	Descriptive
		401-4		C6. Mining companies report that employees have the right to collective bargaining.	Ordinal	Descriptive
		406-1		C7. Employees in mining companies have equal job opportunities.	Ordinal	Descriptive
		406-1		C8. Mining companies report that employees have equal job opportunities.	Ordinal	Descriptive
		405-2		C9. Employees in mining companies have fair and equal benefits.	Ordinal	Descriptive
		405-2		C10. Mining companies report that employees have the right to fair and equal benefits for employees.	Ordinal	Descriptive
		405-2		C11. Mining companies adhere to equal pay for equal work principle.	Ordinal	Descriptive
		405-2		C12. Mining companies report adherence to equal pay for equal work principle.	Ordinal	Descriptive
		N/A		C13. Mining companies have a living wage.	Ordinal	Descriptive
		N/A		C14. Mining companies report that they have a living wage.	Ordinal	Descriptive
		404-2		C15. Mining companies implement employee development programmes.	Ordinal	Descriptive

Articles	South African Mining Laws and Regulations informing research instrument questions or items	The GRI standard informing research instrument questions or items	UNGC Principle informing research instrument questions or items	Research instrument questions or items	Variable Type	Analysis
		404-2		C16. Mining companies report on employee development programmes.	Ordinal	Descriptive
		404-2		C16. Mining companies report on employee development programmes.	Ordinal	Descriptive
		404-2		C17. Mining companies invest in long term employment growth of employees.	Ordinal	Descriptive
		404-2		C18. Mining companies report investment in long term employment growth of employees.	Ordinal	Descriptive
		405-2	UNGC 6 (UNGC, 2009)	C19.Mining companies employ women in executive management positions.	Ordinal	Descriptive
		405-2		C20. Mining companies report employment of women in executive management positions.	Ordinal	Descriptive
		406-1		C21. Mining companies employ disabled people in executive management positions.	Ordinal	Descriptive
		406-1		C22. Mining companies report employment of disabled people in executive management positions.	Ordinal	Descriptive
		406-1		C23. Mining companies employ Black people in executive management positions.	Ordinal	Descriptive
		406-1		C24. Mining companies report employment of Black people in executive management positions.	Ordinal	Descriptive
		406-1		C25. Mining companies employ white people in executive management positions.	Ordinal	Descriptive
		406-1		C26. Mining companies report employment of white people in executive management positions.	Ordinal	Descriptive
		405-2 406-1		C27. Mining companies employ women in senior management positions.	Ordinal	Descriptive
		405-2 406-1		C28. Mining companies report employment of women in senior management positions.	Ordinal	Descriptive
		406-1		C29. Mining companies employ disabled people in senior management positions.	Ordinal	Descriptive
		406-1		C30. Mining companies report employment of disabled people in senior management positions.	Ordinal	Descriptive
		406-1		C31. Mining companies employ Black people in senior management positions.	Ordinal	Descriptive

Articles	South African Mining Laws and Regulations informing research instrument questions or items	The GRI standard informing research instrument questions or items	UNGC Principle informing research instrument questions or items	Research instrument questions or items	Variable Type	Analysis
		406-1		C32. Mining companies report employment of Black people in senior management positions.	Ordinal	Descriptive
		406-1		C33. Mining companies employ white people in senior management positions.	Ordinal	Descriptive
		406-1		C34. Mining companies report employment of white people in senior management positions.	Ordinal	Descriptive
		405-2 406-1		C35. Mining companies employ women in middle management positions.	Ordinal	Descriptive
		405-2 406-1		C36. Mining companies report employment of women in middle management positions.	Ordinal	Descriptive
		406-1		C37. Mining companies employ disabled people in middle management positions.	Ordinal	Descriptive
		406-1		C38. Mining companies report employment of disabled people in middle management positions.	Ordinal	Descriptive
		406-1		C39. Mining companies employ Black people in middle management positions.	Ordinal	Descriptive
		406-1		C40. Mining companies report employment of Black people in middle management positions.	Ordinal	Descriptive
		406-1		C41. Mining companies employ white people in senior management positions.	Ordinal	Descriptive
		406-1		C42. Mining companies report employment of white people in middle management positions.	Ordinal	Descriptive
		405-2 406-1		C43. Mining companies employ women in junior positions.	Ordinal	Descriptive
		405-2 406-1		C44. Mining companies report employment of women in junior positions.	Ordinal	Descriptive
		406-1		C45. Mining companies employ disabled people in junior positions.	Ordinal	Descriptive
		406-1		C46. Mining companies report employment of disabled people in junior positions.	Ordinal	Descriptive
		406-1		C47. Mining companies employ Black people in junior positions.	Ordinal	Descriptive
		406-1		C48. Mining companies report employment of Black people in junior positions.	Ordinal	Descriptive
		406-1		C49. Mining companies employ white people in junior positions.	Ordinal	Descriptive

Articles	South African Mining Laws and Regulations informing research instrument questions or items	The GRI standard informing research instrument questions or items	UNGC Principle informing research instrument questions or items	Research instrument questions or items	Variable Type	Analysis
		406-1		C50. Mining companies report employment of white people in junior positions.	Ordinal	Descriptive
Moloi (2015); Bernard (2018); Coulson (2018); Stewart (2020); Ramatji (2013); Crous et al. (2021)	MPRDA, MPRDA regulations Mining Charter, SLP	403-2		C51. Mining companies have effective mine safety strategies to prevent employee harm and exposure to risk and danger.	Ordinal	Descriptive
		403-2		C52. Mining companies report on mine safety strategies to prevent employee harm, exposure to risk and danger.	Ordinal	Descriptive
		403-2		C53. Mining companies effectively implement mine safety strategies to prevent harm.	Ordinal	Descriptive
		403-2		C54. Mining companies report that they effectively implement mine safety strategies to prevent harm.	Ordinal	Descriptive
		403-1		C55. Mining companies have effective health and safety management systems to protect the health and safety of employees in mines.	Ordinal	Descriptive
		403-1		C56. Mining companies report the effectiveness of health and safety management systems in protecting the health and safety of employees.	Ordinal	Descriptive
		403-2		C57. Mining companies have effective safety monitoring systems to prevent harm, exposure to risk and danger.	Ordinal	Descriptive
		403-2		C58. Mining companies report on the effectiveness of safety monitoring systems to prevent harm, exposure to risk and danger.	Ordinal	Descriptive
		403-3		C59. Mining companies have effective controls in place to protect the health and safety of mining employees.	Ordinal	Descriptive
		403-3		C60. Mining companies report on the effectiveness of health and safety controls to protect the health and safety of mining employees.	Ordinal	Descriptive
		403-2		C61. Mining companies have effective Safety Improvement Plans to reduce incidents in mines.	Ordinal	Descriptive
		403-2		C62. Mining companies report the effectiveness of Safety Improvement Plans to reduce incidents in mines.	Ordinal	Descriptive
		403-2		C63. Mining companies timely implement Safety improvement plans to eliminate incidents in mines.	Ordinal	Descriptive
		403-2		C64. Mining companies report that they effectively implement Safety Improvement Plans to eliminate incidents in mines.	Ordinal	Descriptive

Articles	South African Mining Laws and Regulations informing research instrument questions or items	The GRI standard informing research instrument questions or items	UNGC Principle informing research instrument questions or items	Research instrument questions or items	Variable Type	Analysis
		403-1		C65. Mining companies allocate appropriate resources to ensure Health and Safety of employees.	Ordinal	Descriptive
		403-1		C66. Mining companies report that they have allocated appropriate resources to ensure Health and Safety of employees.	Ordinal	Descriptive
		403-9		C67. Mining companies have effective preventative measures to eliminate fatalities.	Ordinal	Descriptive
		403-9		C68. Mining companies report that they have effective preventative measures to eliminate fatalities.	Ordinal	Descriptive
		403-5		C69. Mining companies conduct effective training and educational programmes about Health and Safety.	Ordinal	Descriptive
		403-5		C70. Mining companies report on the effectiveness of training and educational programmes about Health and Safety.	Ordinal	Descriptive
		403-5		C71. Mining companies conduct effective training and educational programmes about communicable diseases.	Ordinal	Descriptive
		403-5		C72. Mining companies report on the effectiveness of training and educational programmes about communicable diseases.	Ordinal	Descriptive
		403-5		C73. Mining companies conduct effective training and educational programmes about non-communicable diseases.	Ordinal	Descriptive
		403-5		C74. Mining companies report on the effectiveness of training and educational programmes about non-communicable diseases.	Ordinal	Descriptive
		403-6		C75. Mining companies have effective wellness programmes.	Ordinal	Descriptive
		403-6		C76. Mining companies report on the effectiveness of wellness programmes.	Ordinal	Descriptive
		403-6		C77. Mining companies have effective disease management programmes.	Ordinal	Descriptive
		403-6		C78. Mining companies report on the effectiveness of disease management programmes.	Ordinal	Descriptive
Stewart (2020); Kengni & Mostert (2022); Ngorima (2019); Kung, Everingham & Vivoda (2020); Ackers &	MPRDA, MRPDA Regulations, NEMA & EMP	N/A	UNGC 7, UNGC 8 and UNGC 9 (UNGC, 2009)	D1. Mining companies have effective Environmental management Plan to reduce the negative impact of mining on the ecosystem.	Ordinal	Descriptive
		N/A		D2. Mining companies report the effectiveness of Environmental Management Plan to reduce the negative impact of mining on the ecosystem.	Ordinal	Descriptive

Articles	South African Mining Laws and Regulations informing research instrument questions or items	The GRI standard informing research instrument questions or items	UNGC Principle informing research instrument questions or items	Research instrument questions or items	Variable Type	Analysis
Grobbelaar (2021); Crous et al. (2021); Latiff & Marimuthu (2021)		N/A		D3. Mining companies effectively implement the Environmental Management Plan to reduce the negative impact of mining on the ecosystem.	Ordinal	Descriptive
		N/A		D4. Mining companies report effective implementation of Environmental management Plan to reduce the negative impact of mining on the ecosystem.	Ordinal	Descriptive
				D5. Mining companies undertake effective environmental management initiatives to promote greater environmental responsibility.	Ordinal	Descriptive
				D6. Mining companies report the effectiveness of environmental management initiatives to promote greater environmental responsibility.	Ordinal	Descriptive
		305-5		D7. Mining companies have effective emission reduction strategies.	Ordinal	Descriptive
		305-5		D8. Mining companies report the effectiveness of emission reduction strategies.	Ordinal	Descriptive
		304-4		D9. Mining companies undertake effective environmental management initiatives to conserve natural resources.	Ordinal	Descriptive
		304-4		D10. Mining companies report the effectiveness of initiatives to conserve natural resources.	Ordinal	Descriptive
		N/A		D11. Mining companies undertake effective environmental management plan to prevent pollution.	Ordinal	Descriptive
		N/A		D12. Mining companies report the effectiveness of environmental management plan to prevent pollution.	Ordinal	Descriptive
		N/A		D13. Mining companies are involved in effective air pollution reduction programmes.	Ordinal	Descriptive
		N/A		D14. Mining companies report effectiveness of air pollution reduction programmes that they undertake.	Ordinal	Descriptive
		N/A		D15. Mining companies are involved in effective water pollution reduction programmes.	Ordinal	Descriptive
		N/A		D16. Mining companies report the effectiveness of water pollution reduction programmes.	Ordinal	Descriptive
		N/A		D17. Mining companies are involved in effective land pollution reduction programmes.	Ordinal	Descriptive

Articles	South African Mining Laws and Regulations informing research instrument questions or items	The GRI standard informing research instrument questions or items	UNGC Principle informing research instrument questions or items	Research instrument questions or items	Variable Type	Analysis
		N/A		D18. Mining companies report the effectiveness of land pollution reduction programmes.	Ordinal	Descriptive
		306-2 306-3 306-4		D19. Mining companies have effective Environmental Management Plan to minimise waste generation.	Ordinal	Descriptive
		306-2 306-3 306-4		D20. Mining companies report the effectiveness of environmental management Plan to minimise waste generation.	Ordinal	Descriptive
		N/A		D21. Mining companies are effectively involved in stewardship for climate change.	Ordinal	Descriptive
		N/A		D22. Mining companies report stewardship for climate change.	Ordinal	Descriptive
		N/A		D23. Mining companies effectively mitigate the influence of climate/weather conditions on the environment.	Ordinal	Descriptive
		N/A		D24. Mining companies report the effectiveness of strategies to mitigate the influence of climate/weather conditions on the environment.	Ordinal	Descriptive
		N/A	UNGC 9 (UNGC, 2009)	D25. Mining companies invest in research and development initiatives to reduce the impact of mining operations on the environment.	Ordinal	Descriptive
				D26. Mining companies report the effectiveness of research and development initiatives in reducing the impact of mining operations on the environment.	Ordinal	Descriptive
				D27. Mining companies contribute towards the development of environmentally friendly technologies.	Ordinal	Descriptive
				D28. Mining companies report the effectiveness of contribution towards the development of environmentally friendly technologies.	Ordinal	Descriptive
				D29. Mining companies are involved in the diffusion of environmentally friendly technologies.	Ordinal	Descriptive
				D30. Mining companies report involvement in the diffusion of environmentally friendly technologies.	Ordinal	Descriptive
		301-1 302-2		D31. Mining companies effectively undertake responsible use of materials.	Ordinal	Descriptive
		301-1 301-2		D32. Mining companies report the effectiveness of responsible use of materials.	Ordinal	Descriptive

Articles	South African Mining Laws and Regulations informing research instrument questions or items	The GRI standard informing research instrument questions or items	UNGC Principle informing research instrument questions or items	Research instrument questions or items	Variable Type	Analysis
		303-3 to 303-5		D33. Mining companies effectively undertake responsible use of water.	Ordinal	Descriptive
		303-3 to 303-5		D34. Mining companies report responsible use of water.	Ordinal	Descriptive
		N/A		D35. Mining companies effectively undertake responsible use of land.	Ordinal	Descriptive
		N/A		D36. Mining companies report responsible use of land.	Ordinal	Descriptive
		302-1 to 302-5		D37. Mining companies effectively undertake responsible use of energy.	Ordinal	Descriptive
		302-1 to 302-5		D38. Mining companies report responsible use of energy.	Ordinal	Descriptive
		302-1 to 302-5		D39. Mining companies effectively undertake initiatives to develop renewable energy alternatives.	Ordinal	Descriptive
		302-1 to 302-5		D40.Mining companies report initiatives to develop renewable energy alternatives.	Ordinal	Descriptive
		304-2		D41. Mining companies effectively undertake rehabilitation and revegetation activities.	Ordinal	Descriptive
		304-2		D42. Mining companies report involvement in rehabilitation and revegetation activities.	Ordinal	Descriptive

Source: *Own study*

Notes: MPRDA: Mineral and Petroleum Resources Development Act 28 of 2002, NEMA: The National Environmental Management Act 107 of 1998; MHSC: The Mine Health and Safety Act 29 of 1996 EMP: DMR Environmental Management Plan 2018; UNGC: The United Nations Global Compact; GRI: The Global Reporting Initiative; COP: Mandatory Code of Practice Guidelines

The research consistency matrix in Table 3-3 demonstrates how the South African mining regulations are embedded within the e-questionnaire used as a research instrument. The first column shows literature or articles on South African mining regulations and the measured variable, followed by a column with applicable mining laws and regulations. The next two columns show the related GRI standard and UNGC principle, only due to the complementary effects of these two international standards and principles on the South African mining regulations, respectively. The next column deals with items in the research instrument and is adjacent to it, showing the type of variables being measured. The last column shows the statistical analysis used to analyse the variables. In this regard, South African mining laws and regulations about measured variables informed all the questions included in the research consistency.

The GRI is the first global standard for sustainability reporting (Cheruiyot-Koech & Reddy, 2022). According to Cheruiyot-Koech and Reddy (2022), the GRI is also one of the main drivers of sustainability in South Africa. Moreover, the GRI is endorsed by King IV and is already embedded into the South African Corporate Governance Codes (Sampong et al., 2018). The King Code I and II required JSE-listed companies to report sustainability based on the GRI guidelines (Sampong et al., 2018). King III and IV explicitly encourage all South African entities, irrespective of the company size, nature, or type, to integrate sustainability into day-to-day business operations and to disclose sustainability issues based on the GRI (Sampong et al., 2018). Molate et al. (2014) attribute the wide adoption of the GRI within the South African mining industry to isomorphic influences and specific reporting requirements of the Mining Charter. The selected GRI4 indicators have been used in this research instrument due to close compatibility with South African mining regulations, as depicted in Table 3-3. Selected GRIs are shown in Appendix B.

3.5.2. Data analysis, model and validation

This study quantitatively investigated the relationship between Sustainability performance and sustainability reporting using primary data from the regulators of South African mining companies. The first research objective is to explore the factors affecting sustainability in a regulated mining sector from the regulators' perspective. The researcher used EFA, a multivariate data analysis technique, to achieve this objective. The main aim of employing EFA was to reduce the dimensionality of a data

set comprising a large number of interrelated items while retaining as much as possible of the variation as suggested to determine items answered most similarly by participants. Through EFA, the researcher explored the underlying relationship pattern among multiple observed variables based on the questionnaire scales used to measure sustainability performance and sustainability reporting. In this respect, the researcher subjected all sustainability performance and sustainability reporting variables to EFA using SPSS (version 25) to transform sustainability performance and sustainability reporting variables into manageable components. Scree plots are visually inspected to determine the factor structure. Factors that explain most of the variability in sustainability data are retained, whereas factors that account for the least proportion of the variability are discarded.

The second objective is to investigate the perceived gap between sustainability performance and sustainability reporting from the regulators' perspective. A pairwise t-test was applied using SAS JMP (version 14) to determine the gap between sustainability performance and sustainability reporting at a 0.5 significance level. The underlying assumption is that since the measured items were formulated from economic theories which predicted a positive relationship between sustainability performance and sustainability reporting, collected data would show the existence of that relationship. Alternatively, socio-political theories predicted a negative relationship between sustainability performance and sustainability reporting, implying greenwashing tendencies. To achieve this, the researcher structured both sustainability performance and sustainability reporting statements to solicit the regulators' perceptions on both sustainability performance and sustainability reporting practices of South African mining companies.

It was expected from the theory that if sustainability were being reported correctly within the mining sector, the reported sustainability performance would favourably compare with the actual sustainability performance outcomes. By implication, the factor loadings should show strong correlations as they should move together in the same direction. However, this should not suggest that the research presupposed sustainability reporting as an automatic measurable surrogate for sustainability performance, in this research, sustainability reporting is not deemed as a proxy for sustainability performance and vice versa.

In the following sub-sections, the researcher focused on the extent to which the questionnaire in this quantitative research measured sustainability performance and sustainability reporting concepts. Moreover, regulators from different branches had varying degrees of involvement in sustainability which could have affected the quality of responses.

A statistician validated the e-questionnaire to ensure the research objectives were not compromised. To further enhance validity, the researcher mitigated this limitation by personally consulting four (4) members of the executive committee (EXCO) in the DMR and two (2) managers at regional offices who interacted directly with companies at the coalface of mining based on practical experience and vast knowledge of the South African mining industry and its regulations. The six (6) experts individually inspected potential problems in the measurement instrument to ensure the preliminary validity of the questionnaire. These experts provided verbal feedback on the instrument to ensure that regulatory aspects of all sustainability areas were widely covered. No item was dropped after the inspection, and the following contributions were made:

- The first important contribution by a Mine Health and Safety EXCO member was that the keywords such as “effective, effectiveness and effectively” were missing, which could render the research weak. The questions were strengthened to incorporate the relevant word for each statement.
- A Mineral Regulation EXCO member indicated that to clarify the statement, the word “local community” was too broad and could imply the whole of South Africa in some contexts. Therefore, the word local community was replaced by “host community”, as recommended.
- Mineral Policy and Promotion’s contribution was that it would be good to disaggregate pollution since it was too broad and to make specific statements measuring air, land, and water pollution instead. This input was incorporated.
- Before the questionnaire was inspected, all sustainability performance statements had been listed under one section, followed by another section dealing with sustainability reporting statements. After the inspection, this order was revised to place sustainability performance statements under odd numbers, immediately followed by corresponding sustainability reporting statements using even numbers;

however, within the same section. Statements B1 and B2 are used as an illustration as follows:

> **B1**. “Mining companies ***undertake*** effective housing infrastructure projects to improve living conditions of employees.”
>
> **B2.** “Mining companies ***report*** on the effectiveness of housing infrastructure projects undertaken to improve living conditions of employees.”

The consulted experts did not participate in answering the questionnaire.

According to Saunders, Lewis & Thornhill (2009), criterion-related validity is the extent to which a question accurately measures the researched variables. The measurement questions in the instrument used for this quantitative study were structured around concepts discussed in Chapter 2.

However, quantitative studies are not immune to survey bias from the measurement instrument or the respondents (Kock, Berbekova & Assaf, 2021). According to Kock et al. (2021), procedural and statistical remedies such as Harman’s single factor test through EFA or CFA can be employed after data collection (ex-post) to identify and control for potential common method bias. To minimise bias, remedies provided by Podsakoff et al. (2003), Kock et al. (2021), and Ernst et al. (2022) were applied in this study.

Firstly, the anonymity rule was evoked to guarantee confidentiality so respondents could honestly respond to the questionnaire. Moreover, respondents completed the e-questionnaire at their own pace and time to manage response fatigue. The researcher also depended on statistical remedies to mitigate bias by establishing measures such as construct validity. Construct validity can be assessed to determine how well the results obtained from the measures fit the theories around which the test is designed (Sekaran, 1992:173). According to Cooper and Schindler (1998), factor analysis can determine the construct validity of a measuring instrument. In this regard, EFA was used in this study as the first step in construct validation.

Discriminant validity was also established in this study. Discriminant validity refers to “the extent to which a construct is truly distinct from other constructs by empirical standards” (Hair, Hult, Ringle, Sarstedt, Danks & Ray, 2021:78). The Fornell-Larcker criterion and the examination of cross-loadings are dominant approaches for

evaluating discriminant validity (Henseler, Ringle & Sarstedt, 2015). To eliminate a threat of discriminant validity, cross-loadings were tested.

Because of the deductive reasoning approach, this quantitative research also relied on the descriptive aspects of the theory to assure reliability. The research used a common heuristic for internal consistency where a Cronbach's alpha (α) of ≥ 0.90 was deemed excellent; 0.90 > α ≥ 0.80 deemed good; 0.80 > α ≥ 0.70 considered acceptable; 0.70 > α ≥ 0.60 is questionable; 0.60 > α ≥ 0.50 is deemed poor and unacceptable (Flo et al., 2018). The α for sustainability performance was 0.91, while the α for sustainability reporting was 0.94, meaning that the constructs were reliable.

3.6. ETHICAL CONSIDERATIONS

The researcher paid special attention to all ethical considerations and adhered to the UNISA Code of Ethics and the Protection of personal information (POPI) Act No 4 of 2013 (RSA, 2013).

Firstly, the researcher obtained permission to conduct research at the DMR before data collection (Appendix H). Respondents were invited to participate in academic research, and detailed information about the research topic, the nature and purpose of the study, procedure, potential benefits, and anticipated inconvenience of participation were provided in a participant information sheet contained in ethics documents (Appendix H). The researcher indicated that participation was voluntary, and participants could choose not to participate. Respondents were informed that they were free to withdraw from the study at any time without any negative consequences, penalty, or loss of benefit for non-participation. Participants were, however, advised that it would be impossible to withdraw from the research after the questionnaire had been completed and submitted for processing.

Upon agreement to participate in the study, each respondent was requested to provide an e-consent indicating a willingness to participate before they started completing the questionnaire. They were also informed that the research results would be anonymously published in the thesis, journal publications and/or conference proceedings.

The researcher distributed an electronic version of the questionnaire using Google Forms to all 512 eligible employees of the DMR. Google Forms generated a web link

in an e-mail inviting respondents to complete the questionnaire electronically. To eliminate the threat of bias, the researcher guaranteed response anonymity. In addition, respondents were advised from the onset that collected data would be treated as confidential and anonymous so that respondents could honestly respond to the questionnaire. The respondents were also informed that the responses would only be accessible by the researchers in line (Gip, Khoa, Guchait, Garcia & Pasamehmetoglu, 2022).

Moreover, since the positivist ontology was followed in this research, there was no interference or assistance by the researcher and, therefore, no subjective bias (Junjie & Yingxin, 2022). In this regard, a non-personal channel was chosen to create distance between the researcher and the respondents to maintain emotional neutrality between the researcher and the research respondents and to ensure that research objectivity is not compromised, thereby eliminating and mitigating bias (Junjie & Yingxin, 2022). Because an e-questionnaire was used, the research did not pose any risk of harm to respondents except for the potential inconvenience of completing the research instrument.

The researcher also ensured compliance with the Protection of Personal Information (POPI) Act No 4 of 2013 (RSA, 2013). POPIA's new dispensation of specific consent and lawful processing of personal information protects the privacy rights of research participants in line with section 14 of the Constitution of the Republic of South Africa (RSA, 1996a), which provides that everyone has the right to privacy (RSA, 2013). The right to privacy includes a right to protection against the unlawful collection, retention, dissemination, and use of personal information (RSA, 2013). The researcher complied with section 13(1) of the POPIA, which deals with the conditions for collecting personal information such as names and addresses of participants. Participants were notified of the specific purpose for the collection of personal information.

Additionally, the researcher complied with section 15 of POPIA, which provides further processing of information already collected, provided the section 13 requirement is complied with. In this regard, the researcher solicited consent to publish the study results in an academic journal. The researcher has already published two articles in academic journals solely for research purposes. None of the information published links to the study participants; therefore, anonymity and confidentiality are upheld.

Moreover, the researcher complied with retaining personal information records by ensuring security safeguards were in place. In this respect, personal information for research purposes is kept secure to maintain confidentiality and integrity and prevent data breaches. Computer-based records are only accessed through privileges and passwords.

The researcher will report any security breaches as required by the POPIA and retain the data for the duration UNISA prescribes.

3.7. CHAPTER SUMMARY

The chapter was structured to reiterate the research aim and objectives to contextualise and justify the epistemological stance adopted. This was followed by identifying the population, the sample and the unit of analysis, namely, employees of the DMR who were directly responsible for regulating the mining industry. This exploratory quantitative methodology adopted a positivist and deductive approach as an epistemological stance. Logic flowed from the specific statistical analysis to explain the greenwashing phenomenon before generalisations could be made.

The research strategy is an e-questionnaire that will be used for data collection in this exploratory quantitative method. An extensive literature review informed the e-questionnaire design. The instrument's validity was supported empirically in terms of content, criterion-related and construct validity. The reliability was computed using Cronbach’s alpha. A systematic process of data collection, data analysis and interpretation followed this. Descriptive statistics and EFA, comparative pairwise differences matched-pairs t-tests, SEM and Cohen’s D are used to analyse the data. This research will provide the perspective of mining regulators on the factors affecting sustainability and the relationship between sustainability performance and sustainability reporting within a highly regulated mining sector. Lastly, the researcher paid special attention to all ethical considerations per the UNISA code of ethics. Chapter 4 focuses on the presentation of research results.

CHAPTER 4: RESULTS AND ANALYSIS

4.1. INTRODUCTION

In the previous chapter, methods used to achieve the study's objectives were explained, detailing how information and data were gathered, analysed and used to answer the research questions. This chapter details the key results of the empirical research and links it back to the literature. Statistical inferences are made to answer the key research questions and to achieve the research objectives. The layout of the rest of this chapter is presented in seven (7) sequential sections. Each section focuses on a particular component of the results; therefore, the results need to be understood as a whole, as each section and sub-section is linked together to answer research questions. Firstly, Section 4.2 deals with the demographics of the cross-sectional sample. This is followed by Section 4.3, which unpacks the Exploratory Factor Analysis (EFA). Section 4.4 focuses on Comparative Pairwise Differences, followed by Section 4.5, which provides results for the Structural Equation Model (SEM). Section 4.6 presents the summary of this chapter.

4.2. DEMOGRAPHICS OF THE CROSS-SECTIONAL SAMPLE

The sample was drawn from individuals regulating mining activities to ensure sustainable development of the mining sector. The profile of this cross-sectional sample has been defined in terms of the following categories:

- Designation;
- Sub-programme;
- Industry experience;
- Office;
- Predominant commodity; and
- Regulatory tools.

1.1.1 Designation

To contextualise the level of regulatory interventions, the designation of the respondents was recorded. This assisted in understanding the regulatory role in the mining industry. Question A1 (Appendix C) requested participants to state their designation within the DMR, displayed in Table 4-1.

Table 4-1: Designation of respondents

Designation	Frequency	%
Assistant Director	84	56
Chief Director	4	3
Deputy Director	37	25
Director	24	16
Social Labour Plan Officer	1	1
Total	**150**	**100**

Source: *Survey data (2019)*

Table 4-1 reflects the designation distribution of the sample. Most of the respondents are assistant directors (56%), followed by deputy directors (25%), directors (16%), and chief directors (13%). The key reason for including the designations of the respondents was to solicit views mostly from those involved in daily interactions with South African mining companies. All the respondents were people involved in policy development, mandatory regulatory inspections, or enforcement activities on a day-to-day basis.

4.2.1. Sub-programmes of the Department of Mineral Resources

The participants were requested in Question A2 (Appendix C) to choose the applicable programme/sub-programme in which they were involved. Various programmes and sub-programmes deal with regulatory aspects of sustainability areas. Table 4-2 shows frequencies from programmes and sub-programmes.

Table 4-2: Programme under the regulatory authority

Programme	Frequency	%
Mine Health and Safety	55	37
Mineral Policy and Promotion	57	38
Mineral Regulation	38	25
Total	**150**	**100**

Source: *Survey data (2019)*

Table 4-2 shows the sample distribution in terms of programmes. The DMR regulation regime is wide-ranging, covering various aspects such as environment, health and

safety, and community development through social labour plans and other initiatives. Therefore, collecting views from various directorates involved in mining regulation was relevant. Respondents from different directorates participated in the research, with mineral policy and promotion contributing to 38% of the respondents, followed by mine health and safety with 37% and mineral regulation with 25%.

4.2.2. Experience of respondents

The experience was vital; therefore, the respondents' views on the performance of South African mining companies regarding sustainability in mining were collected. People with more experience in regulation matters provide a considered and objective view of the industry's performance over time. It was assumed that when choosing the option to which they related best concerning a statement, they could look back and draw from experience on the mining industry's performance on various regulatory issues under investigation in this study.

Most of the respondents had been working for the DMR for between five (5) and 20 years. The length of experience was critical as views could be solicited based on the respondents' industry experience and expert knowledge of regulators. Question A3 (Appendix C) requested participants to indicate their experience. Table 4-3 depicts the length of respondents' experience working in the DMR.

Table 4-3: Experience of respondents (n=149)

Experience	Frequency	%
2-3 Years	8	5
4-5 Years	18	12
5-10 Years	47	31
10-20 years	54	36
More than 20 years	23	15
Total	**150**	**100**

Source: *Survey data (2019)*

Table 4-3 shows that 82% of the respondents had been involved in regulatory matters for over five (5) years. It was deemed that most of the respondents had vast experience in regulatory matters, and views would provide deep insights into the

sustainability practices of South African mining companies regarding regulatory matters.

4.2.3. The geographical spread of respondents

Participants were requested in Question A4 (Appendix C) to indicate the geographical area they operated from. The DMR's footprint is in nine (9) provinces countrywide, with its head office in Pretoria. Table 4-4 depicts the composition of respondents across the 10 DMR offices.

Table 4-4: Geographical spread of respondents across regions

Office	Frequency	%
Eastern Cape	5	3
Free State	12	8
Gauteng	17	11
Head Office	40	26
Kwa-Zulu Natal	10	7
Limpopo	15	10
Mpumalanga	8	5
North-West	21	14
Northern Cape	17	11
Western Cape	5	3
Total	**150**	**100**

Source: *Survey data (2019)*

The geographical spread of the participants was a valuable tool to derive a national picture of regulators' views on the industry's performance in South Africa as a whole. As evidenced in Table 4.4, respondents were distributed across nine (9) provinces and the head office. The highest percentage comprised respondents at the head office (26%). North-West was the second largest at 14%; Gauteng and Northern Cape were 11%, followed by Limpopo at 10%. The response rate for the Free State was 8%, while Kwa-Zulu Natal was 7%. At the bottom end was Mpumalanga at 5%, while the Eastern Cape and Western Cape recorded the lowest at 3%. It should also be noted that

although 150 responses were received, two (2) participants did not indicate the office they operated from. It can be concluded that the sample fairly represented all the provinces of South Africa.

4.2.4. Predominant commodity

Question A5 (Appendix C) asked respondents to indicate one predominant commodity they regulated. Table 4-5 shows that respondents were involved in regulating a range of minerals being mined in South Africa, with gold, coal and platinum being the most common minerals among the respondents. The results represent the regulators' view across commodity lines.

Table 4-5: Number of respondents working with a specific commodity (n=150)

Predominant commodity	Frequency	%
Stone Aggregate	6	4
All Commodities	16	11
Alluvial Diamond	1	1
Asbestos	2	1
Asbestos, Coal, Gold, Silver, etc.	1	1
Building Material	1	1
Chrome	6	4
Chrome and Platinum	2	1
Coal	20	13
Coal, Gold, and Platinum	1	1
Coal, Heavy Minerals, Aggregates	1	1
Construction Material-Mainly Aggregate and Sand	1	1
Diamonds	10	7
Administration	1	1
Environment	1	1
Fluorspar, Andalusite and Sulphur	1	1
Gold	23	15

Predominant commodity	Frequency	%
Gold and Coal	1	1
Gold and Diamond	1	1
Gold and Platinum	1	1
Gold, Coal, Aggregate and Sand	1	1
Hard Rock and Sand	1	1
Industrial Minerals	2	1
Iron Ore	2	1
Manganese and Iron Ore	1	1
Manganese Ore	4	3
N/A	1	1
None	4	3
Oil and Gas	1	1
Other	1	1
PGM and Sand	1	1
Platinum Group Metals	20	13
Platinum Group Metals, Diamonds & Chrome	1	1
Platinum, Chrome, Coal & Diamonds	1	1
Sand	9	6
Shale Gas	1	1
Tiger's Eye	1	1
Titanium Minerals	1	1
Total	**150**	**100**

Source: *Survey data (2019)*

Table 4-5 illustrates more than twenty commodities in South Africa. These include gold, coal, platinum group metals (PGMs), diamond, chrome, stone aggregates, silver, fluorspar, andalusite and sulphur, sand, manganese, iron ore, oil and gas, shale gas, tiger's eye, titanium minerals, alluvial diamond, and asbestos. The majority of the sample consisted of respondents who predominantly regulated gold (15%), followed

by those regulating coal (13%) and PGMs (13%). In comparison, those who regulated all commodities are 11%, diamonds 7%, sand 6%, chrome 4% and stone aggregate 4%.

4.2.5. Regulatory tools

This demographic category reflected the context of the research. This work was based on the regulatory policy framework of the South African mining industry. The study investigated the regulators' perceptions of South African mining companies' sustainability practices. Question A6 (Appendix C) asked respondents to indicate the regulatory tools available to ensure sustainability in the mining industry. Table 4-6 shows that various regulatory mechanisms are used to monitor and enforce regulatory compliance to improve positive externalities in the mining sector.

Table 4-6: Regulatory tools

Regulatory Tools	Frequency	%
Legislation	43	29
Legislation: National Environmental Management Act and the Associated EIA Regulations, 2014, As Amended	1	1
Legislation; Regulations	71	47
Legislation; Regulations; Code of Practices	1	1
Legislation; Regulations; Codes of Practice and Guidelines	1	1
Legislation; Regulations; Court Judgements	1	1
Legislation; Regulations; Court Orders, Directives	1	1
Legislation; Regulations; Environmental Auditing	1	1
Legislation; Regulations; Environmental Management Plan	1	1
Legislation; Regulations; Financial Resources	1	1
Legislation; Regulations; Guidelines	3	2
Legislation; Regulations; Social Compacts	1	1
Legislation; Regulations; Stakeholders Engagement/Public Participation	1	1
Legislation; Regulations; Strategies and Guidelines	1	1
None	2	1

Regulatory Tools	Frequency	%
Regulations	18	12
Regulations; Mine Health and Safety Act No 29 09 1996	1	1
Standard Protocol and Guideline for The Rehabilitation of Derelict and Ownerless Asbestos Mine Residue Deposit in South Africa	1	1
Total	**150**	**100**

Source: *Survey data (2019)*

Table 4-6 illustrates that 47% of the respondents used both legislation and regulations to enforce statutory compliance by the mining industry. This was followed by those who used legislation (29%); regulations (12%); and a combination of legislation, regulations, and guidelines (2%). Moreover, codes of practice, court judgements, court orders, directives, stakeholders' engagements/public participation, environmental audits, environmental management plans and standard protocols were among the tools available to regulate South African mining companies.

4.3. EXPLORATORY FACTOR ANALYSIS

Exploratory Factor Analysis (EFA) is a multivariate data analysis technique which determines which items are answered most similarly by participants (Murmura et al., 2017). The main aim of employing EFA was to reduce the dimensionality of a data set comprising many interrelated items while retaining as much variation as suggested by Kuhil (2013). The Oblimin rotation method was used to fit data to the underlying structure of the interrelationships among the variables (Murmura et al., 2017). The method examined the underlying relationships among the items and summarised them into a smaller number of unobserved latent variables called factors. Factors group variables that belong together and have overlapping measurement characteristics to make theoretical sense (Hair, Anderson, Tatham & Black, 1998).

This research used an e-questionnaire as a data collection instrument comprising 154 dually structured statements. The survey simultaneously solicits perceptions of the regulators on both sustainability performance and sustainability reporting practices of South African mining companies. The respondents ranked sustainability performance and sustainability reporting on a 5-point Likert scale indicating whether they strongly disagreed, disagreed, neutral, agreed or strongly agreed with the statements. These

rankings were used to compute sustainability performance and sustainability reporting factor structures, that is, 77 sustainability performance variables were first subjected to EFA, followed by 77 corresponding sustainability reporting variables, which were also run on EFA.

It is important to note that sustainability performance and sustainability reporting are treated as two (2) complementary constructs. If sustainability is being reported correctly at the company level, the actual sustainability performance would favourably compare with sustainability reporting. It was, therefore, theorised that there would be no statistically significant differences between sustainability performance and sustainability reporting; in other words, there would be no greenwashing tendencies in companies operating within the mining sector.

The research used Cattell's (1966) scree plots to determine the factor structure with the most accurate number of factors to retain in the factor analysis. The ideal pattern of a scree plot is a steep curve followed by an elbow bend and a straight line (Cattell, 1966). The researcher used all the factors in the steep curve just before the first inflexion point on the screen plot in line with Schönrock-Adema, Heijne-Penninga, van Hell and Cohen-Schotanus (2009). These are factors that explain most of the variability in sustainability data. The remaining factors were discarded as they account for the least proportion of the variability, in line with Ledesma and Valero-Mora (2007). In this regard, all the factors to the left of the inflexion point were retained, while all the factors to the right of the elbow were dropped, as per Cattell (1966).

EFA results were analysed to determine statistical, theoretical, and practical implications. Since data for sustainability performance and sustainability reporting variables were derived from the same theory and respondents, it is important to emphasise theoretical application for both sustainability performance and sustainability reporting constructs. In the first EFA results, a few items loaded on a particular sustainability performance factor while the sustainability reporting equivalent loaded onto a different factor altogether. The second rotation was conducted to improve the interpretability and labelling of factors, resulting in improved consistency between sustainability performance and sustainability reporting, except for D35 and D36; and D39 and D40, which included cross-loadings. To eliminate a threat of discriminant validity, cross-loadings were tested. Examination of cross-loadings is one of the dominant approaches for evaluating discriminant validity (Henseler et al., 2015). Cross-loadings were considered in previous studies (Gräuler, Freundlieb, Ortwerth &

Teuteberg, 2013; Doorasamy, 2016; Scharf & Nestler, 2019). However, it should be noted that D35 and D36; and D39 and D40 were later discarded as they could not meet the reliability criteria, therefore, discriminant validity is established in this study.

Moreover, the researcher also examined if items loaded more strongly with the other constructs than with their construct. The one-factor model rather than the two-factor model is preferred. According to Bozionelos and Simmering (2021:199), “the one-factor test can be conducted using exploratory factor analysis to which all items in a same-respondent questionnaire survey are subjected. If all items load on a single factor, or the first factor contains more than 50% of the variance extracted, the data is believed to be biased by common method variance.” Importantly, using EFA results, the researcher cross-verified the absence of common variance bias. All 10 factors were within the 50% cut-off point, except for environmental management. The next sub-sections present the EFA results in detail.

4.3.1. Analysis of community development as an indicator of sustainability

EFA results show a four-factor solution for sustainability performance and sustainability reporting constructs. The selection of four (4) factors is supported by the scree plot results in Appendix D, which show that only four (4) factors could be reasonably extracted from the data. This was reflected by the point of inflexion, meaning that only four (4) factors to the left of the inflexion point met the retention criteria, while all the factors to the right of the inflexion point were discarded. Tables 4-7 and 4-8 summarise a 4-factor solution for sustainability performance and sustainability reporting, respectively.

Table 4-7 reflects the views and perceptions of the regulators on South African mining companies’ participation in community development regarding sustainability performance. The results show four (4) factors affecting sustainability performance under community development: local enterprise development, local infrastructure development, housing and living conditions and skills development. This is followed by Table 4-8, which shows the factor loading for the sustainability reporting variable.

Table 4-7: A 4-factor solution for sustainability performance – Community development

		Local enterprise development	Local infrastructure development	Skills development	Housing and living conditions	*a*
B31	Mining companies procure goods from host communities	**0,93**	-0,10	-0,10	0,03	0,78
B33	Mining companies procure services from host communities	**0,82**	0,06	0,00	0,01	0,73
B27	Mining companies effectively create opportunities for enterprise development initiatives for host communities	**0,72**	0,00	0,08	0,16	0,63
B29	Mining companies undertake supplier development initiatives for host communities	**0,70**	0,09	0,06	0,00	0,60
B13	Mining companies effectively participate in health infrastructure projects in host communities	0,00	**0,73**	0,10	0,05	0,65
B15	Mining companies effectively participate in Sports and Recreation infrastructure projects as part of community development	0,06	**0,71**	0,03	0,00	0,56
B11	Mining companies effectively participate in Water and sanitation infrastructure as part of community development	0,06	**0,66**	-0,10	0,12	0,50
B9	Mining companies effectively participate in road infrastructure projects in host communities	0,06	**0,64**	-0,10	0,10	0,46
B7	Mining companies effectively contribute in educational infrastructure projects as part of community development	-0,20	**0,62**	0,32	0,06	0,61
B17	Mining companies employ people from host communities	0,26	0,35	0,27	-0,30	0,44

		Local enterprise development	Local infrastructure development	Skills development	Housing and living conditions	*a*
B23	Mining companies have internship programmes for people in host communities	0,06	0,00	**0,82**	0,05	0,74
B21	Mining companies have learnership programmes for people in host communities	0,00	0,00	**0,69**	0,13	0,50
B25	Mining companies transfer skills to host communities	0,24	0,06	**0,59**	0,01	0,58
B5	Mining companies undertake effective housing infrastructure projects to improve living conditions in labour-sending areas	0,11	0,05	0,01	**0,72**	**0,61**
B3	Mining companies undertake effective housing infrastructure projects to improve living conditions in host communities	0,12	0,17	0,05	**0,67**	**0,69**
B1	Mining companies undertake effective housing infrastructure projects to improve living conditions of employees	0,00	0,07	0,16	**0,66**	**0,56**
Eigenvalue		7,34	1,88	1,40	1,09	
Total Explained Variance per Factor		43,20	11,03	8,26	6,41	
Cumulative Explained Total Variance		43,20	54,23	62,48	68,89	
Cronbach's α (Reliability)		**0,89**	**0,84**	**0,80**	**0,83**	

Notes: a = Communality Score

Source: *Survey data (2019)*

Table 4-8: A 4-factor solution for sustainability reporting – Community development

		Local enterprise development	Local infrastructure development	Skills development	Housing and living conditions	*a*
B32	Mining companies report procurement of goods from host communities	**0,89**	0,00	0,04	0,00	0,79
B34	Mining companies report procurement of services from host communities	**0,83**	0,00	0,09	0,01	0,76
B30	Mining companies report the effectiveness of supplier development initiatives for host communities	**0,73**	0,06	0,00	0,04	0,59
B28	Mining companies report the effectiveness of involvement in enterprise development opportunities for host communities	**0,71**	0,03	0,03	0,20	0,67
B20	Mining companies report investment in capacity development programmes for host communities in view of future job opportunities	0,38	0,20	0,27	0,00	0,46
B14	Mining companies report on the effectiveness of participation in health infrastructure projects in host communities	-0,10	**0,77**	0,10	0,02	0,64
B16	Mining companies report the effectiveness of involvement in Sports and Recreation infrastructure projects as part of community development	0,00	**0,77**	0,01	0,00	0,61
B12	Mining companies report on the effectiveness of participation in Water and Sanitation infrastructure as part of community development	0,28	**0,60**	-0,20	0,06	0,55
B10	Mining companies report on the effectiveness of participation in road infrastructure projects in host communities	0,16	**0,50**	0,00	0,18	0,47
B24	Mining companies report internship programmes for people in host communities	0,05	0,00	**0,83**	0,00	0,70
B22	Mining companies report learnership programmes for people in host communities	0,00	-0,10	**0,72**	0,19	0,60

		Local enterprise development	Local infrastructure development	Skills development	Housing and living conditions	*a*
B26	Mining companies report skills transferred to host communities	0,16	0,13	**0,51**	0,04	0,48
B18	Mining companies report employment from host communities	0,25	0,18	**0,45**	-0,20	0,43
B4	Mining companies report on the effectiveness of Housing infrastructure projects undertaken to improve living conditions in host communities	0,07	0,01	0,09	**0,77**	0,69
B6	Mining companies report on the effectiveness of Housing infrastructure projects undertaken to improve living conditions in labour-sending areas	0,11	0,04	-0,10	**0,67**	0,50
B2	Mining companies report on the effectiveness of housing infrastructure projects undertaken to improve living conditions of employees	0,00	0,16	0,17	**0,55**	0,50
Eigenvalue		7,18	1,85	1,51	1,06	
Total Explained Variance		42,22	10,86	8,91	6,26	
Cumulative Explained Total Variance		42,22	53,08	61,98	68,24	
Cronbach's α		**0,90**	**0,84**	**0,80**	**0,79**	

Notes: a = Communality Score

Source: *Survey data (2019)*

Table 4-7 shows the factor structure for sustainability performance, while the sustainability reporting factor structure is depicted in Table 4-8, which both revealed identical factors under community development. The results show that the four (4) factors affecting community development cumulatively account for 68.89% and 68.24% of the total variance for sustainability performance and sustainability reporting, respectively. Local enterprise development alone accounted for 43.20% and 42.22% of the total variance for sustainability performance and sustainability reporting, respectively; local infrastructure development accounted for 11.03% and 10.86%; skills development accounted for 8.26% and 8.91% of the variance, while housing and living conditions accounted for 6.41% and 6.26% for sustainability performance and sustainability reporting, respectively. The four (4) factors are analysed in detail in the next sub-sections starting with local enterprise development.

4.3.1.1. Local Enterprise Development

Local enterprise development was empirically tested and validated as a factor for sustainability under community development. This factor brought together economic variables related to enterprise development, supplier development and procurement of local goods and services from mine host communities. These results resonate with prior studies (Ortas et al., 2015; Lambrechts et al., 2019). Local economic development plays a vital role in stimulating the local economy by contributing to job creation, leading to increased income for residents and expansion of the source of taxation (Park & Choi, 2015).

According to Fagerström (2016), the success of companies ought to filter through to communities in which they operate such that local community development becomes indicative of the importance of successful communities in maximising shared value. In another study by Lambrechts et al. (2019), the procurement practices of companies emerged as an important economic indicator of sustainability.

Based on a five-point Likert that ranged from 1 (strongly agree) to 5 (strongly disagree), mean scores were computed to determine how the respondents perceive the mining companies' level of involvement in supplier development, enterprise development and local procurement strategies. This research showed respondents disagreed that South African mining companies were effectively involved in creating opportunities for local economic development through enterprise development,

supplier development and local procurement, as depicted in Table 4-9, as shown by high mean scores.

Table 4-9: South African mining companies ranking on local enterprise development

Sustainability Performance			Sustainability Reporting		
Items	**Item Score**		**Items**	**Item Score**	
B27. Mining companies effectively create opportunities for enterprise development initiatives for host communities	2,80	Disagree	B28. Mining companies report the effectiveness of involvement in enterprise development opportunities for host communities	2,90	Disagree
B29. Mining companies undertake supplier development initiatives for host communities	2,90	Disagree	B30. Mining companies report the effectiveness of supplier development initiatives for host communities	2,90	Disagree
B31. Mining companies procure goods from host communities	2,70	Disagree	B32. Mining companies report procurement of goods from host communities	2,80	Disagree
B33. Mining companies procure services from host communities	2,80	Disagree	B34. Mining companies report procurement of services from host communities	2,90	Disagree

Source: *Survey data (2019)*

Table 4-9 shows the views and perceptions of the regulators on South African mining companies' level of involvement in local enterprise development as part of sustainability practices. The regulators acknowledged some level of consistency between sustainability performance and sustainability reporting as far as local economic development is concerned. Although companies are obliged to contribute meaningfully to local economic development, in the views of regulators, there was no such evidence from the sample. Regulators disagreed with both sustainability performance and sustainability reporting statements.

It was the opinion of regulators that South African mining companies might not have fully explored using local enterprise development as one of their sustainability

activities. In this respect, South African mining companies should collaborate extensively with host communities and other stakeholders to identify meaningful procurement opportunities to uplift Small, Medium and Micro Enterprises (SMMEs) to create shared value through local spending (Renzi, 2021). To improve stakeholder collaboration, South African mining companies can also positively impact communities by working closely with local suppliers by sub-contracting SMMEs with large suppliers. Moreover, mining companies may develop existing procurement capacity to source from local suppliers to stimulate local economic activities.

Business leaders also need to be proactive in correcting this perception. If indeed they are not performing as expected, South African mining companies need to explain any impediments and try to explore solutions together with the regulators. South African mining companies should ensure effective communication with stakeholders, including industry regulators since their views and perceptions influence policy direction that impacts the industry.

4.3.1.2. Local infrastructure development

The research validated local infrastructure development as a factor for sustainability under community development. The items measured in this factor included participation in local infrastructure development such as educational infrastructure, roads, water and sanitation, health, and sports and recreation infrastructure projects.

The results are consistent with Dissanayake et al. (2016), who addressed incorporating infrastructure development projects as part of sustainable development. Dissanayake et al. (2016) further indicated that companies feel some stakeholder pressure from the government when there is a policy focus on infrastructure development for legitimacy purposes. Table 4-10 shows the current sample's sustainability performance and sustainability reporting results.

Table 4-10: South African mining companies ranking on infrastructure development

Sustainability Performance			**Sustainability Reporting**		
Items	**Item Score**		**Items**	**Item Score**	
B7. Mining companies effectively contribute in educational	3,30	Neutral	B8. Mining companies report on the effectiveness of	3,20	Neutral

Sustainability Performance				Sustainability Reporting			
Items		**Item Score**		**Items**		**Item Score**	
	infrastructure projects as part of community development				contribution towards educational infrastructure projects as part of community development		
B9.	Mining companies effectively participate in road infrastructure projects in host communities	2,90	Disagree	B10.	Mining companies report on the effectiveness of participation in road infrastructure projects in host communities	2,90	Disagree
B11.	Mining companies effectively participate in Water and sanitation infrastructure as part of community development	2,80	Disagree	B12.	Mining companies report on the effectiveness of participation in Water and Sanitation infrastructure as part of community development	2,80	Disagree
B13.	Mining companies effectively participate in health infrastructure projects in host communities	3,10	Neutral	B14.	Mining companies report on the effectiveness of participation in health infrastructure projects in host communities	3,10	Neutral
B15.	Mining companies effectively participate in Sports and Recreation infrastructure projects as part of community development	3,00	Neutral	B16.	Mining companies report the effectiveness of involvement in Sports and Recreation infrastructure projects as part of community development	3,00	Neutral
Composite score		**3,00**	**Neutral**	**Composite score**		**3,00**	**Neutral**

Source: *Survey data (2019)*

Table 4-10 shows that regulators were neutral on South African mining companies' investment in local infrastructure development projects in host communities to improve the quality of life. It is important for South African mining companies to adhere to regulatory prescripts and to extensively engage with regulators to keep up with the provisions of the MPRDA, the SLP and the mining charter (Renzi, 2021). This would assist all parties involved in understanding the impact of prioritised local infrastructure

projects in line with the social licence to operate for the duration of the mining right (Gaudencio et al., 2020).

Moreover, regulators need to take cognisance of the factual issues behind South African mining companies' neutral perceived performance regarding the level of infrastructure development. This will enable respective parties to ensure that a sustainable solution can be arrived at, considering the value South African mining companies continue to derive from mining operations in these communities. Failure to meet societal expectations could have negative implications for business continuity, tantamount to the termination of the social licence to operate (Hossain et al., 2015; O'Faircheallaigh, 2015). It is, therefore, in companies' interest to be visible in the communities in which they operate and to give back to communities through investment in infrastructure.

4.3.1.3. Skills development

Skills development emerged as one of the factors affecting sustainability under community development. The factor focuses on improving the skills profile of host community members through learnerships, internships and skills transfers. Companies are now incorporating skills development within sustainability strategies by extending internal skills development initiatives to communities where they operate to maintain legitimacy (Duff, 2017). Moreover, companies that merged training and development by appealing to youth and graduates have created an image of integrity. They are seen as having wider interests in actions by putting something back into the communities in which they operate (Duff, 2017).

According to Bocken et al.'s (2015), training assists community members in securing future long-term employment to alleviate poverty in host communities. Other initiatives such as bursaries, learnerships and relevant work-related exposure benefit communities as it improves the quality of life (O'Faircheallaigh, 2015; Ranängen & Zobel, 2014). The results from this research suggest performance gaps as far as South African mining companies' effective involvement in skills development initiatives to host communities is concerned. Table 4-11 shows South African mining companies' sustainability performance and sustainability reporting rankings by regulators.

Table 4-11: South African mining companies' ranking on skills development

Sustainability Performance			Sustainability Reporting		
Items	**Item Score**		**Items**	**Item Score**	
B21. Mining companies have learnership programmes for people in host communities	3,50	Neutral	B22. Mining companies report learnership programmes for people in host communities	3,50	Neutral
B23. Mining companies have internship programmes for people in host communities	3,50	Neutral	B24. Mining companies report internship programmes for people in host communities	3,50	Neutral
B25. Mining companies transfer skills to host communities	3,10	Neutral	B26. Mining companies report skills transferred to host communities	3,10	Neutral
Composite score	**3,40**		**Composite score**	**3,40**	

Source: *Survey data (2019)*

Table 4-11 shows that regulators were neutral on whether South African mining companies effectively invested in skills development programmes through internships, learnerships and skills transfers. It should be noted that in this context, skills development initiatives are not limited to training on skills in the mining sector. South African mining companies could contribute to community development by closing the skills gap. South African mining companies also could consider a diversity of skills needed to address broader employment needs by supporting local capacity building outside mining careers.

If South African mining companies are not transferring technical skills to host communities, they could face a future skills gap. In this sense, skills development is no longer a social imperative to legitimise a company's standing in the eyes of regulators and other stakeholders but rather a lifeline for companies' future sustainability. It is, therefore, in South African mining companies' interest to secure a pipeline of requisite skills as part of their sustainability activities to ensure a pool of future resources while simultaneously improving the living standards and livelihood of host communities.

4.3.1.4. Housing and living conditions

The housing and living conditions factor was tested as a factor of sustainability in a regulated setting. This factor had three (3) dominant loadings onto it: housing and living conditions of employees, host communities and labour-sending areas. Literature related to the results is almost non-existent. Most literature on South African mining studies dealt with local housing as a generic concept and not in terms of greenwashing (Atkins & Maroun, 2015; de Villiers & Alexander, 2014; Humby, 2016). Humby (2016), for example, broadly dealt with it by shedding some light on the tainted South African mining legacy of the past and the subsequent regulation to eradicate the hostel system.

Humby (2016) indicates that the MPRDA, the Mining Charter and the introduction of SLPs should redress past injustices and imbalances in the industry. While the negative externalities of the mining industry are historically innate and well-documented, they include social disruption of communities by mining operations; land title disputes; inequitable distribution of wealth across the community and to other stakeholders; community-based corporate initiatives falling short and inadequately compensating residents for damages to livelihoods, the environment, and the community at large (Dimmler, 2017). Dimmler (2017) further noted that the mining industry was also marred with overconsumption of natural resources, social tensions that could rise to physical violence due to social changes brought to the community by operations, and technological innovations requiring a higher-level skillset and disrupting employment.

It is a requirement for South African mining companies to comply with the SLP and to report compliance to the DMR. South African mining companies' ranking on housing and living conditions is displayed in Table 4-12.

Table 4-12: South African mining companies' ranking on housing and living conditions

Sustainability Performance			**Sustainability Reporting**		
Items	**Item Score**		**Item Score**	**Item Score**	
B1. Mining companies undertake effective housing infrastructure projects to improve living conditions of employees	3,00	Neutral	B2. Mining companies report on the effectiveness of their housing infrastructure projects undertaken to improve	3,00	Neutral

Sustainability Performance				Sustainability Reporting			
Items		**Item Score**		**Item Score**		**Item Score**	
					living conditions of employees		
B3.	Mining companies undertake effective housing infrastructure projects to improve living conditions in host communities	2,80	Disagree	B4.	Mining companies report on the effectiveness of housing infrastructure projects undertaken to improve living conditions in host communities	2,90	Disagree
B5.	Mining companies undertake effective housing infrastructure projects to improve living conditions in labour-sending areas	2,60	Disagree	B6.	Mining companies report on the effectiveness of housing infrastructure projects undertaken to improve living conditions in labour-sending areas	2,60	Disagree
Composite score		**2,80**		**Composite score**		**2,80**	

Source: *Survey data (2019)*

Table 4-12 shows that mining companies are required to provide decent housing for employees, host communities and labour-sending areas but regulators were neutral (neither agree nor disagree) on whether South African mining companies undertook housing infrastructure projects to improve living conditions of employees effectively and they disagreed that South African mining companies were undertaking effective housing infrastructure projects to improve living conditions in host communities and labour-sending areas. This means that South African mining companies are not meaningfully addressing housing and living conditions as regulations envisage.

However, these perceptions should not imply that South African mining companies did not fully embed housing and living conditions in their respective SLPs. This is just an indication of implementation gaps in SLP projects. Therefore, all involved parties should ensure that tangible sustainability projects are undertaken based on mutually acceptable terms per the SLP. It is also argued that when the livelihoods and quality of life of local communities improve, South African mining companies will enjoy more social support in keeping with the principles of the social licence to operate in those communities (Gaudencio et al. 2020). It is, therefore, necessary for South African mining companies to invest in decent accommodation for employees and to promote affordable home ownership to improve living conditions.

4.3.2. Analysis of employee welfare as an indicator of sustainability

The scree plot for sustainability performance – Employee welfare shows that 38 items from the survey were reduced to three (3) factors. This is evidenced by a noticeable difference in the slope depicted in Appendix D, which shows a gradual decline until the point of inflexion. Therefore, only three (3) factors to the left of the elbow met the retention criteria. Tables 4-13 and 4-14 examine the EFA results of the rotated solution for sustainability performance and sustainability reporting, respectively.

Table 4-13 reflects the views and perceptions of the regulators on South African mining companies' participation in community development regarding sustainability performance. The results show three (3) factors affecting sustainability performance under employee welfare: Occupational Health and Safety, labour practices, diversity and inclusion and employment equity. In Table 4-14, the study explores the sustainability reporting factor structure.

Table 4-14 reflects the views and perceptions of the regulators on South African mining companies' participation in community development as far as sustainability reporting is concerned. It also shows that the three (3) factors affecting SR that loaded successfully are Occupational health and safety, labour practices, diversity and inclusion, and employment equity. A detailed analysis of sustainability factors under community development is provided in the next sub-sections starting with Occupational health and safety.

Table 4-13: A 3-factor solution for sustainability performance – Employee welfare

	Health and Safety	Labour practices, diversity and inclusion	Employment equity	*a*
C53. Mining companies effectively implement mine safety strategies to prevent harm	**0,87**	0,00	0,05	0,69
C57. Mining companies have effective safety monitoring systems to prevent harm, exposure to risk and danger	**0,85**	0,00	0,04	0,71
C59. Mining companies have effective controls in place to protect the health and safety of mining employees	**0,85**	0,01	0,03	0,74
C69. Mining companies conduct effective training and educational programmes about Health and Safety	**0,82**	0,01	0,07	0,70
C61. Mining companies have effective Safety Improvement Plans to reduce incidents in mines	**0,80**	0,03	0,00	0,66
C55. Mining companies have effective health and safety management systems to protect the health and safety of employees in mines	**0,80**	0,03	0,10	0,69
C51. Mining companies have effective mine safety strategies to prevent employee harm and exposure to risk and danger	**0,79**	0,00	0,09	0,63
C75. Mining companies have effective wellness programmes	**0,79**	0,03	0,06	0,66
C65. Mining companies allocate appropriate resources to ensure occupational health and safety of employees	**0,79**	0,00	0 and	0,59
C63. Mining companies timely implement Safety improvement plans to eliminate incidents in mines	**0,78**	0,04	-0,10	0,62
C77. Mining companies have effective disease management programmes	**0,76**	0,00	0,00	0,55
C71. Mining companies conduct effective training and educational programmes about communicable diseases	**0,75**	0,05	0,07	0,62
C67. Mining companies have effective preventative measures to eliminate fatalities	**0,73**	0,00	-0,20	0,53
C73. Mining companies conduct effective training and educational programmes about non-communicable diseases	**0,69**	0,07	0,06	0,55
C31. Mining companies employ Black people in senior management positions	-0,10	**0,76**	0,24	0,61

	Health and Safety	Labour practices, diversity and inclusion	Employment equity	*a*
C23. Mining companies employ Black people in executive management positions	0,09	**0,71**	0,00	0,58
C11. Mining companies adhere to equal pay for equal work principle	0,00	**0,66**	-0,20	0,42
C29. Mining companies employ disabled people in senior management positions	0,04	**0,65**	-0,50	0,59
C19. Mining companies employ women in executive management positions	0,09	**0,64**	-0,20	0,49
C21. Mining companies employ disabled people in executive management positions	0,04	**0,64**	-0,50	0,59
C9. Employees in mining companies have fair and equal benefits	0,06	**0,63**	-0,10	0,43
C27. Mining companies employ women in senior management positions	0,24	**0,58**	0,02	0,53
C15. Mining companies implement employee development programmes	0,15	**0,53**	0,24	0,47
C7. Employees in mining companies have equal job opportunities	0,06	**0,52**	0,01	0,31
C39. Mining companies employ Black people in middle management positions	-0,10	0,52	**0,48**	0,52
C37. Mining companies employ disabled people in middle management positions	0,15	**0,52**	-0,20	0,37
C17. Mining companies invest in long-term employment growth of employees	0,17	**0,52**	0,03	0,39
C3. Mining companies uphold freedom of association for employees	0,05	**0,45**	0,24	0,31
C45. Mining companies employ disabled people in junior positions	0,00	**0,44**	0,06	0,19
C1. Mining companies uphold fair labour relations practices	0,20	**0,43**	0,12	0,33
C13. Mining companies have a living wage	0,10	**0,41**	0,15	0,26
C49. Mining companies employ white people in junior positions	0,00	0,39	0,03	0,14
C33. Mining companies employ white people in senior management positions	0,02	-0,20	**0,74**	0,56
C47. Mining companies employ Black people in junior positions	0,14	-0,10	**0,72**	0,55

	Health and Safety	Labour practices, diversity and inclusion	Employment equity	*a*
C43. Mining companies employ women in junior positions	-0,10	0,29	**0,71**	0,59
C25. Mining companies employ white people in executive management positions	0,07	-0,10	**0,67**	0,46
C35. Mining companies employ women in middle management positions	0,15	0,32	**0,46**	0,43
C5. Employees in the mining companies have the right to collective bargaining	0,08	0,30	0,35	0,27
Eigenvalue	12,85	3,92	3,49	
Total Explained Variance	33,80	10,32	9,18	
Cumulative Explained Total Variance	33,80	44,12	53,31	
Cronbach's α	**0,96**	**0,90**	**0,82**	

Notes: a = Communality score

Source: *Survey data (2019)*

Table 4-14: A 3-factor solution for sustainability reporting – Employee welfare

	Occupational Health and Safety (OHS)	Labour Practices, Diversity and Inclusion	Employment equity	a
C58. Mining companies report on the effectiveness of their safety monitoring systems to prevent harm, exposure to risk and danger	**0,85**	-0,10	0,06	0,66
C78. Mining companies report on the effectiveness of their disease management programmes	**0,84**	0,00	-0,10	0,63
C70. Mining companies report on the effectiveness of their training and educational programmes about OHS	**0,84**	0,03	0,00	0,73
C62. Mining companies report the effectiveness of Safety Improvement Plans to reduce incidents in mines	**0,81**	0,00	0,00	0,65
C60. Mining companies report on the effectiveness of health and safety controls to protect the health and safety of mining employees	**0,81**	-0,10	0,06	0,64
C76. Mining companies report on the effectiveness of their wellness programmes	**0,80**	0,03	0,00	0,67
C56. Mining companies report the effectiveness of their health and safety management systems in protecting the health and safety of employees	**0,79**	-0,10	0,19	0,65
C72. Mining companies report on the effectiveness of their training and educational programmes about communicable diseases	**0,78**	0,10	-0,10	0,65
C64. Mining companies report that they effectively implement Safety Improvement Plans to eliminate incidents in mines	**0,77**	0,04	0,01	0,64
C54. Mining companies report that they effectively implement mine safety strategies to prevent harm	**0,77**	0,00	0,16	0,67
C68. Mining companies report that they have effective preventative measures to eliminate fatalities	**0,76**	0,08	-0,10	0,62
C66. Mining companies report that they have allocated appropriate resources to ensure OHS of employees	**0,73**	0,09	0,00	0,62
C74. Mining companies report on the effectiveness of their training and educational programmes about non-communicable diseases	**0,73**	0,12	-0,10	0,61
C52. Mining companies report on their mine safety strategies to prevent employee harm, exposure to risk and danger	**0,65**	0,12	0,24	0,68

	Occupational Health and Safety (OHS)	Labour Practices, Diversity and Inclusion	Employment equity	a
C30. Mining companies report employment of disabled people in senior management positions	0,08	**0,76**	-0,30	0,63
C22. Mining companies report employment of disabled people in executive management positions	0,13	**0,74**	-0,30	0,63
C20. Mining companies report employment of women in executive management positions	0,06	**0,70**	-0,10	0,51
C12. Mining companies report their adherence to equal pay for equal work principle	-0,10	**0,69**	0,00	0,40
C8. Mining companies report that employees have equal job opportunities	0,00	**0,67**	0,03	0,46
C18. Mining companies report investment in long-term employment growth of employees	0,11	**0,62**	0,00	0,46
C10. Mining companies report that their employees have the right to fair and equal benefits for employees	0,00	**0,62**	0,10	0,43
C2. Mining companies report that they uphold fair labour relations practices	0,03	**0,60**	0,26	0,52
C38. Mining companies report employment of disabled people in middle management positions	0,16	**0,58**	-0,20	0,42
C24. Mining companies report employment of Black people in executive management positions	0,23	**0,51**	0,16	0,51
C32. Mining companies report employment of Black people in senior management positions	0,09	**0,50**	0,35	0,53
C28. Mining companies report employment of women in senior management positions	0,32	**0,49**	0,19	0,62
C14. Mining companies report that they have a living wage	0,10	**0,49**	0,23	0,42
C46. Mining companies report employment of disabled people in junior positions	0,00	**0,46**	0,09	0,23
C16. Mining companies report on their employee development programmes	0,28	**0,46**	0,16	0,50
C4. Mining companies report that freedom of association of employees is upheld	0,02	**0,42**	0,26	0,31

	Occupational Health and Safety (OHS)	Labour Practices, Diversity and Inclusion	Employment equity	a
C48. Mining companies report employment of Black people in junior positions	0,11	-0,10	**0,78**	0,63
C34. Mining companies report employment of white people in senior management positions	0,03	-0,20	**0,71**	0,49
C44. Mining companies report employment of women in junior positions	0,05	0,15	**0,71**	0,61
C26. Mining companies report employment of white people in executive management positions	0,00	0,00	**0,70**	0,46
C40. Mining companies report employment of Black people in middle management positions	0,12	0,25	**0,61**	0,59
C36. Mining companies report employment of women in middle management positions	0,21	0,09	**0,55**	0,46
C6. Mining companies report that employees have the right to collective bargaining	0,11	0,27	**0,49**	0,45
C50. Mining companies report employment of white people in junior positions	0,00	0,18	0,19	0,07
Eigenvalue	14,51	3,43	3,25	
Total Explained Variance	38,19	9,02	8,56	
Cumulative Explained Total Variance	38,19	47,21	55,77	
Cronbach's α	**0,96**	**0,91**	**0,85**	

Notes: a = communality score

Source: *Survey data (2019)*

4.3.2.1. Occupational health and safety

Occupational health and safety is the first rotated factor that alone accounted for 33.80% and 38.19% of the total variance for sustainability performance and sustainability reporting, respectively. The factor was comprised of items that dealt with effective mine safety strategies to prevent harm; safety monitoring systems to prevent harm and exposure to risk and danger; the existence of effective controls to protect employees' health and safety; safety improvement plans to reduce incidents in mines; effective health and safety management systems; effective wellness programmes; allocation of appropriate resources to ensure health and safety of employees; timely implementation of safety improvement plans to eliminate incidents in mines; effective disease management programmes; effective preventative measures to eliminate fatalities; and effective training and educational programmes about communicable and non-communicable diseases.

Literature recognised the importance of employee health and safety as a stakeholder issue to be managed and incorporated into companies' sustainability agenda (Ruiz-Frutos et al., 2019). Employee health and safety has attracted considerable attention from governments and is being positioned as a key aspect in the decision-making process of companies. Ruiz-Frutos et al. (2019) found that sustainability reporting on health and safety did not reflect factual information on the quality of life at work. The results for the health and safety of workers were found to be seemingly overestimated when compared to the occupational health and safety management system audits and with the performance indicators (Ruiz-Frutos et al., 2019).

Hossain et al. (2015) found that workplace safety and security, including occupational health and safety and training, was moderately disclosed in sustainability reporting due to pressure from employee stakeholders and the coincidence of introducing labour laws. Table 4-15 presents this research's occupational health and safety results.

Table 4-15: South African mining companies' ranking on occupational health and safety

Sustainability Performance			Sustainability Reporting		
Items	**Item Score**		**Items**	**Item Score**	
C51. Mining companies have effective mine safety strategies to prevent employee harm and exposure to risk and danger	3,60	Neutral	C52. Mining companies report on their mine safety strategies to prevent employee harm, exposure to risk and danger	3,70	Neutral
C53. Mining companies effectively implement mine safety strategies to prevent harm	3,40	Neutral	C54. Mining companies report that they effectively implement mine safety strategies to prevent harm	3,70	Neutral
C55. Mining companies have effective health and safety management systems to protect the health and safety of employees in mines	3,50	Neutral	C56. Mining companies report the effectiveness of their health and safety management systems in protecting the health and safety of employees	3,60	Neutral
C57. Mining companies have effective safety monitoring systems to prevent harm, exposure to risk and danger	3,30	Neutral	C58. Mining companies report on the effectiveness of their safety monitoring systems to prevent harm, exposure to risk and danger	3,50	Neutral
C59. Mining companies have effective controls in place to protect the health and safety of mining employees	3,40	Neutral	C60. Mining companies report on the effectiveness of health and safety controls to protect the health and safety of mining employees	3,50	Neutral
C61. Mining companies have effective safety improvement plans to reduce incidents in mines	3,50	Neutral	C62. Mining companies report the effectiveness of Safety Improvement Plans to reduce incidents in mines	3,50	Neutral
c63. Mining companies timeously implement safety improvement plans to eliminate incidents in mines	3,30	Neutral	c64. Mining companies report that they effectively implement safety improvement plans to eliminate incidents in mines	3,40	neutral
C65. Mining companies allocate appropriate resources to ensure occupational health and safety of employees	3,30	Neutral	C66. Mining companies report that they have allocated appropriate resources to ensure occupational health and safety of employees	3,40	Neutral
C67. Mining companies have effective preventative measures to eliminate fatalities	3,20	Neutral	C68. Mining companies report that they have effective preventative measures to eliminate fatalities	3,40	Neutral
C69. Mining companies conduct effective training and educational programmes about occupational health and safety	3,40	Neutral	C70. Mining companies report on the effectiveness of their training and educational programmes about occupational health and safety	3,50	Neutral
C71. Mining companies conduct effective training and educational programmes about communicable diseases	3,40	Neutral	C72. Mining companies report on the effectiveness of their training and educational programmes about communicable diseases	3,40	Neutral

Sustainability Performance			Sustainability Reporting		
Items	**Item Score**		**Items**	**Item Score**	
C73. Mining companies conduct effective training and educational programmes about non-communicable diseases	3,30	Neutral	C74. Mining companies report on the effectiveness of their training and educational programmes about non-communicable diseases	3,40	Neutral
C75. Mining companies have effective wellness programmes	3,40	Neutral	C76. Mining companies report on the effectiveness of their wellness programmes	3,40	Neutral
C77. Mining companies have effective disease management programmes	3,30	Neutral	C78. Mining companies report on the effectiveness of their disease management programmes	3,30	Neutral
Composite score	**3,50**	**Neutral**	**Composite score**	**3,40**	**Neutral**

Source: *Survey data (2019)*

The results in Table 4-15 indicate that respondents perceived South African mining companies had taken a rather neutral stance concerning occupational health and safety practices. Overall, this perception could be unhealthy for South African mining companies since investors are beginning to consider health and safety indicators as key determinants for the future sustainability of companies.

It should be noted that if South African mining companies neglect safety standards and protocols, they stand to lose out on production targets and profits due to mine stoppages. In this regard, it is in South African mining companies' interest to conform to stakeholders' pressure by providing a safe environment, adopting a risk-based management approach to occupational health and safety, providing training to reduce health and safety risks and appropriating adequate resources to support existing occupational health and safety systems and procedures.

In this regard, South African mining companies need to be well poised to adhere to legislative requirements to ensure a healthy workforce by preventing employee harm and fatalities. South African mining companies need to prioritise the health and safety of employees by investing in safety-related technologies to prevent mine accidents and fatalities. Furthermore, adherence to standard operating procedures and best practices places South African mining companies in good stead with stakeholders who wittingly or unwittingly determine their existence through the SLO. Therefore, South African mining companies should work very closely with regulators to ensure that safety management systems and controls are in place and aligned with health and safety policies.

South African mining industry is already tainted by the apartheid legacy of an uncaring attitude towards employees' health and safety, where marginalised Black people were exposed to dust and dangerous conditions in the mines (Ramatji, 2013). South African mining companies appear obliged by legislation to comply with statutory laws. Furthermore, occupational health and safety have since become a reputation variable characterised as a social problem that affects various stakeholders (Dimmler, 2017). In this respect, a culture of risk prevention has to be fostered to ensure the implementation of safety strategies and associated safety improvement plans that need to be promoted, along with the use of available technology to prevent hazards and fatalities. Moreover, legislation empowers regulators to halt operations and even

affect mine closures. Therefore, It is in South African mining companies' interest to uphold the law concerning mine health and safety to prevent injuries and save lives.

4.3.2.2. Labour practices, diversity and inclusion

Labour practices, diversity and inclusion as a sustainability factor had 20 loadings accounting for 10.32% and 9.02% of the variation for Sustainability performance and sustainability reporting, respectively. The items that loaded on this factor included employment of black people in executive, senior and middle management positions; employment of women in executive and senior management positions; employment of disabled people in executive, senior and junior positions; employment of white people in junior positions; equal job opportunities; adherence to equal pay for equal work; fair and equal benefits; fair labour relations practice; a living wage; investment in long-term employment growth of employees; employee development programmes; and freedom of association for employees.

Existing literature broadly dealt with labour practices and the promotion of diversity and inclusion and not in the context of sustainability, particularly the promotion of gender equality in the workplace covered different aspects of diversity and inclusion. There is growing pressure for companies to disclose their employment practices in their sustainability reports in response to legislative and policy initiatives actively promoting gender equality, equal employment opportunities for women and diversity in the workplace (Kaggwa, 2020).

Frias-Aceituno et al. (2013) found that gender diversity was among the most important factors contributing to companies' sustainability reporting posture. In addition, the presence of women at the senior management level was found to positively influence company behaviour and its sustainability reporting practices (Frias-Aceituno et al., 2013). Diversity statistics such as race, sex, age, ethnicity, and other diversity initiatives are important in companies' sustainability reporting; however, disclosures of diversity information were poor (Hossain et al., 2015).

Table 4-16 shows the overall ranking scores of regulators on South African mining companies' labour practices, diversity and inclusion are neutral.

Table 4-16: South African mining companies' ranking on labour practices, diversity and inclusion

Sustainability Performance			Sustainability Reporting		
Items	**Item Score**		**Items**	**Item Score**	
C1. Mining companies uphold fair labour relations practices	3,00	Neutral	C2. Mining companies report that they uphold fair labour relations practices	3,20	Neutral
C3. Mining companies uphold freedom of association for employees	3,30	Neutral	C4. Mining companies report that freedom of association of employees is upheld	3,30	Neutral
C7. Employees in mining companies have equal job opportunities	2,40	Disagree	C8. Mining companies report that employees have equal job opportunities	2,80	Disagree
C9. Employees in mining companies have fair and equal benefits	2,50	Disagree	C10. Mining companies report that their employees have the right to fair and equal benefits	2,90	Disagree
C11. Mining companies adhere to equal pay for equal work principle	2,50	Disagree	C12. Mining companies report their adherence to equal pay for equal work principle	2,70	Disagree
C13. Mining companies have a living wage	3,00	Neutral	C14. Mining companies report that they have a living wage	3,20	Neutral
C15. Mining companies implement employee development programmes	3,30	Neutral	C16. Mining companies report on their employee development programmes	3,30	Neutral
C17. Mining companies invest in long-term employment growth of employees	2,80	Disagree	C18. Mining companies report investment in long-term employment growth of employees	3,00	Neutral
C19. Mining companies employ women in executive management positions	2,80	Disagree	C20. Mining companies report employment of women in executive management positions	3,00	Neutral
C21. Mining companies employ disabled people in executive management positions	2,40	Disagree	C22. Mining companies report employment of disabled people in executive management positions	2,60	Disagree
C23. Mining companies employ Black people in executive management positions	3,10	Neutral	C24. Mining companies report employment of Black people in executive management positions	3,20	Neutral
C27. Mining companies employ women in senior management positions	3,00	Neutral	C28. Mining companies report employment of women in senior management positions	3,10	Neutral
C29. Mining companies employ disabled people in senior management positions	2,50	Disagree	C30. Mining companies report employment of disabled people in senior management positions	2,70	Disagree
C31. Mining companies employ Black people in senior management positions	3,20	Neutral	C32. Mining companies report employment of Black people in senior management positions	3,30	Neutral
C37. Mining companies employ disabled people in middle management positions	2,60	Disagree	C38. Mining companies report employment of disabled people in middle management positions	2,80	Disagree
C45. Mining companies employ disabled people in junior positions	2,90	Disagree	C46. Mining companies report employment of disabled people in junior positions	2,90	Disagree
Composite score	**3,00**	**Neutral**	**Composite score**	**2,90**	**Disagree**

Source: *Survey data (2019)*

Table 4-16 shows that, in the main, regulators were neutral in their rankings of sustainability performance as far as labour practices, diversity and inclusion were concerned, while they generally disagreed with South African mining companies' reporting on labour practices, diversity and inclusion. However, it should be noted that these perceptions do not necessarily reflect that South African mining companies' sustainability performance has reached desired levels as far as labour practices, diversity, and inclusion, as regulators were neutral. In other words, they neither agreed nor disagreed that South African mining companies' approach to labour practices, diversity and inclusion was satisfactory. This is cause for concern, and South African mining companies need to fully embrace labour practices that incorporate diversity and inclusion in the workplace as part of their sustainability activities. It would be reasonable to expect that South African mining companies, in consultation with key stakeholders, could incorporate these views and give effect to various regulatory prescripts and guidelines on affirmative action to avert non-compliance.

4.3.2.3. Employment equity

Employment equity emerged as a sustainability factor, accounting for 9.18% and 8.56% of the variation in the data for sustainability performance and sustainability reporting, respectively. The items that successfully loaded onto this factor were employment of white people in executive and senior management positions and the employment of Black people and women in junior and middle management positions. Literature deals with employment equity in general terms and not specifically in the context of greenwashing.

Table 4-17 presents data from this study which shows regulators' ranking of South African mining companies' employment equity.

Table 4-17: South African mining companies' ranking on employment equity

Sustainability Performance			Sustainability reporting		
Items	**Item score**		**Items**	**Item Score**	
C25. Mining companies employ white people in executive management positions	4,10	Agree	C26. Mining companies report employment of white people in executive management positions	3,60	Neutral
C33. Mining companies employ white people in senior management positions	4,00	Agree	C34. Mining companies report employment of white people in senior management positions	3,60	Neutral
C35. Mining companies employ women in middle management positions	3,50	Neutral	C36. Mining companies report employment of women in middle management positions	3,50	Neutral
C43. Mining companies employ women in junior positions	3,60	Neutral	C44. Mining companies report employment of women in junior positions	3,60	Neutral
C47. Mining companies employ Black people in junior positions	3,90	Neutral	C48. Mining companies report employment of Black people in junior positions	3,70	Neutral
C39. Mining companies employ Black people in middle management positions	3,40	Neutral	C40. Mining companies report employment of Black people in middle management positions	3,50	Neutral
Composite score	3,60		Composite score	3,80	

Source: *Survey data (2019)*

Table 4-17 indicates that employment in senior and executive management levels was skewed towards white people, while respondents were neutral on the employment of black people and women in junior and middle management. Due to historical employment imbalances in management roles by South African companies, regulations have been introduced to ensure the representation of historically disadvantaged South Africans in various management layers, focusing on Black people and women. The research results suggest that despite these progressive regulations, South African mining companies have not achieved transformation targets as intended (Kaggwa, 2020), particularly regarding the representation of Black people and women in executive and senior management positions.

South African mining companies are legislatively expected to change the face and composition of the workforce to start reflecting society's demographics through employment practices that strive towards employment equity as demanded by laws and regulations. To achieve these, South African mining companies could also consider a targeted approach whereby historically disadvantaged South Africans are employed in occupational positions that are still underrepresented. By targeting historically disadvantaged South Africans as preferred candidates for accelerated skills development programmes, companies could create a pool of historically disadvantaged South Africans eligible for promotion into executive and senior management positions.

However, it seems that more still needs to be done to close gender gaps to advance transformation in mining. This should, amongst other things, include gender mainstreaming, creating an environment conducive for women and driving succession planning that earmarks the promotion of historically disadvantaged South Africans. However, this should not be implemented as a token for companies' legitimacy in society based on merit. While South African mining companies need to bolster their efforts to foster employment equity by including designated groups, especially historically disadvantaged South Africans such as women and Black people, in managerial positions, regulators need to improve their enforcement capabilities to monitor compliance to fast-track transformation in the industry. Over and above legislated targets, South African mining companies could require ethical and responsible business leadership and innovation to overcome some obstacles towards employment equity targets. Overall, companies' posture on employment equity will

ultimately determine their transformation trajectory, and a stakeholder-centric approach to employment equity is likely to produce the desired outcomes.

4.3.3. Analysis of environmental protection as an indicator of sustainability

The study examines the factor structure for environmental protection in the following sub-sections. The scree plots were examined to analyse the factor structure of environmental protection. The results of the scree plots were observed and presented in Appendix D. Of all the items measured from the questionnaire, only three (3) factors met the retention criteria. The retained factors were environmental management, environmental leadership, and environmental responsibility.

Environmental management as a validated factor of sustainability accounted for 55.84% and 58.22% of the total variance for sustainability performance and sustainability reporting, respectively; environmental leadership accounted for 9.18% and 10.10%, whereas environmental responsibility accounted for 5.85% and 5.39% of the variance for sustainability performance and sustainability reporting, respectively. The three (3) identified factors cumulatively accounted for 70.87% and 73.71% of the total variance. The 3-factor solution best explains the relationship between variations in the data. Tables 4-18 and 4-19 show factor loadings for environmental protection for sustainability performance and sustainability reporting, respectively.

Table 4-18: A 3-factor solution for sustainability performance – Environmental protection

	Environmental management	Environmental leadership	Environmental responsibility	*a*
D13. Mining companies are involved in effective air pollution reduction programmes	**0,91**	0,03	-0,20	0,75
D11. Mining companies undertake effective environmental management plan to prevent pollution	**0,90**	-0,10	0,00	0,72
D7. Mining companies have effective emission reduction strategies	**0,81**	0,15	-0,20	0,71
D17. Mining companies are involved in effective land pollution reduction programmes	**0,80**	0,11	0,05	0,79
D9. Mining companies undertake effective environmental management initiatives to conserve natural resources	**0,80**	0,07	0,02	0,72
D5. Mining companies undertake effective environmental management initiatives to promote greater Environmental Responsibility	**0,76**	0,09	0,06	0,71
D15. Mining companies are involved in effective water pollution reduction programmes	**0,74**	0,04	0,15	0,70
D19. Mining companies have effective Environmental Management Plan to minimise waste generation	**0,74**	0,06	0,07	0,66
D3. Mining companies effectively implement the Environmental Management Plan to reduce the negative impact of mining on the ecosystem	**0,72**	-0,10	0,19	0,62
D1. Mining companies have effective Environmental management Plan to reduce the negative impact of mining on the ecosystem	**0,67**	-0,10	0,26	0,33
D23. Mining companies effectively mitigate the influence of climate/weather conditions on the environment	0,55	**0,46**	-0,10	0,69
D27. Mining companies contribute towards the development of environmentally friendly technologies	0,00	**0,85**	0,11	0,81
D29. Mining companies are involved in the diffusion of environmentally friendly technologies	0,06	**0,80**	0,09	0,77
D25. Mining companies invest in research and development initiatives to reduce the impact of mining operations on the environment	0,13	**0,66**	0,09	0,63
D21. Mining companies are effectively involved in stewardship for climate change	0,46	**0,54**	-0,10	0,73
D31. Mining companies effectively undertake responsible use of materials	0,10	**0,49**	0,33	0,59
D39. Mining companies effectively undertake initiatives to develop renewable energy alternatives	-0,10	0,36	**0,56**	0,53
D37. Mining companies effectively undertake responsible use of energy	0,02	0,21	**0,67**	0,63
D33. Mining companies effectively undertake responsible use water	0,32	-0,10	**0,66**	0,66
D41. Mining companies effectively undertake rehabilitation and revegetation activities	0,20	0,15	**0,49**	0,49
D35. Mining companies effectively undertake responsible use of land	**0,42**	0,11	**0,42**	0,61
Eigenvalue	11,73	1,93	1,23	
Total Explained Variance per factor	55,84	9,18	5,85	
Cumulative Explained Total Variance	55,84	65,02	70,87	
Cronbach's α	**0,95**	**0,91**	**0,80**	

Notes: a = communality score ***Source:*** *Survey data (2019)*

Table 4-18 depicts the three (3) factors affecting sustainability under community development: environmental management, environmental leadership, and environmental responsibility. Table 4-19 analysis the factor solution for the sustainability reporting variable. From Table 4-18, it is evident that all the rotated factors, 20 out of 21 variables successfully loaded highly, however, it should be noted that D35 (Mining companies effectively undertake responsible use of land) had a cross-loading as it loaded successfully on both environmental management and environmental responsibility. Table 4-19 shows the factor loadings for environmental protection for sustainability reporting environmental protection.

From Tables 4-18 and 4-19, it is evident that all the rotated factors, 20 out of 21 variables, successfully loaded highly except D39 (Mining companies effectively undertake initiatives to develop renewable energy alternatives). Based on the slope of the scree, the results showed that the three (3) factors that loaded significantly onto the factor structure were environmental management, environmental leadership, and environmental responsibility. These factors are discussed in the next subsections starting with environmental management.

Table 4-19: A 3-factor solution for sustainability reporting – Environmental protection

	Environmental management	Environmental leadership	Environmental responsibility	*a*
D8. Mining companies report the effectiveness of their emission reduction strategies	**0,91**	0,00	-0,10	0,75
D6. Mining companies report the effectiveness of their environmental management initiatives to promote greater Environmental Responsibility	**0,88**	0,00	0,06	0,80
D14. Mining companies report their effectiveness of air pollution reduction programmes that they undertake	**0,87**	0,13	-0,10	0,82
D12. Mining companies report the effectiveness of environmental management plan to prevent pollution	**0,86**	0,13	-0,10	0,84
D4. Mining companies report effective implementation of their Environmental management Plan to reduce the negative impact of mining on the ecosystem	**0,84**	-0,20	0,15	0,68
D10. Mining companies report the effectiveness of their initiatives to conserve natural resources	**0,82**	0,03	0,02	0,72
D18. Mining companies report the effectiveness of their land pollution reduction programmes	**0,82**	0,16	0,00	0,83
D16. Mining companies report the effectiveness of their water pollution reduction programmes	**0,79**	0,09	0,01	0,71
D2. Mining companies report the effectiveness of their Environmental Management Plan to reduce the negative impact of mining on the ecosystem	**0,78**	-0,20	0,21	0,64
D20. Mining companies report the effectiveness of their environmental management Plan to minimise waste generation	**0,78**	0,16	0,00	
D28. Mining companies report the effectiveness of their contribution towards the development of environmentally friendly technologies	-0,10	**0,82**	0,23	0,76
D30. Mining companies report their involvement in the diffusion of environmentally friendly technologies	-0,10	**0,81**	0,22	0,79
D26. Mining companies report the effectiveness of their research and development initiatives in reducing the impact of mining operations on the environment	0,01	**0,79**	0,02	0,64
D24. Mining companies report the effectiveness of their strategies to mitigate the influence of climate/weather conditions on the environment	0,27	**0,71**	-0,20	0,70
D22. Mining companies report their stewardship for climate change	0,33	**0,70**	-0,20	0,74
D40. Mining companies report initiatives to develop renewable energy alternatives	0,08	**0,40**	0,37	0,48
D32. Mining companies report the effectiveness of their responsible use of materials	0,31	0,36	0,36	0,68
D36. Mining companies report their responsible use of land	**0,45**	*0,22*	*0,37*	*0,69*
D38. Mining companies report their responsible use of energy	0,04	0,30	**0,51**	0,51
D42. Mining companies report involvement in rehabilitation and revegetation activities	0,27	0,04	**0,49**	0,45
D34. Mining companies report their responsible use of water	0,39	0,22	**0,43**	0,68
Eigenvalue	12,23	2,12	1,13	
Total Explained Variance per factor	58,22	10,10	5,39	
Cumulative Explained Total Variance	58,22	68,32	73,71	
Cronbach's α	**0,96**	**0,91**	**0,75**	

Notes: a = communality score ***Source:*** *Survey data (2019)*

1.1.1.1. Environmental management

Environmental management had 10 items loading, namely, effective air pollution reduction programmes; environmental management plan to prevent pollution; emission reduction strategies; land pollution reduction programmes; environmental management initiatives to conserve natural resources; environmental management initiatives to promote greater environmental responsibility; water pollution reduction programmes; environmental management plan to minimise waste generation; effective implementation of the environmental management plan to reduce the negative impact of mining on the ecosystem; and availability of an effective environmental management plan to reduce the negative impact of mining on the ecosystem.

Environmental management factor accounted for 55.84% and 58.24% of the total variance for sustainability performance and sustainability reporting, respectively. Included in this factor were items such as pollution reduction programmes; the existence of effective environmental management plans to prevent pollution; existence of effective emission reduction strategies; minimising waste management; and whether South African mining companies had effective environmental management plans to conserve natural resources and to reduce the negative impact of mining on the ecosystem. Table 4-20 presents South African mining companies' rankings on environmental management.

Table 4-20: South African mining companies' ranking on environmental management

Sustainability Performance			Sustainability Reporting		
Items	**Item Score**		**Items**	**Item Score**	
D1. Mining companies have effective Environmental management Plan to reduce the negative impact of mining on the ecosystem	3,30	Neutral	D2. Mining companies report the effectiveness of their Environmental Management Plan to reduce the negative impact of mining on the ecosystem	3,40	Neutral
D3. Mining companies effectively implement the Environmental Management Plan to reduce the negative impact of mining on the ecosystem	3,00	Neutral	D4. Mining companies report effective implementation of their Environmental management Plan to reduce the negative impact of mining on the ecosystem	3,20	Neutral
D5. Mining companies undertake effective environmental management initiatives to promote greater Environmental Responsibility	3,00	Neutral	D6. Mining companies report the effectiveness of their environmental management initiatives to promote greater Environmental Responsibility	3,20	Neutral
D7. Mining companies have effective emission reduction strategies	2,90	Disagree	D8. Mining companies report the effectiveness of their emission reduction strategies	3,10	Neutral
D9. Mining companies undertake effective environmental management initiatives to conserve natural resources	3,00	Neutral	D10. Mining companies report the effectiveness of their initiatives to conserve natural resources	3,20	Neutral
D11. Mining companies undertake effective environmental management plan to prevent pollution	3,00	Neutral	D12. Mining companies report the effectiveness of environmental management plan to prevent pollution	3,20	Neutral
D13. Mining companies are involved in effective air pollution reduction programmes	3,00	Neutral	D14. Mining companies report their effectiveness of air pollution reduction programmes that they undertake	3,10	Neutral
D15. Mining companies are involved in effective water pollution reduction programmes	3,00	Neutral	D16. Mining companies report the effectiveness of their water pollution reduction programmes	3,20	Neutral
D17. Mining companies are involved in effective land pollution reduction programmes	3,00	Neutral	D18. Mining companies report the effectiveness of their land pollution reduction programmes	3,20	Neutral
D19. Mining companies have effective Environmental Management Plan to minimise waste generation	3,10	Neutral	D20. Mining companies report the effectiveness of their environmental management Plan to minimise waste generation	3,20	Neutral
Composite score	**3,20**	**Neutral**	**Composite score**	**3,00**	**Neutral**

Source: *Survey data (2019)*

Table 4-20 shows that, on average, regulators adopted a neutral view when it comes to environmental management practices by South African mining companies. The results are consistent with Zhang et al. (2022).

4.3.3.1. Environmental leadership

Environmental leadership as a factor of sustainability had seven (7) items loading, which included mitigating the influence of climate/weather conditions on the environment; contribution towards the development of environmentally friendly technologies; diffusion of environmentally friendly technologies; investment in research and development initiatives to reduce the impact of mining operations on the environment; and involvement in stewardship for climate change.

The factor measured underlying sustainability performance and sustainability reporting areas related to environmental leadership and accounted for 9.18% and 10.10% of the variance, respectively. Items included in environmental leadership related to investment in research and development initiatives to reduce the impact of mining on the environment, the development of environmentally friendly technologies, and involvement in the diffusion of environmentally friendly technologies. Data from this research is presented in Table 4-21, which shows regulators' perceptions of South African mining companies' environmental leadership.

Table 4-21: South African mining companies' ranking on environmental leadership

Sustainability Performance			Sustainability Reporting		
Items	**Item Score**		**Items**	**Item Score**	
D21. Mining companies are effectively involved in stewardship for climate change	2,80	Disagree	D22. Mining companies report their stewardship for climate change	2,90	Disagree
D23. Mining companies effectively mitigate the influence of climate/weather conditions on the environment	2,80	Disagree	D24. Mining companies report the effectiveness of their strategies to mitigate the influence of climate/weather conditions on the environment	2,90	Disagree
D25. Mining companies invest in research and development initiatives to reduce the impact of mining operations on the environment	2,90	Disagree	D26. Mining companies report the effectiveness of their research and development initiatives in reducing the impact of mining operations on the environment	2,90	Disagree
D27. Mining companies contribute towards the development of environmentally friendly technologies	3,00	Neutral	D28. Mining companies report the effectiveness of their contribution towards the development of environmentally friendly technologies	3,00	Neutral
D29. Mining companies are involved in the diffusion of environmentally friendly technologies	2,90	Disagree	D30. Mining companies report their involvement in the diffusion of environmentally friendly technologies	3,00	Neutral
Composite score	**2,90**	**Disagree**	**Composite score**	**2,90**	**Disagree**

Source: *Survey data (2019)*

Table 4-21 shows that regulators adopted a neutral position when it comes to environmental leadership by South African mining companies. The results are consistent with Chen et al. (2018).

4.3.3.2. Environmental responsibility

Environmental responsibility had three (3) items loading: measuring responsible energy use, responsible water use, and rehabilitation and revegetation activities. The factor measured underlying sustainability performance areas related to environmental responsibility and accounted for 5.85% and 5.39% of the variance for sustainability performance and sustainability reporting, respectively. The results are consistent with previous similar studies (Murguía & Böhling, 2013). Data from this research is presented in Table 4-22, which shows the results on environmental responsibility.

Table 4-22: South African mining companies' rankings on environmental responsibility

Sustainability Performance			**Sustainability Reporting**		
Items	**Item Score**		**Items**	**Item Score**	
D33. Mining companies effectively undertake responsible use water	3,20	Neutral	D34. Mining companies report their responsible use of water	3,30	Neutral
D37. Mining companies effectively undertake responsible use of energy	3,20	Neutral	D38. Mining companies report their responsible use of energy	3,20	Neutral
D41. Mining companies effectively undertake rehabilitation and revegetation activities	3,20	Neutral	D42. Mining companies report involvement in rehabilitation and revegetation activities	3,30	Neutral
Composite score	**3,20**		**Composite score**	**3,30**	

Source: *Survey data (2019)*

The results presented in Table 4-22 show that regulators perceived a conservatively moderate (neutral) ranking of South African mining companies' environmental responsibility. Regulators should conduct mandatory environmental inspections; these results suggest some non-compliance by the industry. The neutral stance of regulators is rather concerning since non-compliance with environmental laws could lead to further environmental degradation, as alluded to by (Abugre & Nyuur, 2015). It is, therefore, important for regulators to adopt more responsive regulation methods.

Regulators should always remain vigilant to institute legal action against transgressors who breach legislative provisions, commitments, and obligations. Moreover, companies found guilty of non-compliance detected through mandatory inspections could be susceptible to environmental liabilities that go hand-in-hand with such non-compliance.

Imposing such environmental fines, penalties, and sanctions might not completely deter companies from contravening environmental laws and regulations. Since punitive actions might not guarantee environmental performance, regulators need to take reasonable steps to address areas of non-compliance with environmental legislation and associated regulations. These could include heightened compliance monitoring of environmental authorisations related to mining rights and mining permit conditions. Regulators mandated to monitor and enforce environmental laws might need to boost their regulatory capacity and allocate adequate resources to monitor environmental compliance and ensure desired levels. Also, regulators might need to revisit their environmental compliance and enforcement strategy in line with the principles of sustainable development and the enforcement pyramid.

4.3.4. Reliability of the factors

In this section, a statistical analysis was conducted to test the reliability of the factors using Cronbach's alpha (α) and standardised alpha as suggested by Nunnally and Bernstein (1994). To ensure the reliability of the questionnaire, the α coefficients were obtained from the responses. The researcher used a commonly accepted rule of thumb for internal consistency. An $\alpha \geq 0.90$ is deemed excellent; $0.90 > \alpha \geq 0.80$ is deemed good; $0.80 > \alpha \geq 0.70$ is considered acceptable; whereas $0.7 > \alpha \geq 0.60$ is questionable; $0.60 > \alpha \geq 0.50$ is poor, and $0.50 > \alpha$ is unacceptable (Flo et al., 2018). The α for sustainability performance is 0.91, while the α for sustainability reporting is 0.94, and both are deemed excellent. The following 12 items were omitted as they did not load significantly in any of the factors and were not reliable:

- Employees in the mining companies have the right to collective bargaining (C5).
- Mining companies report that employees have the right to collective bargaining (C6).
- Mining companies employ people from host communities (B17).
- Mining companies report employment from host communities (B18).

- Mining companies effectively undertake responsible use of materials (D31).
- Mining companies report the effectiveness of their responsible use of materials (D32).
- Mining companies effectively undertake responsible use of land (D35).
- Mining companies report their responsible use of land (D36).
- Mining companies effectively undertake initiatives to develop renewable energy alternatives (D39).
- Mining companies report initiatives to develop renewable energy alternatives (D40).
- Mining companies employ white people in senior management positions (C41).
- Mining companies report employment of white people in middle management positions (C42).
- Mining companies employ white people in junior positions (C49).
- Mining companies report employment of white people in junior positions (C50).

The complete test results on reliability are found in **Appendix E.**

4.4. COMPARATIVE PAIRWISE DIFFERENCES

The second objective of this study was to investigate the perceived gap between sustainability performance and sustainability reporting from the regulators' perspective. The regulators assessed South African mining companies' sustainability performance and sustainability reporting on a Likert scale of 1-5. This section, therefore, reports the key results on the perceived gap between sustainability performance and sustainability reporting. Statistical inferences are made to answer the research questions and to attain the second research objective.

The researcher observed data collected from the regulators to measure sustainability performance and sustainability reporting variables and to determine if there were greenwashing tendencies by South African mining companies. However, to fully understand sustainability performance and sustainability reporting constructs, two (2) sets of descriptive statistics were computed, starting with individual descriptive statistics for all sustainability performance and sustainability reporting constructs, followed by descriptive statistics for matched pairs.

The pairwise differences t-test was used to investigate the differences between sustainability performance and sustainability reporting variables. The test was conducted at a significance level of 0.05. This means that the significance of the differences between sustainability performance and sustainability reporting was reflected by p-values less than 0.05, and the lack of significance was reflected by p-values greater than 0.05 (Bhagat & College, 2018). However, the researcher sought first to analyse the descriptive statistics for all sustainability constructs.

The descriptive statistics are presented starting with individual descriptive statistics. Descriptive statistics were first checked for normality, skewness and kurtosis measures, as Schönrock-Adema et al. (2009) suggested. Selected descriptive statistics for this research include means, standard deviations, skewness, and kurtosis. The standard deviation measured the deviation from the mean, while skewness indicated the symmetry of a distribution (Weber, 2014). The skewness and kurtosis of the variables were examined to check the normality of the data. A positive skew would describe a distribution where many scores are at the low end of the tail to the right, while a negative skew would indicate a longer left tail. “Kurtosis describes the shape of a probability distribution” (Weber, 2014: 307). Positive kurtosis reflects very peaked distributions with short and thick tails representing few outliers, while negative kurtosis is flat with long and thin tails indicating many outliers (Weston & Gore, 2006). Table 4.23 presents the descriptive statistics for all sustainability constructs.

Table 4-23: Descriptive statistics for all sustainability constructs

		Mean	Std Dev	Std Err Mean	Upper 95% Mean	Lower 95% Mean	N	Skewness	Kurtosis
B1P		2.81	0.81	0.07	2.94	2.67	150	–0.22	–0.19
B2P		3.02	0.74	0.06	3.14	2.90	150	–0.62	0.02
B3P		3.39	0.71	0.06	3.51	3.28	150	–0.64	0.38
B4P		2.81	0.79	0.06	2.93	2.68	150	–0.11	0.02
B1R		2.88	0.77	0.06	3.00	2.75	150	–0.23	0.14
B2R		3.00	0.70	0.06	3.11	2.89	150	–0.53	–0.13
B3R		3.37	0.70	0.06	3.48	3.25	150	–0.53	0.12
B4R		2.83	0.75	0.06	2.95	2.71	150	–0.16	0.24
C1P		3.37	0.71	0.06	3.49	3.25	150	–0.48	0.53
C2P		2.87	0.60	0.05	2.96	2.77	150	–0.22	0.36
C3P		3.77	0.68	0.06	3.88	3.66	150	–0.52	–0.12
C1R		3.48	0.65	0.05	3.58	3.37	150	–0.44	1.13
C2R		3.00	0.58	0.05	3.10	2.91	150	–0.32	0.84
C3R		3.57	0.69	0.06	3.68	3.46	150	–0.15	–0.53
D1P		3.04	0.76	0.06	3.16	2.91	150	–0.62	0.22
D2P		2.87	0.76	0.06	2.99	2.75	150	–0.69	–0.00
D3P		3.18	0.72	0.06	3.29	3.06	150	–0.58	0.19
D1R		3.20	0.76	0.06	3.32	3.08	150	–0.79	0.86
D2R		2.95	0.74	0.06	3.06	2.83	150	–0.46	0.33
D3R		3.24	0.71	0.06	3.36	3.13	150	–0.48	0.49

Notes: *B1P = Local enterprise development-Sustainability Performance; B2P = Local Infrastructure development- Sustainability Performance; B3P = Skills development- Sustainability Performance; B4P = Housing and living conditions- Sustainability Performance; C1P = Occupational Health and Safety- Sustainability Performance; C2P = Labour practices, diversity and inclusion- Sustainability Performance; C3P = Employment Equity-Sustainability Performance; D1P = Environmental management- Sustainability Performance;D2P = Environmental Leadership-Sustainability Performance; D3P = Environmental responsibility- Sustainability Performance; B1R = Local enterprise development- Sustainability Reporting; B2R = Local infrastructure development- Sustainability Reporting; B3R = Skills development- Sustainability Reporting; B4R = Housing and living conditions- Sustainability Reporting; C1R = Occupational Health and Safety- Sustainability Reporting; C2R = Labour practices, diversity and inclusion- Sustainability Reporting; C3R = Employment equity- Sustainability Reporting; D1R = SR-environmental management- Sustainability Reporting; D2R = Environmental leadership-Sustainability Reporting; D3R = SR-environmental responsibility- Sustainability Reporting*

Source: *Survey data (2019)*

Table 4-23 depicts that data was normally distributed according to skewness measures in the range of –3 to +3 distribution (Kline, 1998). No variable was found to be extreme or in excess of the threshold. However, all distributions were negatively skewed, while B1P, B2R, C3P, C3R and D2P showed a negative kurtosis.

The researcher is, however, interested in the mean differences between sustainability performance and sustainability reporting variables. In this regard, the Matched-Pairs Analysis was used to evaluate differences in mean scores of responses between sustainability performance and sustainability reporting. The matched-pairs differences were used to test the significance of the statistical differences in the means. Sustainability performance and sustainability reporting pairwise differences are calculated for each pair of factors; for example, Diff B1 = B1P-B1R. Therefore, the mean difference would indicate the gap between sustainability performance and sustainability reporting for B1. This computation was repeated for all paired constructs. Table 4-24 displays the descriptive statistics and statistical tests for sustainability performance, and sustainability reporting matched pairs.

Table 4-24 shows sustainability performance and sustainability reporting means, the standard error of the means, the upper and the lower 95% confidence intervals of the differences, correlations, the t-ratio, degrees of freedom, and associated *p*-values.

Across all 10 pairs, sustainability reporting received higher mean scores (an average composite score of 3.15) than sustainability performance (an average composite score of 3.11), with two (2) exceptions; B3R-B3P and C3R-C3P. The researcher found that the overall mean difference ranged from 0.02 for B2R-B2P and B4R-B4P to 0.19 for C3R-C3P. The mean difference was greatest for C3R-C3P (0.19), followed by D1R-D1P (0.16). However, the sample showed a slight variation (0.04) in the standard errors.

Table 4-24: Descriptive statistics and statistical tests for matched pairs

Matched Pairs	SP	SR	Mean Difference	Std Error	Upper 95%	Lower 95%	N	Correlation	t-Ratio	DF	Prob > |t|	Prob > t	Prob < t
B1R-B1P	2.81	2.88	0.07	0.04	0.15	-0.01	150	.81	1,81	149	.07	.04*	.96
B2R-B2P	3.02	3.00	-0.02	0.04	0.06	-0.10	150	.77	-0,50	149	.62	.69	.69
B3R-B3P	3.39	3.37	-0.03	0.03	0.03	-0.08	150	.89	-0,99	149	.32	.84	.16
B4R-B4P	2.81	2.83	0.02	0.05	0.11	-0.07	150	.75	0,44	149	.66	.33	.67
C1R-C1P	3.37	3.48	0.11	0.03	0.17	0.04	150	.83	3,16	149	.00*	.00*	1.00
C2R-C2P	2.87	3.00	0.13	0.04	0.21	0.06	150	.71	3,68	149	.00*	.00*	1.00
C3R-C3P	3.77	3.57	-0.19	0.04	-0.12	-0.27	150	.75	-4,90	149	<.00*	1.00	<.00*
D1R-D1P	3.04	3.20	0.16	0.04	0.25	0.07	150	.75	3,65	149	.00*	.00*	1.00
D2R-D2P	2.87	2.95	0.07	0.04	0.15	0.00	150	.82	2,02	149	.05*	.02*	.98
D3R-D3P	3.18	3.24	0.07	0.04	0.15	-0.01	150	.76	1,64	149	.10	.05	.95
Average	3.11	3.15	0.04	0.04									

Notes*: B1P = Local enterprise development-Sustainability Performance; B2P = Local Infrastructure development- Sustainability Performance; B3P = Skills development-Sustainability Performance; B4P = Housing and living conditions- Sustainability Performance; C1P = Occupational Health and Safety- Sustainability Performance; C2P = Labour practices, diversity and inclusion- Sustainability Performance; C3P = Employment Equity-Sustainability Performance; D1P = Environmental management- Sustainability Performance;D2P = Environmental Leadership-Sustainability Performance; D3P = Environmental responsibility- Sustainability Performance; B1R = Local enterprise development- Sustainability Reporting; B2R = Local infrastructure development- Sustainability Reporting; B3R = Skills development- Sustainability Reporting; B4R = Housing and living conditions- Sustainability Reporting; C1R = Occupational Health and Safety- Sustainability Reporting; C2R = Labour practices, diversity and inclusion- Sustainability Reporting; C3R = Employment equity- Sustainability Reporting; D1R = SR-environmental management- Sustainability Reporting; D2R = Environmental leadership- Sustainability Reporting; D3R = SR-environmental responsibility- Sustainability Reporting*

(-) = Negative; * denotes statistical significance at the 5% level

< = less than

Source: *Survey data (2019)*

Key conclusions of pairwise relationships between individual variables are shown in Table 4-25.

Table 4-25: Summary of matched-pairs differences results

Sustainability Constructs and associated hypothesis	Matched Pairs	SP	SR	Mean Diff	t-Ratio	Prob > |t|	Hypothesis Results
Local enterprise development	B1R-B1P	2.81	2.88	0.07	1,81	0,07	Fail to reject
Infrastructure development	B2R-B2P	3.02	3.00	-0.02	-0,50	0,62	Fail to reject
Skills Development	B3R-B3P	3.39	3.37	-0.03	-0,99	0,32	Fail to reject
Housing and living conditions	B4R-B4P	2.81	2.83	0.02	0,44	0,66	Fail to reject
Occupational Health and safety	C1R-C1P	3.37	3.48	0.11	3,16	.00*	Reject
Labour practices, diversity and inclusion	C2R-C2P	2.87	3.00	0.13	3,68	.00*	Reject
Employment equity	C3R-C3P	3.77	3.57	-0.19	-4,90	<.00*	Reject
Environmental management	D1R-D1P	3.04	3.20	0.16	3,65	.00*	Reject
Environmental leadership	D2R-D2P	2.87	2.95	0.07	2,02	.05*	Reject
Environmental responsibility	D3R-D3P	3.18	3.24	0.07	1,64	0.10	Fail to reject

Notes: *B1P = Local enterprise development-Sustainability Performance; B2P = Local Infrastructure development-Sustainability Performance; B3P = Skills development- Sustainability Performance; B4P = Housing and living conditions- Sustainability Performance; C1P = Occupational Health and Safety- Sustainability Performance; C2P = Labour practices, diversity and inclusion- Sustainability Performance; C3P = Employment Equity-Sustainability Performance; D1P = Environmental management- Sustainability Performance;D2P = Environmental Leadership-Sustainability Performance; D3P = Environmental responsibility- Sustainability Performance; B1R = Local enterprise development- Sustainability Reporting; B2R = Local infrastructure development- Sustainability Reporting; B3R = Skills development- Sustainability Reporting; B4R = Housing and living conditions- Sustainability Reporting; C1R = Occupational Health and Safety- Sustainability Reporting; C2R = Labour practices, diversity and inclusion- Sustainability Reporting; C3R = Employment equity- Sustainability Reporting; D1R = SR-environmental management- Sustainability Reporting; D2R = Environmental leadership- Sustainability Reporting; D3R = SR-environmental responsibility- Sustainability Reporting.*

** Denotes statistical significance at the 5% level*

Source: *Survey data (2019)*

Table 4-25 shows the comparative pairwise differences results. The results show significant differences between sustainability performance and sustainability reporting concerning occupational health and safety, labour practices, diversity and inclusion, environmental management, and environmental leadership at a 5% significance level. The results show that the highest difference between sustainability performance and sustainability reporting was 0.19 regarding employment equity. The following conclusions can be drawn based on Table 4-25.

4.4.1. Community development

Community development is regulated through the MPRDA, the Mining Charter and the SLP. All the factors under the community development sustainability dimension showed no greenwashing tendencies. The lack of significance of the gap between sustainability reporting and sustainability reporting is reflected in a p-value greater than 0.05. The results further reveal p-values greater than 0.05 for the following matched constructs: local enterprise development (t = 1.81; p, 0.07), infrastructure development (t = – 0.50; p, 0.62), skills development (t = –0.99; p, 0.32); local housing development (t = 0.44; p, 0.66). Since all the p-values are greater than 0.05, there is no statistically significant difference between the mean scores of sustainability performance and sustainability reporting at a 95.05% confidence level.

These results confirm Famiyeh et al.'s (2021) finding, which shows that from the lens of institutional theory, regulatory pressures have a significant positive impact on the sustainability decisions of mining companies. This is coherent with Ackers and Grobbelaar (2021), who, using the enlightened stakeholder theory, concluded that South African mining companies are seeking to gain the trust and approval of local communities and other stakeholders to secure the licence to operate in terms of both the mining right granted by DMR and the metaphorical social license from local communities. Using the stakeholder theory, Ngorima (2019) explained the South African mining companies' sustainability posture. According to Ngorima (2019), the legal requirements of the Mining Charter and the SLPs contributed to driving sustainability. Ngorima (2019) further indicated that South African mining companies were expected to do better since the industry itself was under the microscope in terms of impact, social expectations, its social contract and real issues in terms of regulatory scrutiny.

The results confirm that South African mining companies' responses to stakeholder pressure are aligned with the arguments of Park and Choi (2015), Demuijnck and Fasterling (2016) and Gaudencio et al. (2020) who found that companies were responsive to pressures from the local community concerning their social licence to operate. In this regard, South African mining companies appear to be displaying pro-social stakeholder sustainability behaviour on this sustainability dimension to avoid penalties for breaching the SLO.

The results agree with Molate et al. (2014), who found that South African mining companies have been institutionalised towards sustainability such that compliance with regulations is no longer a function of company-specific characteristics such as company size and sustainability-related intentions and performance. The results also support Zhao (2017) and Dong and Xu (2016), who found that regulation deters corporate misconduct through its authoritative and inhibitory legal mode. The results are discussed below, delving into each sustainability factor under the community development dimension, starting with local enterprise development.

4.4.1.1. Local enterprise development

The pair revealed a paired t-test statistic equal to 1.81, and a *p*-value of 0.07 was obtained. Since the *p*-value is greater than 0.05, the mean difference between the paired constructs is not statistically significantly different from 0, meaning there was no greenwashing by South African mining companies regarding local enterprise development.

The DMR regulates local enterprise development through the MPRDA, the mining charter under the “Inclusive Procurement, Supplier and Enterprise Development” element and SLP. The absence of greenwashing in the local enterprise development factor is in line with the predictions of stakeholder theory which assume a positive relationship between sustainability performance and sustainability reporting (Herbohn et al., 2014; Zhu et al., 2016).

From the agency theory perspective, the absence of greenwashing shows no signs of information asymmetry between agents (South African mining companies) and principals (Regulators) as far as local economic development is concerned (Acar & Temiz, 2020; Gupta & Gupta, 2020; Ruiz-Blanco et al., 2022). This alignment between sustainability performance and sustainability reporting from the regulator’s perspective is necessary to enhance the moral legitimacy of mining companies towards host communities (Lu & Wang, 2021). It is important for mining companies to be transparent about their contribution to sustainable development and to maintain good relations with the communities in the spirit and letter of governing regulations (MPRDA, SLP and the Mining Charter).

The results on local enterprise development indicate some consensus between the regulators (DMR) and regulatees (South African mining companies). The absence of

greenwashing also indicates that enforcement strategies have secured some level of compliance. In this respect, the results are in line with the responsive regulation approach to sustainability, which advocates for stakeholder-centric mechanisms between the regulator and regulatees to ensure regulatory compliance (Bolton et al., 2020). Importantly, the absence of greenwashing attests that mining companies' sustainable development priorities are coordinated according to the license to operate to avoid revocation (Nishitani et al., 2021). Revocation of licences is at the top of Braithwaite's enforcement pyramid to secure compliance (Braithwaite, 2014, 2020; Braithwaite & Hong, 2015; Ivec & Braithwaite, 2015).

It should be noted that the absence of greenwashing does not necessarily translate into distinct levels of sustainability performance. It simply means that from the regulators' perspective, there are no inconsistencies between sustainability reporting and sustainability performance in local enterprise development. It remains a major concern that economic transformation targets have not been achieved (Kilambo, 2021). Nonetheless, the absence of greenwashing is encouraging, and it assists in closing the trust deficit alluded to by Mathibe (2011), Ackers and Grobbelaar (2021) and Crous et al. (2021). Mining companies, however, appear to have earned stakeholders' trust, especially the industry's regulators, as far as reporting on local economic development is concerned.

The results also show that the industry has been institutionalised to acknowledge its vital role in stimulating the local economy as per the social contract, which entails the literal mining license and its preconditions stipulated in SLPs (Ngorima, 2019). Mining companies are expected to make greater contributions towards the sustainability of host communities (Cole & Broadhurst, 2021) in partnership with the government. This confirms de Villiers et al.'s (2014) view that South African mining companies have reached some level of maturity in sustainability. This is viewed in line with institutional theory. Validation of this factor as a sustainability indicator is regarded as a major contribution to the body of knowledge.

4.4.1.2. Local infrastructure development

B2R-B2P showed a paired t-test statistic equal to 0.50 and a *p*-value of 0.62; hence, no greenwashing was detected regarding infrastructure development. Regarding the SLP, South African mining companies should produce a mining community

development plan before a mining right can be granted (Renzi, 2021). Mining companies are also legislatively mandated to report annually on progress in implementing the SLP projects.

Firstly, the results affirm those of Bester and Groenewald (2021) and Lamola (2017), who assert that SLPs allow South African mining companies to contribute to the socio-economic development of mining communities. This is an important outcome for the regulators and other social partners (stakeholders) in local infrastructure development. The positive outcome is consistent with the tenets of stakeholder theory.

The results are also interpreted using the lens of institutional theory. Institutional theorists predict that societal expectations embodied in the codes of best practice are a powerful source of normative isomorphic pressure which encourages compliance by companies (Dong & Xu, 2016). The results on infrastructure development provide evidence of isomorphic behaviours from South African mining companies and are in line with Famiyeh et al. (2021). The results also align with Zhang et al. (2022), who posit that isomorphic pressures from governmental laws, regulations, and social expectations influence companies' sustainability practices. The results support de Villiers et al.'s (2014) finding that South African legislation of mining company practice has resulted in coercive isomorphism.

The absence of greenwashing is positive as it indicates that mining companies are likely to comply with SLP regulations to maintain legitimacy through isomorphic behaviours (Zhang et al., 2022). Dong and Xu (2016) posit that companies incorporate laws, regulations and institutionalised norms such that amendments in laws, regulations and institutional norms or values impact company behaviour. From the results, it can be deduced that South African mining companies are not greenwashing local infrastructure development due to coercive isomorphism. Therefore, a possible theoretical explanation for the alignment between sustainability performance and sustainability reporting in local infrastructure development is seen concerning institutional theory. This is a valuable contribution to the body of knowledge.

4.4.1.3. Skills development

A paired t-test statistic equal to 0.99 and a *p*-value of 0.32 were obtained for B3R-B3P; therefore, there was no greenwashing by South African mining companies regarding skills development. The results show no difference between sustainability

performance and sustainability reporting as far as skills development is concerned. The results agree with the predictions of stakeholder theory and stakeholder accountability theory which assume a positive relationship between sustainability performance and sustainability reporting.

South African mining companies should participate in improving the skills profile of members of host communities. South African mining companies also seem to be tacitly applying stakeholder accountability theory which is a step in the right direction towards sustainable development. It is encouraging that the study found no greenwashing tendencies as far as skills development is concerned. The results of skills development constitute a valuable contribution to the body of knowledge.

4.4.1.4. Housing and living conditions

Housing and living conditions obtained a t-test statistic equal to 0.44 and a *p*-value of 0.66, indicating no greenwashing by South African mining companies regarding housing and living conditions. The housing and living conditions factor is regulated through the MPRDA, the subsequent Mining Charter, the SLP and the HLCS. The results show that South African mining companies' sustainability reporting of housing and living conditions is free of greenwashing practices, which is in line with Ngorima (2019). Ngorima (2019) attributed the quality of the mining industry's sustainability reporting to the Mining Charter and SLP legal requirements. The SLP is perceived as the primary compliance mechanism for fostering employment and the socio-economic well-being of affected communities, especially previously disadvantaged South Africans (Bester & Groenewald, 2021).

The results also support Pelders and Nelson's (2019) empirical evidence regarding improvements in housing and living conditions due to Mining Charter requirements and industry preferences. This perspective is aligned with Mathibe (2011), who viewed the Mining Charter as a driver of sustainability in the mining sector. The results are also interpreted from the lens of institutional theory. Banerjee (2020), Jain (2020) and Singh et al. (2020) found that regulation is effective in curbing greenwashing practices and that sustainability reporting is mainly driven by coercive isomorphism.

However, the absence of greenwashing cannot be conflated with higher sustainability performance as the latter is not the subject of this research. This study is concerned with greenwashing tendencies by South African mining companies. The regulators'

perspective is that there is no perceived gap between what mining companies are reporting and what mining companies are doing on the ground regarding housing and living conditions.

While significant strides have been made to eradicate the all-male notorious hostel accommodation system (Humby, 2016), it is arguable that the South African mining industry has not completely escaped its legacy as migrant workers continue to be separated from where their families live (Cloete & Marais, 2021). Thousands of people living in host communities remain deprived of basic services, secondary education and decent jobs (Cole & Broadhurst, 2021).

According to Bester and Groenewald (2021), implementing MPRDA and the subsequent Mining Charter, the SLP, and the HLCS requirements should have significantly improved living standards and job prospects for mine communities. However, this has not fully materialised. Dimmler (2017) asserts that South Africa remains one of the most unequal societies in the world, with varying standards of living that reflect the legacy of apartheid spatial planning despite pro-poor legislation. Therefore, the housing and living standards results must be understood in this context.

The stakeholder accountability theory is a plausible theory to explain the results of housing and living conditions. The absence of greenwashing shows that mining companies realise that their existence in society is owed to the polity that allows companies to operate, whether the social licence to operate is expressed (mining right and SLP) or implicit (social expectations) (Nishitani et al., 2021). The results also show that South African mining companies know that, like any other contract, the social licence to operate can be terminated or revoked (Hossain et al., 2015; O'Faircheallaigh, 2015).

The stakeholder-accountability theorists believe that since market forces alone cannot fully protect stakeholders' interests amidst information asymmetry, legally mandated regulation of sustainability is still required for accountability (Liu et al., 2017; Osuji, 2015; Tamvada, 2020). This is consistent with Semenova and Hassel (2015), who assert that government should regulate companies to mitigate some of the market failures and negative externalities (Braithwaite, 2014, 2020; Braithwaite & Hong, 2015; Ivec & Braithwaite., 2015).

The absence of greenwashing can be attributed to South Africa's legal route to regulate housing and living conditions through the MPRDA and the mining charter. Therefore, The results also reflect that the Mining Charter, the SLP and the HLCS are already institutionalised within the sector. The results provide empirical evidence that the legal system of South Africa has to a certain extent, influenced the degree to which mining companies have invested in sustainability. It is, therefore, plausible that appropriate regulations are essential to ensure stakeholder accountability (Tamvada, 2020). Stakeholder accountability theory best explains the absence of greenwashing concerning housing and living conditions.

4.4.2. Employee welfare

The significance of the gap between the mean scores is reflected in p-values less than 0.05. This holds for the employee welfare constructs; health and safety (t = 3.16; p, 0.00*); diversity and inclusion (t = 3.68; p, 0.00*); and employment equity (t = -4.90; p, <.00*). The p-values with (*) are all less than 0.05. Based on the matched sample, there is sufficient evidence to conclude that there is a statistically significant difference between paired sustainability performance and sustainability reporting means. This is consistent with Hora and Subramanian (2019), who assert that companies sometimes indicate positive discretionary sustainability reporting to steer attention away from their negative externalities (greenwashing). In agreement with Wang and Sarkis (2017), Testa et al. (2018), Gatti et al. (2019) and Lukinović and Jovanović (2019), regulatory enforcement is required to curb the diffusion of greenwashing concerning the employee welfare dimension.

The results show signals of greenwashing practices under all employee welfare composite pairs, namely, occupational health and safety, labour practices, diversity and inclusion and employment equity. However, in more general terms, this result is consistent with that of Semenova and Hassel (2015), Diouf and Boiral (2017) and Hora and Subramanian (2019), that showed that companies sometimes choose to provide positive discretionary sustainability reporting to deflect attention from contentious stakeholder issues. Moreover, Barkemeyer et al. (2014), Hahn and Lülfs (2014), and Lock and Seele (2016) found that companies tended to paint an overly positive picture in their sustainability reports instead of providing an accurate account of their true sustainability performance. Diouf and Boiral (2017) reported that companies turned to

legitimacy tactics to obscure failures, overemphasise successes and misdirect bad news by limiting the release of compromising information to distort stakeholders' perceptions in their favour. Abernathy, Stefaniak, Wilkins and Olson (2017) found that manipulative companies used concealment and attribution to sway stakeholders' impressions. These results are consistent with impression management theory.

4.4.2.1. Occupational health and safety

A paired t-test statistic equal to t = 3.16 and a p-value of 0.00* were obtained. The results show that greenwashing is prevalent concerning occupational health and safety factor. While Coulson (2018) found a significant improvement in occupational health and safety since the promulgation of the MHSA, the results indicate that more work is required in this area. The results confirm those of Mathibe (2011), who asserts that although the MHSA is one of the key drivers to implementing sustainability strategies, negative elements impede sustainability, including leadership challenges, significant credibility and trust deficit, and a fragmented approach to sustainable development. However, Renzi (2021) argues that mining practices can be improved by regularly publishing ministerial codes and guidelines and periodic policy reviews.

Of note is that occupational health and safety in mining is highly regulated through MHSA and accompanying code of practices guidelines that are amended regularly. The government's intentions for enacting and implementing such laws and regulations are well-meaning, ethical and for the greater public good (Jain, 2020; Kengni & Mostert, 2022). In this regard, the results are also interpreted in cognisance of Habib and Bhuiyan (2017), Knebel and Seele (2015) and Khubana et al. (2022), who cautioned that excessive regulation could bring unintended consequences for sustainability objectives. Greenwashing is one of the consequences of stringent regulations as companies seek to be accepted in society (Knebel & Seele, 2015; Habib & Bhuiyan, 2017). The results also resonate with He et al. (2022), who assert that penalties are effective only when regulatory capacity exists. Insufficient government regulatory capacity was found to be a trigger for greenwashing. Ultimately, companies portray what they want to report, and there are no legally binding penalties for impression reporting or greenwashing in South Africa (Denhere, 2022).

In agreement with Liu et al. (2017), it is evident from these results that market forces alone have not successfully enforced government regulations on occupational health

and safety. Although regulatory mechanisms are in place to assist governments in embedding sustainability and minimise possible negative externalities of business operations (Vitale et al., 2019), more still needs to be done. In this regard, greenwashing could be better prevented with a combination of voluntary and mandatory aspects since regulations alone are ineffective in bringing about significant changes in outcomes (Gatti et al., 2019). Thus, roping in the regulators, regulatees and other stakeholders to have a meaningful dialogue can yield positive outcomes resulting in a win-win scenario for business and society. In line with the principles of responsive regulation, a stakeholder-centric approach is central to sustainable development. Regulators need to apply the principles of the enforcement pyramid to get rid of greenwashing tendencies.

The results are coherent with legitimacy theory implying that South African mining companies will likely use sustainability reporting on OHS to keep their business actions legitimate. The argument underlying legitimacy theory is that management can influence public perceptions toward keeping companies' actions legitimate (Hummel & Schlick, 2016).

4.4.2.2. Labour practices, diversity and inclusion

A paired t-test statistic equal to t = 3.68; and a *p*-value of 0.00* were obtained. Therefore, there was greenwashing by South African mining companies regarding the labour practices, diversity and inclusion constructs. The results on labour practices, diversity and inclusion are consistent with Moloi (2015), who found elements of non-disclosure of labour relations by South African mining companies pre and posts Marikana event. The non-disclosure or concealment of information is seen as a strategy to distort the companies' information for legitimacy purposes (du Toit & Esterhuyse, 2021). Stakeholders could end up with ill-informed decisions about sustainability and company risk profile (Moloi, 2015). The results are therefore explained through the lens of legitimacy theory (Molate et al., 2014). The results are supported by Ackers and Grobbelaar (2021), who indicated that companies selectively report on positive societal performance whilst concealing adverse performance, thereby increasing the risk of greenwashing.

The results align with Atkins and Maroun (2015), who noted the presence of impression management evidenced by the prevalence of photographic content of

happy, low-paid mining employees on the front page and within sustainability reports, distorting the true situation of greenwashing. The results agree with Haji and Anifowose (2016) and du Toit and Esterhuyse (2021), who found that a selective impression management communication style in line with impression management theory was used to legitimise companies' continued existence.

In this regard, regulators and regulatees need to find it easier to move as social partners to tackle the negative externalities and real issues creating the negative perceptions of South African mining companies in sensitive areas (Humby, 2016). Evidence of greenwashing in the labour practices, diversity and inclusion factor suggest that South African mining companies have not responded to growing stakeholder pressures. South African mining companies should significantly address greenwashing in this area through partnership and collaboration with the government.

4.4.2.3. Employment equity

A paired t-test statistic equal to -4.90 and a *p*-value of <.00* were obtained, indicating greenwashing by South African mining companies regarding employment equity. Based on the collected data, there is greenwashing in the employment equity factor. The results are consistent with Kaggwa (2020), who found that despite legislative intervention by the South African government and its progressive gender-sensitive regulation, there is still evidence of inequality in the South African mining sector. While there has been noticeable progress in integrating women into a male-dominated sector, more still needs to be done to address gender equality issues (Kaggwa, 2020). This shows that legislation alone cannot redress gender equality (Kaggwa, 2020).

The perceived greenwashing concerning employment equity is viewed through the lens of legitimacy theory (Ali et al., 2020; Kumar et al., 2021; Rajagopal et al., 2016). The results indicate that there is a legitimacy gap between societal expectations and business operations of South African mining companies (Ali et al., 2020; Lambrechts et al., 2019; Raimo et al., 2021; Zhang et al., 2022). The prevalence also shows an incongruence between sustainability performance and sustainability reporting (Ali et al., 2020; Kumar et al., 2021). The results support legitimacy theory as an explanatory reason for the disjuncture. Legitimacy theory predicts that the worst sustainability performers are more inclined to greenwashing tendencies (Zhang et al., 2022).

Legitimisation strategies are evidenced by a negative relationship between sustainability performance and sustainability reporting (Zhang et al., 2022). It should be noted that failure to comply with social norms and values of society is tantamount to a threat to legitimacy (Kumar et al., 2021). Given the progressive regulations, South African mining companies should be responsive to stakeholders' pressures and changes imposed at the broader societal level to justify continued operations (Loh et al., 2015). Failure and inability to respond to such pressures impact the validity of its social contract, leading to excessive penalties and regulatory fines or even revocation of the licence.

4.4.3. Environmental protection

In South Africa, environmental aspects of mining are regulated by the National Environmental Management Act 107 of 1998 (NEMA), Environmental Management Plan 2018 (EMP) and the Mining and Biodiversity Guideline 2013 (MBG). The results for the environmental protection dimension are analysed in terms of environmental laws and regulations, the theoretical perspective and practical application. As indicated previously, the significance of the gap between mean scores is reflected in *p*-values less than 0.05. In this regard, environmental management (t = 3.65; *p*, 0.00*) and environmental leadership (t = 2.02; *p*, 0.05*). Environmental responsibility (t = 1.64; *p*, 0.10) produced weak evidence, and the *p*-values for environmental management and environmental leadership are less than 0.05.

Greenwashing emerges when sustainability reporting is contradicted by environmental performance records (Jones, 2019). In this case, it is evident that the mining industry's record of accomplishment in environmental management and environmental leadership warrants more regulatory enforcement. This research produced mixed results for environmental protection, where two (2) out of three (3) constructs showed greenwashing (environmental management and environmental leadership), whereas there was no evidence of greenwashing in environmental responsibility. The results under environmental protection align with Ackers and Eccles (2015), who found that sustainability practices of South African mining can be explained using legitimacy with stakeholders to derive reputational benefits. At a more practical level, the results of this research have far-reaching implications, as greenwashing is not regulated per se.

4.4.3.1. Environmental management

A paired t-test statistic equal to 3.65 and a *p*-value of 0.00* were obtained. Hence, there was greenwashing by South African mining companies as far as environmental management was concerned. The paired t-test for D1R-D1P (environmental management) recorded the largest mean score difference of 0.16, a t-value of 3.65 with an attached *p*-value of 0.00*, implying that, according to participants, environmental management had the highest level of inconsistencies between sustainability performance and sustainability reporting mean scores.

The results support the applicability of legitimacy theory as an explanation for the decision to disclose environmental information (Kumar et al., 2021). The theory suggests that poorly performing companies use sustainability reporting as a legitimation tactic to influence public perceptions regarding their sustainability practices (Lu & Wang, 2021). Greenwashing is used as a legitimisation tactic to deceive stakeholders to preserve legitimacy (Nemes et al., 2022). Prior research in South Africa tested legitimacy theory from the context of the South African mining industry (Dube & Maroun, 2017; du Toit & Esterhuyse, 2021; Setia et al., 2015). The greenwashing results, therefore, extend the applicability of legitimacy theory to the South African mining context (Dube & Maroun, 2017).

The environmental management results can also be interpreted from the lens of impression management theory, which predicts a negative relationship between sustainability performance and sustainability reporting. According to Haji and Anifowonse (2016), companies only report environmental information favourable to their image, but such sustainability reports do not accurately reflect their sustainability management.

4.4.3.2. Environmental leadership

The results for environmental leadership show a paired t-test statistic equal to 2.02 and a *p*-value of 0.05*, which means that there was greenwashing by South African mining companies regarding environmental leadership. To a certain extent, the greenwashing results are viewed in light of Kengni and Mostert's (2022) assertions about the environmental legal framework of South Africa and a fragmented approach to the One Environmental System. Although the DMR is the competent authority to

implement environmental provisions in the mining sector, there seem to be weaknesses and poor implementation of the regulatory framework, which is one of the factors impairing the effectiveness of environmental regulations (Kengni & Mostert, 2022).

The greenwashing behaviour of South African mining companies is observed through the lens of legitimacy, which propagates that environmentally polluting companies tend to report higher sustainability information to address legitimacy concerns (Kumar et al., 2021). The results are also coherent with de Silva Lokuwaduge and de Silva (2022), Nemes et al. (2022) and Zhang et al. (2022), who predicted that the worst sustainability performers are more inclined to greenwashing tendencies to sway stakeholders' perceptions about companies' actual sustainability performance, for legitimacy purposes (Uyar et al., 2020). He et al. (2022) assert that poor performance is a prerequisite for greenwashing. In this regard, legitimacy theory provides a more suitable explanation for mining companies' motivation to engage in greenwashing on environmental leadership. Gatti et al. (2019) and Ruiz-Blanco et al. (2022) argue that greenwashing could be better prevented with a combination of voluntary and mandatory aspects.

Although mandatory regulation was found to have a strong and positive influence on sustainability performance, the effects of voluntary pressures show that such regulations are ineffective in bringing about significant changes in outcomes (Gatti et al., 2019). There is, therefore, a compelling case to rethink how new regulatory mechanisms are formulated and implemented to embed sustainability while encouraging full compliance by companies, given the dissuasive effect of regulation on greenwashing (Ruiz-Blanco et al., 2022). The results are consistent with Beare et al.'s (2014) conclusions that there are increasing pressures for legislative policy interventions to restrain anti-sustainable practices.

4.4.3.3. Environmental responsibility

A paired t-test statistic equal to 1.64 and a *p*-value of 0.10 were obtained, indicating that there was no greenwashing by South African mining companies regarding environmental responsibility. The research results on environmental responsibility show a positive association between sustainability performance and sustainability reporting. This is consistent with Ackers and Grobbelaar (2021), who found that an

inclusive stakeholder approach is already entrenched into South African governance codes in the best interest of many stakeholders. Companies disclose sustainability performance to reduce information asymmetry through increased transparency to showcase accountability to stakeholders (Acar & Temiz, 2020; Gupta & Gupta, 2020; Ruiz-Blanco et al., 2022).

In summary, the results from comparative pairwise differences have far-reaching implications, as greenwashing in South Africa is not regulated per se. This research, therefore, presents that since greenwashing exists in five (5) factors, regulatory mechanisms such as penalties can be evoked to curb its spread. Similarly, where there is no greenwashing and a demonstration of good sustainability performance, companies can be incentivised through tax rebates and subsidies.

Figure 4-1 shows how regulatory mechanisms such as penalties and incentives can be applied, considering the results from mining in South Africa.

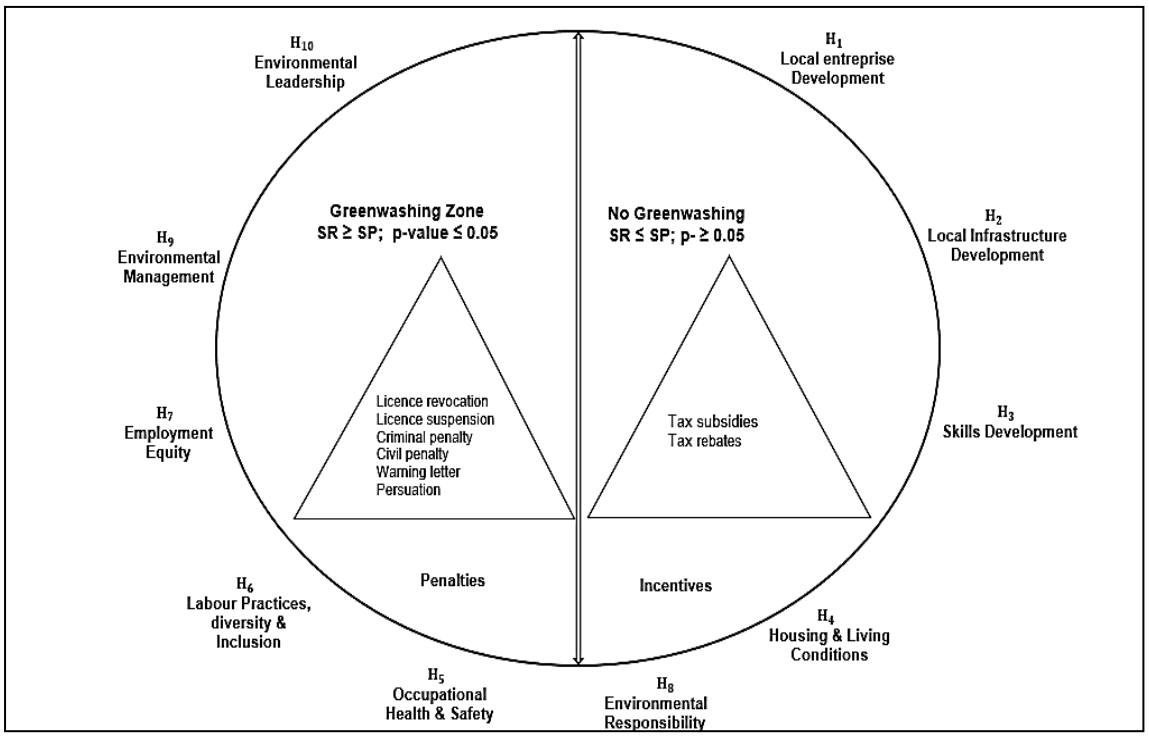

Figure 4-1: Curbing greenwashing through regulation

***Source**: Author's illustration adapted from Ayres and Braithwaite (1993)*

Figure 4-1 shows that where there is no greenwashing on regulated areas such as local enterprise development, local infrastructure development, skills development, housing and living conditions and environmental responsibility, tax rebates and government subsidies can incentivise and encourage companies to improve

sustainability performance. Figure 4-1 also shows that where there is greenwashing in areas of occupational health and safety; labour practices, diversity and inclusion; employment equity; environmental management and environmental leadership, regulatory mechanisms proposed by Ayres and Braithwaite (1992) can be applied. These mechanisms include persuasion, warning letters, civil penalties, criminal penalties, license suspension, and revocation.

4.5. STRUCTURAL EQUATION MODEL

In this section, the results of the Structural Equation Modelling (SEM), which consists of both the structural and measurement models, are analysed to understand the theoretical relationships between sustainability performance and sustainability reporting. Due to the complexity of the relationships under investigation, the SEM-Covariance method (CB-SEM) is deemed the most appropriate statistical analysis for the study. According to Al-Adwan, Albelbisi, Hujran, Al-Rahmi and Alkhalifah (2021), SEM is used for complex models. Therefore, CB-SEM is a suitable statistical tool for this study, considering that greenwashing has abstract and complex indicators with different parameters. This is consistent with Pimonenko et al. (2020). The researcher constructs an SEM model based on second-order factors of sustainability. The measurement model is based on valid and reliable scales.

The researcher started by applying the SEM technique by specifying a model to be estimated using a set of linear equations, assessing the goodness of fit and estimated parameters of the hypothesised model. The researcher used Lavaan 0.6-6 Package in R to estimate the SEM using the covariance approach to empirically validate the framework for linking sustainability performance with sustainability reporting using regulation as a compliance mechanism.

As a result of factor analysis, 10 sustainability factors were identified and validated through CFA. These factors were subjected to comparative pair-wise analysis. Pair-wise parameter comparisons were used to determine which pairs are statistically significantly different between sustainability performance and sustainability reporting and which pairs are not. Pair-wise results were then extrapolated to SEM, a more appropriate multivariate statistical analysis to simultaneously test multiple regression equations, analyse relationships and test the theoretical model. The matched pairs are

used as a measurement for the model to investigate whether second-order factors would load successfully.

The explicit assumption for the model is that since sustainability performance was paired with sustainability reporting, the two variables would be measuring the same subjects. Moreover, SEM is preceded by EFA and CFA, which have already demonstrated satisfactory results with significant loadings. Consequently, structural parameter estimates linking the observed variables are assessed through SEM to determine the existence of hypothesised relationships and model fitness.

4.5.1. Theory and research literature to support model specification

SEM requires the specification of a model based on theory and research (Suhr, 2006). Therefore, this empirical investigation tested the model's accuracy when estimating the hypothesised relationships between observed variables based on prior knowledge of the relationships. As such, the factors assessed in this study were valid and reliable. Based on the proposed model, theory-based hypotheses are tested using SEM on primary data collected through an e-questionnaire of 150 South African mining industry regulators. For the full model, Lavaan (0.6-1) normally converged after 119 iterations, details of which are shown in the SEM output (Appendix F). Hypothesis testing is conducted to answer the second research question of this study. The research question posed is as follows:

From the regulators' perspective, is there a relationship between sustainability performance and sustainability reporting?

4.5.2. Model specification

SEMs are based on linear statistical models. Model specification is formulating a statement about a set of parameters and stating a model. Since SEM accounts for specified relationships between observed and latent variables, a set of variables involving sustainability performance and sustainability reporting are translated from theory and transformed into a set of mathematical equations. Below is the proposed equation showing measured variables for the measurement model. The equation is traditionally conceived and specified as follows:

$$Y= \beta 0 + \beta 1x1 + \beta 2x2 + \beta 3x3+ \beta 4x4 + \beta 5x5 + \beta 6x6+ \beta 7x7 + \beta 8x8 + \beta 9x9+ \beta 10x10 + \beta 11x11+\boldsymbol{\varepsilon}$$

Where:

Y= is a dependent variable

B0 = is a constant, the value of Y when all X values are zero

β1 = is the slope of the regression surface (the β represents the regression coefficient associated with each x)

β2 = Level of Local enterprise development

β3 = Level of Local infrastructure development

β4 = Level of Skills development

β5 = Level of Housing and living conditions

β6 = Level of Occupational Health and Safety

β7 = Level of Labour Practices, diversity, and inclusion

β8 = Level of Employment Equity

β9 = Level of Environmental management

β10 = Level of Environmental leadership

β11 = Level of Environmental Responsibility

ε = an error term, normally distributed about a mean of 0 (ε is assumed to be 0).

The equation resembles the 10 hypotheses visualised in the planned model depicted in Figure 3-1. Covariance-based SEM analysis is used in this research only to examine the structural relationships between the variables and not the cause-effect relationships owing to the study's design. The relationships between sustainability performance and sustainability reporting are pictorially depicted and summarised graphically in Figure 4-2.

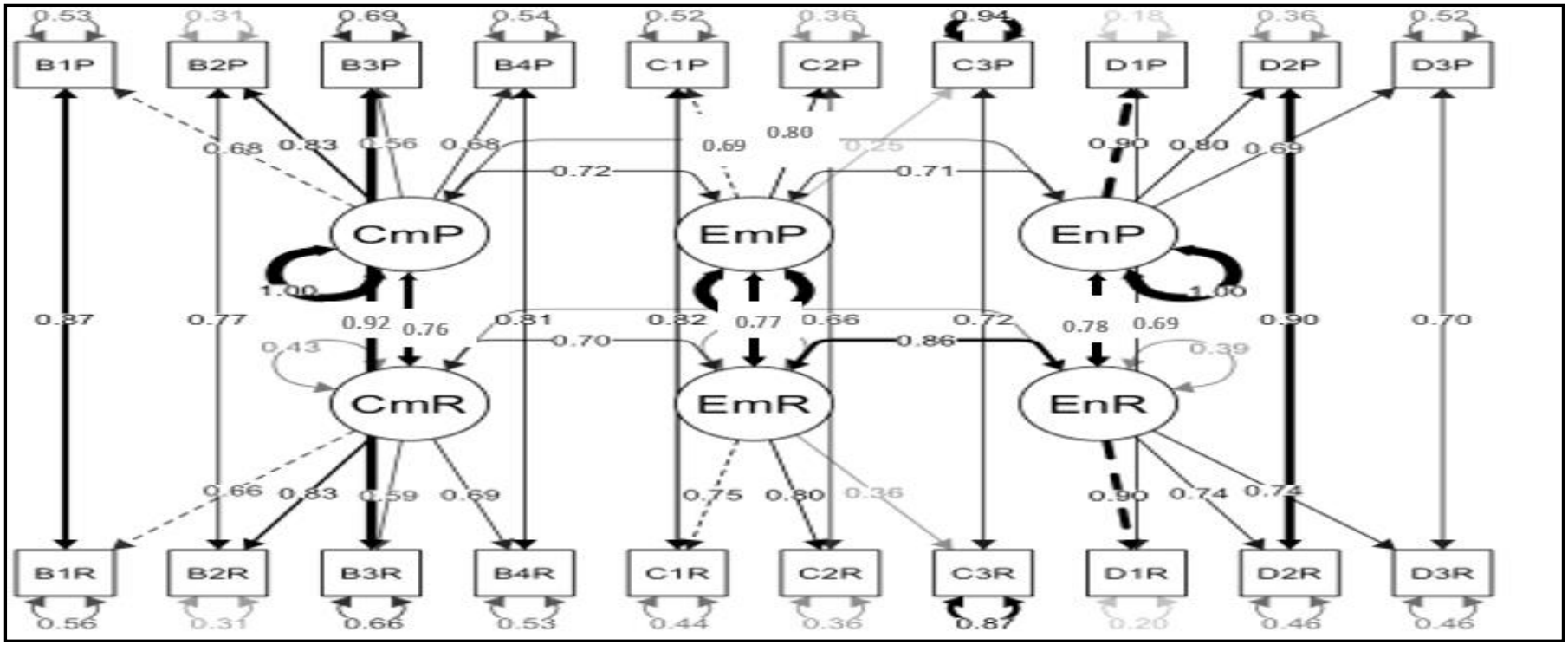

Figure 4-2: Full model for linking Sustainability performance and sustainability reporting factors

Notes: ↔ *Covariances; → regression coefficients; ↗↙ Path loadings; Non-significant loadings; CmP= Community development-Sustainability Performance; CmR= Community development- Sustainability Reporting; EmP= Employee Welfare- Sustainability Performance; EmR= Employee Welfare- Sustainability Reporting; EnP=SP-Environmental Protection- Sustainability Performance; EnR=Environmental Protection- Sustainability Reporting; B1P = Local enterprise development-Sustainability Performance; B2P = Local Infrastructure development- Sustainability Performance; B3P = Skills development- Sustainability Performance; B4P = Housing and living conditions- Sustainability Performance; C1P = Occupational Health and Safety- Sustainability Performance; C2P = Labour practices, diversity and inclusion- Sustainability Performance; C3P = Employment Equity-Sustainability Performance; D1P = Environmental management- Sustainability Performance;D2P = Environmental Leadership-Sustainability Performance; D3P = Environmental responsibility- Sustainability Performance; B1R = Local enterprise development- Sustainability Reporting; B2R = Local infrastructure development- Sustainability Reporting; B3R = Skills development- Sustainability Reporting; B4R = Housing and living conditions- Sustainability Reporting; C1R = Occupational Health and Safety- Sustainability Reporting; C2R = Labour practices, diversity and inclusion- Sustainability Reporting; C3R = Employment equity- Sustainability Reporting; D1R = SR-environmental management-Sustainability Reporting; D2R = Environmental leadership- Sustainability Reporting; D3R = SR-environmental responsibility- Sustainability Reporting.*

***Source**: Survey data (2019)*

Figure 4-2 presents the model for linking sustainability performance and sustainability reporting constructs. The model consists of six (6) latent variables and 20 observed variables. An ellipse shape represents the six (6) latent variables. This shape shows the structural model representing constructs (latent variables) and the relationship between external and internal variables, whilst the rectangles show the measurement of the model of the constructs and the indicator variables (Al-Qudah et al., 2022). The 20 square boxes represent observed variables, whilst there are 10 paths with double-headed arrows between them.

Double-headed arrows indicate correlations without a causal interpretation (Lam & Maguire, 2012:9). “Single arrowheads from the latent variable to the observed variables represent direct effects and arrows at the top and bottom of observed variables represent measurement errors”. The thickness of a single arrowhead corresponds to the strength of its estimates based on its standardised estimate. The single dashed arrowheads depict non-significant paths (Lam & Maguire 2012:11).

Statistically, the double-headed arrows or paths represent covariances (Lam & Maguire, 2012). The estimated path coefficients represent the strength of connections of specified relationships when other variables in the model are held constant (Bollen, 1989). In this regard, the estimated pathway connection strengths of the relationships between sustainability performance and sustainability reporting variables, together with factor loadings and associated coefficients, are analysed.

4.5.3. Model identification

The CB-SEM is used to evaluate and describe the hypothesised relationships between sustainability performance and sustainability reporting within the observed data to draw inferences about the population. The researcher relied on preliminary pairwise t-tests conducted in section 4.4 to assign items to SEM. CB-SEM is employed to test both the significance and the sign of the coefficient of the hypothesised relationship while considering theoretical and practical considerations. The sign of the path coefficient has the predicted direction of the relationship. All sustainability indicators loaded significantly.

4.5.4. Model evaluation – Goodness of fit

Firstly, the researcher used goodness of fit methods to validate the research model. The researcher should assess if the model fits the data before testing the measurement model for sustainability performance and sustainability reporting. Five (5) model fit statistical tests were employed to assess the structural goodness of fit. According to Hu and Bentler (1999), for a model to fit, the χ^2 should be non-significant; however, other fit indexes can be used to supplement the χ^2 test to determine the adequacy of model fit. These include the Root Mean Square Error of Approximation (RMSEA), which should be less than 0.05, the Comparative Fit Index (CFI)/Tucker-Lewis Index (TLI), which should be above 0.90 to 0.95, and the Standardized Root Mean Square Residual (SRMR) should be less than 0.08 (Hu & Bentler, 1999). Table 4-26 depicts the goodness of fit of the Structural Equation Model.

Table 4-26: Goodness-of-fit indices

Model	χ^2	CFI	RMSEA	TLI	SRMR	P Value	Result
Fit Statistics	0,00	0,98	0,05	0,97	0,09	0,01	Good

Table 4-26 shows that the model fit statistics applied, and the model constructs indicated a good model. The researcher used the rule of thumb cut-off criteria (Hu & Bentler, 1999) to assess the model's goodness of fit. The results show a *p*-value = 0.01; CFI = 0.98; TLI = 0.97, RMSEA = 0.05 and SRMR = 0.09 for the model. The *p*-value for the model is 0.01, which is highly significant. The model fitted the data satisfactorily. The non-significant χ^2 discrepancies are preferred. In this case, the χ^2 statistic is significant. However, other descriptive fit statistics reflect a good overall fit as the CFI and the TLI exceed 0.95. As such, the criteria are met; therefore, the model is not rejected. As the fit criteria of the models have been met satisfactorily, the hypothesised relationships between sustainability performance and sustainability reporting can be tested.

4.5.5. Measurement model

In the main, the primary focus is on parameter estimates. Parameter estimates are significant at the 0.05 level. Table 4-27 presents the selected output from CB-SEM,

showing standardised estimates, regression coefficients, z-values, and p-values for the model.

Table 4-27: Standardised estimates for the model

Factors	Covariances	Estimate	St. Err	z-value	P(>|z|)	St. all
Local Enterprise Development	B1R ~~. B1P	0,32	0,05	6,58	0,00	0,85
Local Infrastructure Development	B2R ~~. B2P	0,11	0,03	3,41	0,00	0,81
Skills Development	B3R ~~. B3P	0,29	0,04	7,02	0,00	0,92
Housing and Living Conditions	B4R ~~. B4P	0,27	0,07	3,87	0,00	0,81
Occupational Health and Safety	C1R ~~.C1P	0,18	0,05	3,62	0,00	0,89
Labour Practices, Diversity and Inclusion	C2R ~~.C2P	0,07	0,04	2,03	0,04	0,57
Employment Equity	C3R ~~.C3P	0,27	0,04	6,58	0,00	0,71
Environmental Management	D1R ~~. D1P	0,12	0,06	2,21	0,03	0,75
Environmental Leadership	D2R ~~. D2P	0,17	0,04	4,01	0,00	0,91
Environmental Responsibility	D3R ~~. D3P	0,16	0,04	4,30	0,00	0,68

Fit indices: χ^2, 0.00; CFI, 0.98; RMSEA, 0.05; TLI, 0.97, SMMR 0.09, Value, 0.01

Significant at the 0.05 level.

Notes: B1P = Local enterprise development-Sustainability Performance; B2P = Local Infrastructure development-Sustainability Performance; B3P = Skills development- Sustainability Performance; B4P = Housing and living conditions- Sustainability Performance; C1P = Occupational Health and Safety- Sustainability Performance; C2P = Labour practices, diversity and inclusion- Sustainability Performance; C3P = Employment Equity-Sustainability Performance; D1P = Environmental management- Sustainability Performance;D2P = Environmental Leadership-Sustainability Performance; D3P = Environmental responsibility- Sustainability Performance; B1R = Local enterprise development- Sustainability Reporting; B2R = Local infrastructure development- Sustainability Reporting; B3R = Skills development- Sustainability Reporting; B4R = Housing and living conditions- Sustainability Reporting; C1R = Occupational Health and Safety- Sustainability Reporting; C2R = Labour practices, diversity and inclusion- Sustainability Reporting; C3R = Employment equity- Sustainability Reporting; D1R = SR-environmental management- Sustainability Reporting; D2R = Environmental leadership- Sustainability Reporting; D3R = SR-environmental responsibility- Sustainability Reporting.

Source: *Survey data (2019)*

Table 4-27 shows all the 10 path coefficients of the hypothesised relationship between sustainability performance and sustainability reporting. The coefficient of the relationship concerning local enterprise development is 0.85, with a z-value of 6.58 and an associated *p*-value of 0.00 ($\rho < 0.05$). Local infrastructure development has a path coefficient of 0.81 with a z-value of 3.41 and a p-value of 0.00 ($\rho < 0.05$). Skills development has a path coefficient of 0.92, yielding a z-value of 7.02 and a p-value of 0.00 ($\rho < 0.05$). The housing and living conditions results indicate a path coefficient of 0.81, a z-value of 3.87 and a p-value of 0.00 ($\rho < 0.05$), whereas local infrastructure

development has a path coefficient of 0.81, a z-value of 3.41 and a p-value of 0.00 (ρ < 0.05).

The statistical results for employment equity show a path coefficient of 0.71, a z-value of 6.58 and a p-value of 0.00 (ρ < 0.05). Concerning occupational health and safety, the path coefficient of the relationship between sustainability performance and sustainability reporting is 0.75, with a z-value of 2.21 and a p-value of 0.03 (ρ < 0.05). Labour practices, diversity and inclusion, displayed a path coefficient of 0,57, a z-value of 2.03 and a p-value of 0.04 (ρ < 0.05). The coefficient for employment equity is 0.81 with a z-value of 3.41 and a p-value of 0.00 (ρ < 0.05).

Environmental management recorded a path coefficient of 0.75, a z-value of 2.21 and an associated p-value of 0.03 (ρ < 0.05). Environmental leadership has a path coefficient of 0.91, a z-value of 4.01, with a p-value of 0.00 (ρ < 0.05). The regression coefficient of the relationship between sustainability performance and sustainability performance about environmental responsibility is 0.68, with a z-value of 4.30 and a p-value of 0.00 (ρ < 0.05). In this regard, the structural model met the requirements of statistical significance for the path-coefficient estimates and the requirement of ‘good fit’ between the hypothesised model and the sample covariance.

However, positivists believe that there are logical relations within and between objects. Therefore, the objective is to find and justify these relationships scientifically, as theories should be verified empirically (Junjie & Yingxin, 2022). The hypothesised relationships should be tested based on theoretical considerations and evidence from the literature. Regarding the research model, the researcher will test 10 hypotheses representing the proposed relationships using path coefficients. The results of the test are based on the p-value. If the p-value of a path coefficient is smaller than 0.05, there is a significant relationship between the hypothesised variables and vice versa. Table 4-28 shows CB-SEM conclusions on the hypothesis based on path coefficients’ p- values.

Table 4-28: CB-SEM Conclusions

Hypothesis			Std. all	Z-value	p-value	Conclusions
Factors of sustainability		Relationship between Sustainability performance and sustainability reporting				
H_1	Local Enterprise Development	B1R ~~. B1P	0,85	6,58	0,00	There is a significant relationship between sustainability performance and sustainability reporting.
H_2	Local Infrastructure Development	B2R ~~. B2P	0,81	3,41	0,00	There is a significant relationship between sustainability performance and sustainability reporting.
H_3	Skills Development	B3R ~~. B3P	0,92	7,02	0,00	There is a significant relationship between sustainability performance and sustainability reporting.
H_4	Housing and Living Conditions	B4R ~~. B4P	0,81	3,87	0,00	There is a significant relationship between sustainability performance and sustainability reporting.
H_5	Health and Safety	C1R ~~. C1P	0,89	3,62	0,00	There is a significant relationship between sustainability performance and sustainability reporting.
H_6	Labour Practices, Diversity and Inclusion	C2R ~~. C2P	0,57	2,03	0,04	There is a significant relationship between sustainability performance and sustainability reporting.
H_7	Employment Equity	C3R ~~. C3P	0,71	6,58	0,00	There is a significant relationship between sustainability performance and sustainability reporting.
H_8	Environmental Management	D1R ~~. D1P	0,75	2,21	0,03	There is a significant relationship between sustainability performance and sustainability reporting.
H_9	Environmental Leadership	D2R ~~. D2P	0,91	4,01	0,00	There is a significant relationship between sustainability performance and sustainability reporting.
H_{10}	Environmental Responsibility	D3R ~~. D3P	0,68	4,30	0,00	There is a significant relationship between sustainability performance and sustainability reporting.

Fit indices: χ^2, 0.00; CFI, 0.98; RMSEA, 0.05; TLI, 0.97, SMMR 0.09, Value, 0.01

Significant at the 0.05 level.

Table 4-28 shows the results of hypothesised relationships in the model. The structural model shows that all structural path coefficients are statistically significant at $p < 0.05$, implying strong and significant directional relationships between sustainability performance and sustainability reporting variables.

Since the proposed hypothesis and fitted the data, the theoretical model is a plausible representation of primary data collected from regulators. Overall, the theoretical model empirically validates the framework for linking sustainability performance with sustainability reporting using regulation as a compliance mechanism for South African mining companies.

The researcher was concerned about the relationships and the practical effect size of the relationship between sustainability performance and sustainability reporting. Cohen's D was calculated to derive the practical application or usefulness of the results. Cohen's D is independent of the sample size and provides greater detail about the magnitude of the mean difference expressed in standard deviation units (Sullivan & Feinn, 2012). The rule of thumb used to interpret the effect size was based on the following conversions for interpretation: The effect size of 0.2 is considered small, 0.5 is medium or moderate, and 0.8 is large (Sawilowsky, 2009). Table 4-29 shows the effect size of the mean differences between sustainability performance and sustainability reporting.

Table 4-29: Effect size of sustainability performance and sustainability reporting difference per factor

Factor	Cohen's D	Effect size
Local enterprise development	0.15	Small effect
Local infrastructure development	0.24	Small effect
Skills development	0.08	Small effect
Housing and living conditions	0.04	Small effect
Health and Safety	0.26	Small effect
Labour practices, diversity and inclusion	0.30	Small effect
Employment equity	0.40	Small effect
Environmental management	0.30	Small effect
Environmental leadership	0.16	Small effect
Environmental responsibility	0.13	Small effect

Source: *Survey data (2019)*

Table 4-29 depicts effect sizes of mean differences ranging from 0.04 for housing and living conditions to 0.40 for employment equity. By referring to Cohen's d conversions for interpretation, the results show a small effect size on the relationship between sustainability performance and sustainability reporting. In this regard, companies are expected to comply with stakeholders' expectations without mitigating or compensating for negative externalities and create mutually advantageous conditions (Demuijnck & Fasterling, 2016; Provasnek, Sentic & Schmid, 2017). The government should, however, rectify externalities through responsive regulation mechanisms to reconcile business and societal values towards sustainable development by curbing greenwashing tendencies.

Although prior studies identified regulatory failure as a hindrance to sustainable development, excessive and stringent regulation was not desirable. Therefore, applying the merits of the stakeholder and responsive regulation theories calls for a progressive legislative approach to seek a delicate balance when holding businesses accountable for societal obligations. In agreement with O'Faircheallaigh (2015), a dialogue between companies, industries and salient stakeholders is important where additional legislation is not warranted.

4.6. CHAPTER SUMMARY

The chapter started with the demographics of the cross-sectional sample comprised of employees of the DMR. EFA uncovered 10 factors affecting sustainability: local enterprise development; local infrastructure development; skills development; housing and living conditions; health and safety; labour practices, diversity and inclusion; employment equity; environmental management; environmental leadership; and environmental responsibility.

Comparative Pairwise t-test results indicate that at a 5% significance level, there are statistically significant differences between sustainability performance and sustainability reporting, which indicates greenwashing. Greenwashing was detected concerning occupational health and safety; labour practices, diversity and inclusion; employment equity; environmental management; and environmental leadership.

The CB-SEM measured the relationship between sustainability performance and sustainability reporting. All the structural path coefficients are statistically significant at a 5% significance level, indicating that from the regulators' perspective, there is a

relationship between sustainability performance and sustainability reporting. Cohen D found that the practical significance of the relationship between sustainability performance and sustainability reporting is small.

In the next chapter, conclusions and recommendations are made.

CHAPTER 5: CONCLUSION AND RECOMMENDATIONS

5.1. INTRODUCTION

The research results are synthesised and presented in the previous chapter. In this chapter, the researcher makes conclusions on each research question and demonstrates the attainment of each research objective. The chapter also presents recommendations and limitations of the research. The chapter is comprised of 6 sections which are structured as follows. Section 5.2 presents the limitations of the study Section 5.3 deals with a summary of conclusions. Section 5.4 presents the overall contribution to the body of knowledge. Section 5.5 presents the generalisation of the results, while Section 5.6 provides the study's recommendations.

The main aim of this research was to develop a framework to link sustainability performance and sustainability reporting using regulation as a compliance mechanism. The researcher endeavoured to contribute to the discourse of sustainable development by enhancing the relationship between business and society by promoting responsible business practices, which is the underlying principle of good corporate citizenship. The study attained all the research objectives, namely:

> **RO1:** Explore the factors affecting sustainability in a regulated mining sector from the regulators' perspective (Section 4.3).
>
> **RO2:** Investigate the perceived gap between sustainability performance and sustainability reporting from the regulators' perspective (sections 4.4 and 4.5)

All the research objectives of the study were met.

5.2. LIMITATIONS OF THE STUDY

While this research provides empirical evidence on greenwashing, it is not without limitations. The results should therefore be interpreted in cognisance of the following:

- The perceptions of mining regulators on both sustainability performance and sustainability reporting and sustainability reporting were measured using the same questionnaire completed by the same respondents who provided all the data for analysis, which could invite potential common method bias. Though the researcher instituted procedural and statistical remedies to address this concern, and there is no indication that the results are contaminated with common method bias, future

researchers could investigate greenwashing in mining using mixed methods research to allow for triangulation.

- Only the views of mining regulators were solicited, and the conclusions should be understood within such a limitation. The results are viewed only from the practical relevance of the regulators' perspective and at a national level. Future research can investigate greenwashing in mining from a multi-stakeholder perspective.
- This study develops a framework for linking sustainability performance to sustainability reporting using regulation as a compliance mechanism. Pairwise results indicate that regulation alone is not the ultimate solution to greenwashing as such well-meaning regulations need to be coupled with other stakeholder-centric approaches. Future researchers may explore other gap-bridging solutions beyond regulations between sustainability performance and sustainability reporting.

5.3. CONCLUSIONS

Positivists believe that there are logical relationships within and between objects. Therefore, the objective is to find these relationships, justify them scientifically and theoretically, and draw conclusions based on statistical results (Junjie & Yingxin, 2022). In this regard, conclusions are made based on the results of each research question.

5.3.1. Conclusion on research question 1

From the regulators' perspective, what factors affect sustainability within a regulated mining sector?

Based on EFA and comparative pairwise differences t-test results, the researcher concludes that from the regulators' perspective, there are 10 factors of sustainability affecting the South African mining companies. Furthermore, sustainability performance and sustainability reporting are two separate complementary constructs that need to be measured separately. The two constructs are not automatic surrogates or proxies for each other. The researcher concludes that greenwashing thrives when sustainability performance and sustainability reporting are not accounted for as two (2) complementary constructs. However, the two constructs can be affected differently by different variables.

5.3.2. Conclusion on research question 2

From the regulators' perspective, is there a relationship between sustainability performance and sustainability reporting?

The results show a significant relationship between sustainability reporting and sustainability performance. The study, therefore, concludes that there is greenwashing by mining companies concerning occupational health and safety, labour practices, diversity and inclusion, employment equity, environmental management and environmental leadership.

The results show that even in a highly regulated setting, there are greenwashing practices by companies. Mainstreaming of SDGs to the mining regulatory framework indicates the South African government's commitment to sustainable development in the mining context. The study concludes that the South African approach to mainstream SDGs through mining legislation is a progressive move towards sustainability, though inadequate in curbing greenwashing, bearing in mind that greenwashing is not regulated in South Africa (Denhere, 2022).

On a practical note, the research amplifies the need to resolve the inherent conflict between business and society based on scientific evidence. Through responsive regulation mechanisms, greenwashing should be resolved within the company-stakeholder (Regulator-regulatee) dialogue. This approach offers mining companies and regulators a platform to iron out grey areas resulting in greenwashing.

5.3.3. Conclusions on the research problem

The main research problem is greenwashing and the use of sustainability reporting to conceal negative externalities caused by the companies' unsustainable business operations to influence stakeholders' perceptions to regard the company favourably. In this section, the researcher presents conclusions on each validated sustainability factor. The conclusions on greenwashing are presented below, starting with local enterprise development.

5.3.3.1. Local enterprise development

The research failed to conclude that there is evidence of greenwashing in the local enterprise development factor. The results agree with Ackers and Grobbelaar (2021),

who indicated that South African mining companies produce significant information in response to stringent mining industry regulations, particularly the MPRDA and the Mining Charter. The results also indicate that South African mining companies' reporting accurately reflects actual sustainability performance, which encourages sustainable development. However, South African mining companies and relevant stakeholders should identify meaningful procurement opportunities to uplift SMMEs and create shared value through local spending (Renzi, 2021).

5.3.3.2. Local infrastructure development

The research concluded that there is no greenwashing by South African mining companies regarding local infrastructure development. This agrees with Renzi (2021) and is in keeping with the provisions of the MPRDA, the SLP and the Mining Charter. The results support Cheruiyot-Koech and Reddy (2022), who conclude that the Mining Charter remains influential in the mining community and rural development as well as housing and living conditions. The results should go a long way in increasing the trust levels between mining companies and society, in line with the licence to operate in host communities, without which the legitimacy of mines is threatened (Ackers & Grobbelaar, 2021). This is an important outcome for the social partners and other stakeholders involved in local infrastructure development. However, South African mining companies should give back to communities through investment in infrastructure in keeping with the provisions of the MPRDA, the SLP and the Mining Charter.

5.3.3.3. Skills development

The study failed to conclude that there is evidence of greenwashing in the skills development factor. Skills development is regulated through the SLP. The results resonate with Bester and Groenewald (2021), who found that SLP is the primary compliance mechanism for achieving sustainability in the mining industry (Bester & Groenewald, 2021). Lamola (2017) posits that SLPs allow South African mining companies to contribute to community development. Non-compliance with the SLP mandatory obligations is a legal offence that can lead to suspension of the mining right (Lamola, 2017). It is, therefore, important that South African mining companies participate in improving the skills profile of members of host communities so that they,

too, can benefit from the mining value chain and other external opportunities to optimise shared value. Overall, closing the skills gap is a sustainability strategy for a company's lifeline for future sustainability and a win-win solution for both the mining company and the host community.

5.3.3.4. Housing and living conditions

The researcher concludes that South African mining companies' reporting on housing and living conditions is free of greenwashing practices. The results back Ngorima's (2019) finding that South African mining companies' reporting could be attributed to legal requirements of the Mining Charter and social labour plans. The results also support Mathibe (2011), who viewed the Mining Charter as a driver of sustainability in the mining sector. The absence of greenwashing in this regulated area partially corroborates Pelders and Nelson (2019), who provide empirical evidence regarding improvements in housing and living conditions due to Mining Charter requirements and industry preferences. These results are also in line with Banerjee (2020), Jain (2020) and Singh et al. (2020), who found that sustainability reporting is mainly driven by coercive isomorphism and supports the predictions of institutional theory, specifically, coercive isomorphism due to government regulation and regulatory pressures.

However, the absence of greenwashing in this area does not automatically translate to good sustainability performance; however, it indicates credibility, trustworthiness and integrity of information reported versus performance on the ground. Mining companies should improve participation in host communities and labour supply areas to positively impact community welfare and living standards as envisaged by regulations and in line with the licence to operate.

5.3.3.5. Occupational health and safety

Based on empirical results, this study concludes that greenwashing practices exist in the occupational health and safety factor. The results are supported by Crous et al. (2021), who indicate that while a significant improvement in occupational health and safety has been noted since the promulgation of the MHSA, the reporting approach does not build trust; instead, scepticism increases over time. MHSA and its associated code of practices highly regulate occupational health and safety. In this regard,

greenwashing is likely to be triggered by stringent regulations and insufficient government regulatory control (He et al., 2022). He et al. (2022) assert that penalties are only effective when regulatory capacity exists. In this regard, more regulatory capacity, rather than excessive regulations, could be the remedy to resolve incompatible obscurity in reporting occupational health and safety. The regulators and regulatees need to work together to resolve occupational health and safety challenges, including greenwashing.

5.3.3.6. Labour practices, diversity and inclusion

The researcher concludes that there is evidence of greenwashing in the labour practices, diversity and inclusion factor. The results of greenwashing are consistent with Moloi (2015), who found elements of non-disclosure of labour relations by South African mining companies pre and post the Marikana event. The non-disclosure is coherent with du Toit and Esterhuyse (2021), who found concealment and omission of information for legitimacy purposes. The results suggest that South African mining companies have not been able to respond to stakeholder demands adequately and conform to legislative and policy requirements. Mining companies should address the perceived inconsistencies between sustainability performance and sustainability reporting in this area through partnership and collaboration with the government, as proposed by Ranängen and Zobel (2014). Ranängen and Zobel (2014) advocate for preferential access to job opportunities; training programmes, skills development of community members; and bursaries and scholarships to benefit locals and to prepare them for jobs. Responsive regulation theorists believe that optimising the interplay between private and public regulation allows the government and citizens to design better policies (Bolton et al., 2020).

5.3.3.7. Employment equity

The researcher concludes that there is greenwashing in the employment equity factor. The results are also consistent with Kaggwa (2020), who found evidence of inequality in the South African mining sector. According to Kaggwa (2020), women still face challenges in the workplace and progressive gender-sensitive regulations (Kaggwa, 2020). The government of South Africa promulgated the Mining Charter to mainstream gender into the mining industry through the Mining Charter. However, the

greenwashing results show that this intervention is not sufficient (Kaggwa, 2020). South African mining companies should intentionally close inequality gaps, particularly regarding the representation of Black people and women in executive and senior management positions. Mining companies need to strengthen their response to legislative and policy initiatives that actively promote gender equality, equal employment opportunities and diversity in the workplace.

5.3.3.8. Environmental management

The researcher concludes that there is greenwashing in environmental management. The results support the applicability of legitimacy theory as an explanation for the decision to disclose environmental information (Kumar et al., 2021). The results show that greenwashing is used as one of the legitimisation tactics to deliberately sway stakeholders' views about environmental management issues (Nemes et al., 2022). From the agency theory perspective, the greenwashing results also imply that South African mining companies are releasing beneficial information and hiding harmful environmental information to be considered favourably by regulators (Zhang et al., 2022). In this regard, greater regulatory and stakeholder supervision through responsive regulation mechanisms is required for South African mining companies to improve environmental management, in line with Latiff and Marimuthu (2021). Moreover, coordination, cooperation and information sharing between the DMR, the Department of Environment, Forestry and Fisheries and the Department of Water and Sanitation should be harmonised and strengthened. From the institutional theory perspective, the DMR, through its coercive isomorphic pressures, can drive environmental sustainability in mining by deepening the impact of NEMA and the One Environmental System and imposing penalties on greenwashing companies.

5.3.3.9. Environmental leadership

The research concludes that there is evidence of greenwashing in the environmental leadership factor, as sustainability reporting claims contradict environmental performance records of accomplishment (Jones, 2019). The greenwashing results are in line with de Villiers and Marques' (2016) assertion that companies domiciled in countries that have prioritised SDGs are likely to disclose less environmental information for fear of attracting litigation and liability for environmental harms (de

Villiers & Marques, 2016). The greenwashing results are viewed from the lens of information asymmetry between principals (regulators) and agents (South African mining companies). Stakeholder engagements proposed by proponents of stakeholder theory blended with responsive regulations mechanisms can be applied to resolve greenwashing practices.

5.3.3.10. Environmental responsibility

The researcher concludes that there are no greenwashing practices as far as environmental responsibility is concerned. The results align with Acar and Temiz (2020), who found that companies with greater environmental performance are more likely to publish environmental information. According to Zhang et al. (2022), the propensity for greenwashing by good environmental performers becomes very low. Therefore, the results on environmental responsibility are interpreted from the lens of stakeholder management and institutional theory, which both predict a positive relationship between sustainability performance and sustainability reporting.

5.4. OVERALL CONTRIBUTION TO THE BODY OF KNOWLEDGE

The study makes a valuable contribution to the body of knowledge. The research's first valuable contribution to the body of knowledge is the framework to create a link between sustainability performance and sustainability reporting using regulation as a mechanism.

5.4.1. Theoretical contributions

This study makes a valuable contribution to the body of knowledge by providing a theoretical framework to analyse greenwashing (see Figure 2.2). Premised on a positivist epistemological foundation, this study applied a multi-theoretical approach to understanding the phenomenon of greenwashing. The multi-theoretical approach improves the understanding of concepts under study in an integrated manner. This approach and perspective provided a holistic view of greenwashing. Table 5-1 summarises the theoretical contribution of this study.

Table 5-1: Theoretical contribution of the study

Theoretical Contribution	Sustainability Factors
Stakeholder theory	• Local enterprise development • Housing and living conditions • Skills development • Environmental responsibility
Agency theory	• Local enterprise development • Local infrastructure development
Institutional theory	• Local Infrastructure development • Skills development • Environmental responsibility
Stakeholder accountability theory	• Environmental management • Environmental leadership
Impression management theory	• Labour practices, diversity and inclusion
Legitimacy theory	• Occupational health and safety • Labour practices, diversity and inclusion • Employment equity • Environmental management • Environmental leadership

Table 5-1 affirms the theoretical contribution of the study. The research results affirm the applicability of stakeholder theory to local enterprise development, housing and living conditions, skills development and environmental responsibility. Agency theory is also confirmed in two sustainability factors: local enterprise development and local infrastructure development. Institutional theory is also confirmed in three sustainability factors: local infrastructure development, skills development, and housing and living conditions mainly due to requirements of the Mining Charter, the SLP and the housing and living conditions standards that have been institutionalised and entrenched in the mining industry.

Impression management is confirmed on one (1) factor of sustainability, which is labour practices, diversity and inclusion to obtain legitimacy by portraying a good image due to stakeholder pressures. The applicability of stakeholder accountability theory is confirmed in environmental management and environmental leadership. From the stakeholder accountability standpoint, symbolic disclosures are just stakeholder management gimmicks marked by contradictions between companies' reporting rhetoric and performance evidence. In this respect, environmental

management and environmental leadership need to be closely monitored to protect vulnerable communities exposed to the negative impacts of mining.

In line with Nemes et al. (2022) and Zhang et al. (2022), this study identified legitimacy theory as the dominant and most suitable theory upon which the study is favourably premised. Legitimacy theory finds expression in all five (5) areas of greenwashing revealed in this study: occupational health and safety, labour practices, diversity and inclusion, employment equity, environmental management and environmental leadership. From a legitimacy standpoint, greenwashing is used as a legitimisation tactic to favourably sway stakeholders' perceptions regarding their sustainability practices without contributing significant financial investments to improve actual sustainability performance (Lai et al., 2016; Loh et al., 2015). According to Ackers and Grobbelaar (2021), other tactics involve concealing and omitting information for legitimacy purposes. Greenwashing conclusions are consistent with du Toit and Esterhuyse (2021), who found both concealment and omission of information for legitimacy purposes. Therefore, this study's theoretical conclusion resonates with recent studies on legitimacy theory, namely, Du et al., 2021; Macellari et al., 2021; Nemes et al., 2022. The study contributes to the body of knowledge, which can be a reference for future research.

The second theoretical contribution is the identification of greenwashing in a highly regulated mining industry of South Africa using quantitative research methods. Greenwashing is widely documented in marketing, and this study adds new insights into the mining field. Considering that there is still no consensus on the explicit definition of greenwashing and measurement thereof, this research contributes to understanding the phenomenon and how greenwashing can be measured from a mining regulator's perspective. This is a valuable contribution to the body of knowledge.

5.4.2. Methodological contribution

The researcher applied SEM to study greenwashing using primary data from South African mining regulators. The framework that was developed will enable regulators to embed sustainability further using stakeholder-centric approaches. Since the instrument is science-backed and informed by mining regulations, regulators will have a credible scientific basis for focusing on sustainability areas that require urgent

attention due to the high propensity to greenwashing. The results bear greenwashing tendencies on occupational health and safety, labour practices, diversity and inclusion, employment equity, environmental management and environmental leadership. In this regard, regulators will be able to divert resources to effectively mainstream sustainability into functions, business processes and operations by paying attention to regulated factors to ensure compliance. The study, therefore, provides a useful tool for regulators to hold South African mining companies accountable for any unsustainable business practices based on a scientific instrument. The study, therefore, adds to the streamlining of sustainable development in mining using regulation as a compliance mechanism.

5.4.3. Practical contribution

At a practical level, the developed framework can facilitate stakeholder dialogue on perceived performance gaps, including setting sustainability performance targets and developing strategies, processes and programmes that align with the sustainable development agenda. In this respect, the study also introduces a missing link in the accountability chain. Mining companies will be forced to revisit business models and their accountability stance to mining regulators to adhere to regulatory measures to curb greenwashing. In turn, mining companies are empowered to incorporate the regulators' views in decision-making processes concerning sustainability. The framework allows regulators and mining companies to collaborate when formulating joint strategic responses to bridge the perceived gap between sustainability performance and sustainability reporting.

The study also contributes to shaping mining legislation and policies which ultimately regulate the business operations of mining companies. The knowledge will be instrumental in eliciting a shift in assessing South African mining companies' interactions with employees, communities, and the environment. If society is informed about mining companies' sustainability orientation, it can inform public debate and influence the development of regulatory policy based on scientific evidence from this study.

The study also contributes contextually, given the unique environment. South Africa is well endowed with minerals; therefore, the applicability of this study is highly relevant. This research highlights the importance of sustainability leadership. Both the South

African government and mining companies can lead from the front to attain the much-desired positive impact of sustainable mining.

5.5. GENERALISATION OF THE RESULTS

Because of the positivist philosophy adopted, this study used objectivist epistemology to generalise the results. The study was conducted in the highly regulated mining industry of South Africa. The results of this cross-sectional study can only be generalised to the unit of analysis being the employees of the DMR responsible for regulating the mining industry. It is concluded that the results of this cross-sectional research represent the perceptions of the DMR employees involved in regulating sustainability in the mining industry. Generalisation is, therefore, limited to sustainability in the context of a highly regulated setting of the South African mining industry.

5.6. RECOMMENDATIONS

The study found greenwashing on occupational health and safety, labour practices, diversity and inclusion, employment equity, environmental management and environmental leadership. The following recommendations are provided primarily to South African mining companies (regulatees), policymakers and regulators based on the research results and conclusions.

5.6.1. Recommendations to Policymakers and regulators

Greenwashing tendencies on occupational health and safety, labour practices, diversity and inclusion, employment equity, environmental management and environmental leadership within the South African mining industry are problematic and require the attention of policymakers and regulators.

Currently, several pieces of mining legislation focus on different dimensions of sustainability. However, no legal instrument regulates greenwashing in South Africa (Denhere, 2022; Kennedy et al., 2022). It is the researcher's view that industry-specific regulations on greenwashing can give impetus to the sustainable development agenda in the mining sector. Policymakers should play a significant role in curbing the proliferation of greenwashing in mining. In this regard, it is recommended that:

- A mandatory mining sector-specific legislative framework on greenwashing be formulated to provide more impetus towards sustainable development.
- Policymakers work with mining companies to design a different mix of policy reforms and regulatory tools to improve sustainability in the sector.
- Policymakers should impose penalties for greenwashing, government tax subsidy mechanisms for green innovation and tax rebates for sustainability projects as incentives to encourage high sustainability performance.
- Regulators should ensure effective regulation is conducted more responsively and transparently to build mutual trust between regulators and regulatees. It is recommended that stakeholder-centric mechanisms be explored to eradicate greenwashing in the mining industry.

5.6.2. Recommendations for the South African mining companies

The study concludes that there are areas of greenwashing within the highly regulated South African mining industry, despite progressive regulations. This implies that mining companies should be proactive and very intentional in addressing externalities caused by mining operations. Business leadership is, therefore, required to champion sustainability in tandem with their profit objectives: profit is no longer the only objective. The following recommendations are made to the South African mining companies considering the greenwashing results:

- South African mining companies should fully embed sustainable development issues into their business models and corporate strategies such that the business strategy becomes a sustainability conduit. Business leadership needs to proactively address regulators' concerns and perceptions of sustainability practices and play a leading role in preventing greenwashing.
- South African mining companies should engage meaningfully with regulators to address perceptions of greenwashing. Regulators' views and perceptions can influence policy direction that impact might negatively affect the mining industry based on perceptions.
- South African mining companies should pioneer sustainability leadership using the developed framework for linking sustainability performance with sustainability reporting and model it at the mine site level. If employed properly, this framework will guide South African mining companies as corporate citizens to reduce negative

externalities and increase their handprint in society. The framework is important as it provides a basis for mining companies to prioritise sustainability dimensions that require urgent attention.

- South African mining companies should collaborate with regulators to achieve distinct sustainability performance levels and to curb the diffusion of greenwashing tendencies. Mining companies and regulators can jointly play a leading role in preventing greenwashing using the principles of responsive regulation and stakeholder theories without the need for stringent regulations. Moreover, strategic responses can be jointly developed to bridge the perceived gap between sustainability performance and sustainability reporting.

5.7. RECOMMENDATIONS FOR FUTURE RESEARCH

The study concludes that despite progressive mining regulation, the greenwashing problem is prevalent in five (5) sustainability factors. The results show that greenwashing is a broad concept that needs to be scrutinised from a multi-theoretical perspective to understand its many forms. Therefore, a more rigorous and deeper theoretical analysis is required to resolve the greenwashing problem. Based on the results of the research, it is further recommended that future research could focus on the following areas:

- Explore a multi-stakeholder analysis of greenwashing in the mining industry.
- Explore mixed-methods research studies on the greenwashing phenomenon based on third-party sustainability information.
- Conduct longitudinal studies to assess the impact of regulation on sustainability development in the mining industry.
- Investigate other stakeholders' perceptions about greenwashing and consider region-specific studies to assist in understanding the greenwashing phenomenon across regions.

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APPENDIX A: AGENDA 2063: THE AFRICA WE WANT

Stakeholder issue		Goal	Priority
Community	Education	2	Literate, creative and adaptive citizenry
	Skills		Skills revolution for the 21st century, global competitive environment (a particular stress is placed on competence in the sciences)
	Basic necessities	4	Every citizen has affordable and sustainable access to quality basic necessities of life
	Economic growth and employment	5	Accelerated and inclusive economic growth and macroeconomic stability
			Accelerated manufacturing as the generator of decent jobs
			Opportunities for transiting from idleness, vulnerable/informal sector jobs to formal sector jobs expanded.
			Expanded ownership, control and value addition (local content) in extractive industries
			Diversified economy for increased resilience to external economic shocks
			Economic development is driven by science, technology and innovation.
	Infrastructure	9	Communications infrastructure connectivity (road, rail, air, marine, voice, electronic) with neighbouring states and beyond
Employees	Education	2	Literate, creative and adaptive citizenry
	Skills		Skills revolution for the 21st century, global competitive environment
	Health and nutrition	3	Citizens enjoy long, and quality healthy lives; nutritional status of citizens is acceptable by international standards.
	Gender equality	15	Empowered women and girls and equal access and opportunity in all spheres of life
	Equal access		Empowered women and girls and equal access and opportunity in all spheres of life
	Transformation and employment equity		Ending all forms of violence and Employment equity (social, economic and political) against women and girls and ensure full enjoyment of all human rights
Environment	Water Security	7	Water security for domestic, agricultural and industrial use assured
	Energy		Renewable energy (wind, solar, hydro, bio, geothermal) as the main source of power for households, businesses and organisations
	Sustainable use		Societies produce and consume goods and services in a sustainable manner.
	Climate Change		Climate-resilient, low-carbon production systems in place and significantly minimising vulnerability and natural disasters;
	Biodiversity conservation		Biodiversity, including forests, genetic resources, land, coastal and marine ecosystems conserved and used sustainably.

APPENDIX B: SELECTED GRI INDICATORS

Code	Disclosure number	Disclosure item	Minimum requirements
SO-1	413-1	Operations with local community engagement, impact assessments, and development programmes	Percentage of operations with implemented local community engagement, impact assessments, and/or development programmes.
SO-2	413-2	Operations with significant actual and potential negative impacts on local communities	Operations with significant actual and potential negative impacts on local communities, including the location of the operations; the significant actual and potential negative impacts of operations.
EC-6	202-2	Proportion of senior management hired from the local community	Percentage of senior management at significant locations of operation that are hired from the local community.
EC-7	203-1	Infrastructure investments and services supported	Extent of development of significant infrastructure investments and services supported. Current or expected impacts on communities and local economies, including positive and negative impacts where relevant. Whether these investments and services are commercial, in-kind, or pro bono engagements.
EC-9	204-1	Proportion of spending on local suppliers	Percentage of the procurement budget used for significant locations of operation that is spent on suppliers local to that operation (such as percentage of products and services purchased locally).
Employees			
G4-LA1	401-1	New employee hires and employee turnover	Total number and rate of new employee hires during the reporting period, by age group, gender and region and Total number and rate of employee turnover during the reporting period, by age group, gender and region.
G4-LA2	401-2	Benefits provided to full-time employees that are not provided to temporary or part-time employees	Benefits which are standard for full-time employees of the organisation but are not provided to temporary or part-time employees, by significant locations of operation.
G4-LA3	401-3	Parental leave	Return to work rate and Retention rate.
G4-LA4	401-4	Minimum notice periods regarding operational changes	Minimum number of weeks' notice typically provided to employees and representatives prior to the implementation of significant operational changes that could substantially affect them. For organisations with collective bargaining agreements, report whether the notice period and provisions for consultation and negotiation are specified in collective agreements.
N/A	403-1	occupational health and safety management system	A statement of whether an occupational health and safety management system has been implemented and a description of the scope of workers, activities, and workplaces covered by

Code	Disclosure number	Disclosure item	Minimum requirements
			the occupational health and safety management system, and an explanation of whether and, if so, why any workers, activities, or workplaces are not covered.
N/A	403-2	Hazard identification, risk assessment, and incident investigation	A description of the processes used to identify work-related hazards and assess risks on a routine and non-routine basis, and to apply the hierarchy of controls in order to eliminate hazards and minimise risks.
N/A	403-3	Occupational health services	A description of the occupational health services' functions that contribute to the identification and elimination of hazards and minimisation of risks, and an explanation of how the organisation ensures the quality of these services and facilitates workers' access to them.
N/A	403-4	Worker participation, consultation, and communication on occupational health and safety	A description of the processes for worker participation and consultation in the development, implementation, and evaluation of the occupational health and safety management system, and for providing access to and communicating relevant information on OCCUPATIONAL health and safety to workers.
N/A	403-5	Worker training on occupational health and safety	A description of any occupational health and safety training provided to workers, including generic training as well as training on specific work-related hazards, hazardous activities, or hazardous situations.
N/A	403-6	Promotion of worker health	An explanation of how the organisation facilitates workers' access to non-occupational medical and healthcare services, and the scope of access provided, and a description of any voluntary health promotion services and programmes offered to workers to address major non-work-related health risks, including the specific health risks addressed, and how the organisation facilitates workers' access to these services and programmes.
N/A	403-7	Prevention and mitigation of occupational health and safety impacts directly linked by business relationships	A description of the organisation's approach to preventing or mitigating significant negative occupational health and safety impacts that are directly linked to its operations, products or services by its business relationships, and the related hazards and risks.
N/A	403-8	Workers covered by an occupational health and safety management system	If the organisation has implemented an occupational health and safety management system based on legal requirements and/or recognised standards/guidelines.
N/A	403-9	Work-related injuries	The number and rate of fatalities as a result of work-related injury; The number and rate of high-consequence work-related injuries (excluding fatalities); The number and rate of recordable work-related injuries; The main types of work-related injury; The number of hours worked.
N/A	403-10	Work-related ill health	The number of fatalities as a result of work-related ill health; the number of cases of recordable work-related ill health; the main types of work-related ill health.
G4-LA9	404-1	Average hours of training per year per employee	Average hours of training that the organisation's employees have undertaken during the reporting period, by gender and employee category.

Code	Disclosure number	Disclosure item	Minimum requirements
G4-LA10	404-2	Programmes for upgrading employee skills and transition assistance programmes	Type and scope of programmes implemented, and assistance provided to upgrade employee skills. Transition assistance programmes provided to facilitate continued Skills development and the management of career endings resulting from retirement or termination of employment.
G4-LA11	404-3	Percentage of employees receiving regular performance and career development reviews	Percentage of total employees by gender and by employee category who received a regular performance and career development review during the reporting period.
G4-LA12	405-1	Diversity of governance bodies and employees	Percentage of individuals within the organisation's governance bodies and employees in each of the following diversity categories: Gender; Age group: under 30 years old, 30-50 years old, over 50 years old and other indicators of diversity where relevant (such as minority or vulnerable groups).
G4-LA13	405-2	Ratio of basic salary and remuneration of women to men	Ratio of the basic salary and remuneration of women to men for each employee category, by significant locations of operation.
G4-HR3	406-1	Incidents of employment equity and corrective actions taken	Total number of incidents of Employment equity during the reporting period and status of the incidents and actions taken.
G4-HR4	407-1	Operations and suppliers in which the right to freedom of association and collective bargaining may be at risk	Operations and suppliers in which workers' rights to exercise freedom of association or collective bargaining may be violated or at significant risk. Measures taken by the company in the reporting period intended to support rights to exercise freedom of association and collective bargaining.
G4-HR2	412-2	Employee training on human rights policies or procedures	Percentage of employees trained during the reporting period in human rights policies or procedures concerning aspects of human rights that are relevant to operations.
Environment			
RE-1	EN1	Materials used	All substantial input materials by weight or volume.
RE-2	EN3/4	Energy consumption and renewables	Direct and indirect energy consumption, share of renewable.
RE-3	EN8	Water use	Total withdrawal by source.
RE-4	EN16/17	GHG emissions	Total direct and indirect emissions (GHG protocol scopes 1, 2, and 3).
RE-5	EN19/20	Ozone-depleting substances and other air emissions	Total emissions of ozone-depleting substances; other significant air emissions by type and weight for at least one sub-stance; alternatively, an explicit statement of irrelevance for both.
RE-6	EN21	Water discharge	Total discharge by quality (emissions to water by type and weight for at least one substance; alternatively, an explicit statement of irrelevance) for both.
RE-7	EN22	Waste	Total weight by type and disposal method.

APPENDIX C: THE QUESTIONNAIRE

A MODEL FOR LINKING SUSTAINABILITY REPORTING TO ACTUAL SUSTAINABILITY PERFORMANCE

The purpose of the study is to develop a framework to create a link between companies' sustainability reporting and actual sustainability performance on the ground.

Instructions:

Please answer all questions. This should not take more than 25 minutes of your time. All your answers will be treated as confidential, and you will not be identified in any of the research reports emanating from this research. The information collected for this study will be collated and analysed to form an accurate picture of this research project. You do not need to identify yourself and, similarly, the researcher will uphold anonymity in that there will be no possibility of any respondent being identified or linked in any way to the research results in the final research report.

SECTION A: BIOGRAPHICAL DATA OF THE RESPONDENTS

YOUR RESPONSIBILITY IN THE DEPARTMENT OF MINERAL RESOURCES

A1. State your designation within the Department of Mineral Resources

a) Assistant Director ☐

b) Deputy Director ☐

c) Director ☐

d) Chief Director ☐

e) Deputy Director General ☐

f) Director General ☐

g) Other, Specify _____

A2. Choose the applicable Sub-Programme

a) Governance Policy and Oversight ☐

b) Mine Health and Safety Regions ☐

c) Mineral Policy ☐

d) Mine Environmental Management ☐

e) Mineral Regulation and Admin ☐

f) Management Mineral Regulation ☐

g) Other, Specify _____

A3. Indicate your experience in the mining industry/Department of Mineral Resources

a) 1 Year and Below ☐

b) 2 -3 Years ☐

c) 4-5 Years ☐

d) 5-10 Years ☐

e) 10-20 years ☐

f) More than 20 years ☐

MINING ACTIVITIES IN YOUR REGION

A4. Please identify the office you operate from

a) Limpopo ☐

b) Gauteng ☐

c) Mpumalanga ☐

d) Free State ☐

e) KZN ☐

f) North West ☐

g) Northern Cape ☐

h) Western Cape ☐

i) Eastern Cape ☐

j) Head Office ☐

A5. Please indicate one predominant commodity in which you mainly focus on

A6. Indicate the Department's regulatory tools available to ensure sustainability performance by the mining industry?

a) None ☐

b) Legislation ☐

c) Regulations ☐

d) Others, specify _____

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
SECTION B: COMMUNITY					
B1. Mining companies undertake effective housing infrastructure projects to improve living conditions of employees.					
B2. Mining companies report on the effectiveness of housing infrastructure projects undertaken to improve living conditions of employees.					
B3. Mining companies undertake effective housing infrastructure projects to improve living conditions in host communities.					
B4. Mining companies report on the effectiveness of Housing infrastructure projects undertaken to improve living conditions in host communities.					
B5. Mining companies undertake effective housing infrastructure projects to improve living conditions in labour-sending areas.					
B6. Mining companies report on the effectiveness of Housing infrastructure projects undertaken to improve living conditions in labour-sending areas.					
B7. Mining companies effectively contribute in educational infrastructure projects as part of community development.					
B8. Mining companies report on the effectiveness of contribution towards educational infrastructure projects as part of community development.					
B9. Mining companies effectively participate in road infrastructure projects in host communities.					
B10. Mining companies report on the effectiveness of participation in road infrastructure projects in host communities.					
B11. Mining companies effectively participate in Water and sanitation infrastructure as part of community development.					
B12. Mining companies report on the effectiveness of participation in Water and Sanitation infrastructure as part of community development.					
B13. Mining companies effectively participate in health infrastructure projects in host communities.					
B14. Mining companies report on the effectiveness of participation in health infrastructure projects in host communities.					
B15. Mining companies effectively participate in Sports and Recreation infrastructure projects as part of community development.					
B16. Mining companies report the effectiveness of involvement in Sports and Recreation infrastructure projects as part of community development.					
B17. Mining companies employ people from host communities.					
B18. Mining companies report employment from host communities.					

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
B19. Mining companies invest in capacity development programmes for host communities in view of future job opportunities.					
B20. Mining companies report investment in capacity development programmes for host communities in view of future job opportunities.					
B21. Mining companies have learnership programmes for people in host communities.					
B22. Mining companies report learnership programmes for people in host communities.					
B23. Mining companies have internship programmes for people in host communities.					
B24. Mining companies report internship programmes for people in host communities.					
B25. Mining companies transfer skills to host communities.					
B26. Mining companies report skills transferred to host communities.					
B27. Mining companies effectively create opportunities for enterprise development initiatives for host communities.					
B28. Mining companies report the effectiveness of involvement in enterprise development opportunities for host communities.					
B29. Mining companies undertake supplier development initiatives for host communities.					
B30. Mining companies report the effectiveness of supplier development initiatives for host communities.					
B31. Mining companies procure goods from host communities.					
B32. Mining companies report procurement of goods from host communities.					
B33. Mining companies procure services from host communities.					
B34. Mining companies report procurement of services from host communities.					
SECTION C: EMPLOYEES					
C1. Mining companies uphold fair labour relations practices.					
C2. Mining companies report that they uphold fair labour relations practices.					
C3. Mining companies uphold freedom of association for employees.					
C4. Mining companies report that freedom of association of employees is upheld.					
C5. Employees in the mining companies have the right to collective bargaining.					
C6. Mining companies report that employees have the right to collective bargaining.					
C7. Employees in mining companies have equal job opportunities.					

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
C8. Mining companies report that employees have equal job opportunities.					
C9. Employees in mining companies have fair and equal benefits.					
C10. Mining companies report that employees have the right to fair and equal benefits for employees.					
C11. Mining companies adhere to equal pay for equal work principle.					
C12. Mining companies report adherence to equal pay for equal work principle.					
C13. Mining companies have a living wage.					
C14. Mining companies report that they have a living wage.					
C15. Mining companies implement employee development programmes.					
C16. Mining companies report on employee development programmes.					
C17. Mining companies invest in long term employment growth of employees.					
C18. Mining companies report investment in long term employment growth of employees.					
C19.Mining companies employ women in executive management positions.					
C20. Mining companies report employment of women in executive management positions.					
C21. Mining companies employ disabled people in executive management positions.					
C22. Mining companies report employment of disabled people in executive management positions.					
C23. Mining companies employ Black people in executive management positions.					
C24. Mining companies report employment of Black people in executive management positions.					
C25. Mining companies employ white people in executive management positions.					
C26. Mining companies report employment of white people in executive management positions.					
C27. Mining companies employ women in senior management positions.					
C28. Mining companies report employment of women in senior management positions.					
C29. Mining companies employ disabled people in senior management positions.					
C30. Mining companies report employment of disabled people in senior management positions.					
C31. Mining companies employ Black people in senior management positions.					
C32. Mining companies report employment of Black people in senior management positions.					
C33. Mining companies employ white people in senior management positions.					
C34. Mining companies report employment of white people in senior management positions.					

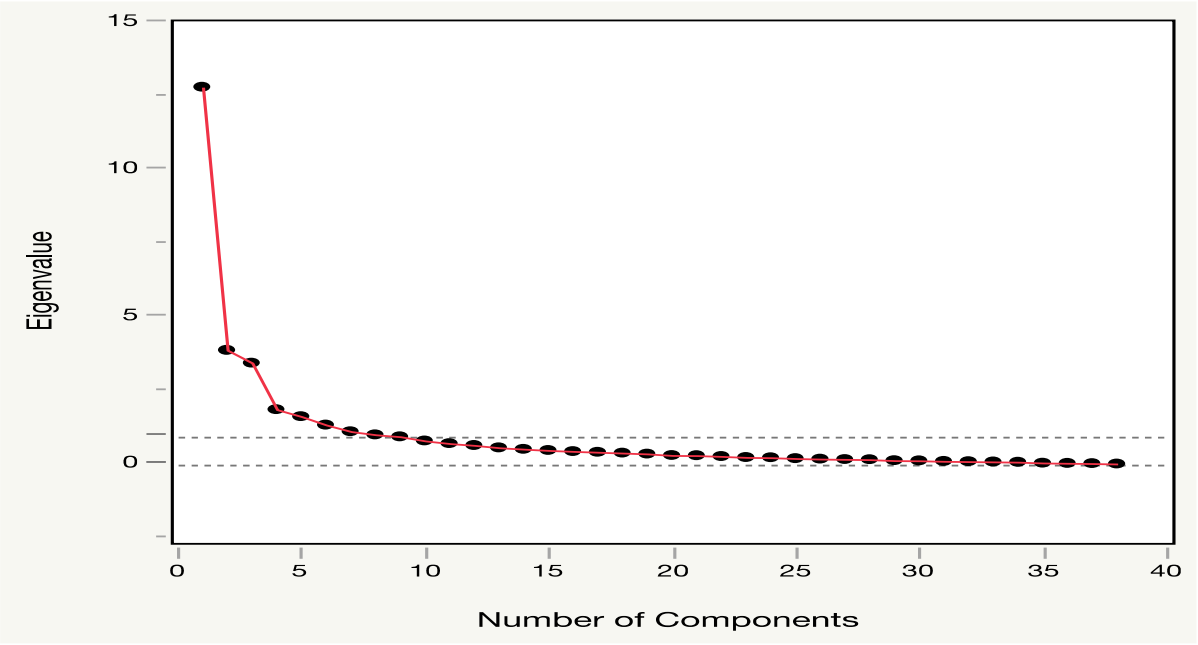
	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
C35. Mining companies employ women in middle management positions.					
C36. Mining companies report employment of women in middle management positions.					
C37. Mining companies employ disabled people in middle management positions.					
C38. Mining companies report employment of disabled people in middle management positions.					
C39. Mining companies employ Black people in middle management positions.					
C40. Mining companies report employment of Black people in middle management positions.					
C41. Mining companies employ white people in senior management positions.					
C42. Mining companies report employment of white people in middle management positions.					
C43. Mining companies employ women in junior positions.					
C44. Mining companies report employment of women in junior positions.					
C45. Mining companies employ disabled people in junior positions.					
C46. Mining companies report employment of disabled people in junior positions.					
C47. Mining companies employ Black people in junior positions.					
C48. Mining companies report employment of Black people in junior positions.					
C49. Mining companies employ white people in junior positions.					
C50. Mining companies report employment of white people in junior positions.					
C51. Mining companies have effective mine safety strategies to prevent employee harm and exposure to risk and danger.					
C52. Mining companies report on mine safety strategies to prevent employee harm, exposure to risk and danger.					
C53. Mining companies effectively implement mine safety strategies to prevent harm.					
C54. Mining companies report that they effectively implement mine safety strategies to prevent harm.					
C55. Mining companies have effective health and safety management systems to protect the health and safety of employees in mines.					
C56. Mining companies report the effectiveness of health and safety management systems in protecting the health and safety of employees.					
C57. Mining companies have effective safety monitoring systems to prevent harm, exposure to risk and danger.					
C58. Mining companies report on the effectiveness of safety monitoring systems to prevent harm, exposure to risk and danger.					

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
C59. Mining companies have effective controls in place to protect the health and safety of mining employees.					
C60. Mining companies report on the effectiveness of health and safety controls to protect the health and safety of mining employees.					
C61. Mining companies have effective Safety Improvement Plans to reduce incidents in mines.					
C62. Mining companies report the effectiveness of Safety Improvement Plans to reduce incidents in mines.					
C63. Mining companies timely implement Safety improvement plans to eliminate incidents in mines.					
C64. Mining companies report that they effectively implement Safety Improvement Plans to eliminate incidents in mines.					
C65. Mining companies allocate appropriate resources to ensure occupational health and safety of employees.					
C66. Mining companies report that they have allocated appropriate resources to ensure occupational health and safety of employees.					
C67. Mining companies have effective preventative measures to eliminate fatalities.					
C68. Mining companies report that they have effective preventative measures to eliminate fatalities.					
C69. Mining companies conduct effective training and educational programmes about occupational health and safety.					
C70. Mining companies report on the effectiveness of training and educational programmes about occupational health and safety.					
C71. Mining companies conduct effective training and educational programmes about communicable diseases.					
C72. Mining companies report on the effectiveness of training and educational programmes about communicable diseases.					
C73. Mining companies conduct effective training and educational programmes about non-communicable diseases.					
C74. Mining companies report on the effectiveness of training and educational programmes about non-communicable diseases.					
C75. Mining companies have effective wellness programmes.					
C76. Mining companies report on the effectiveness of wellness programmes.					
C77. Mining companies have effective disease management programmes.					
C78. Mining companies report on the effectiveness of disease management programmes.					

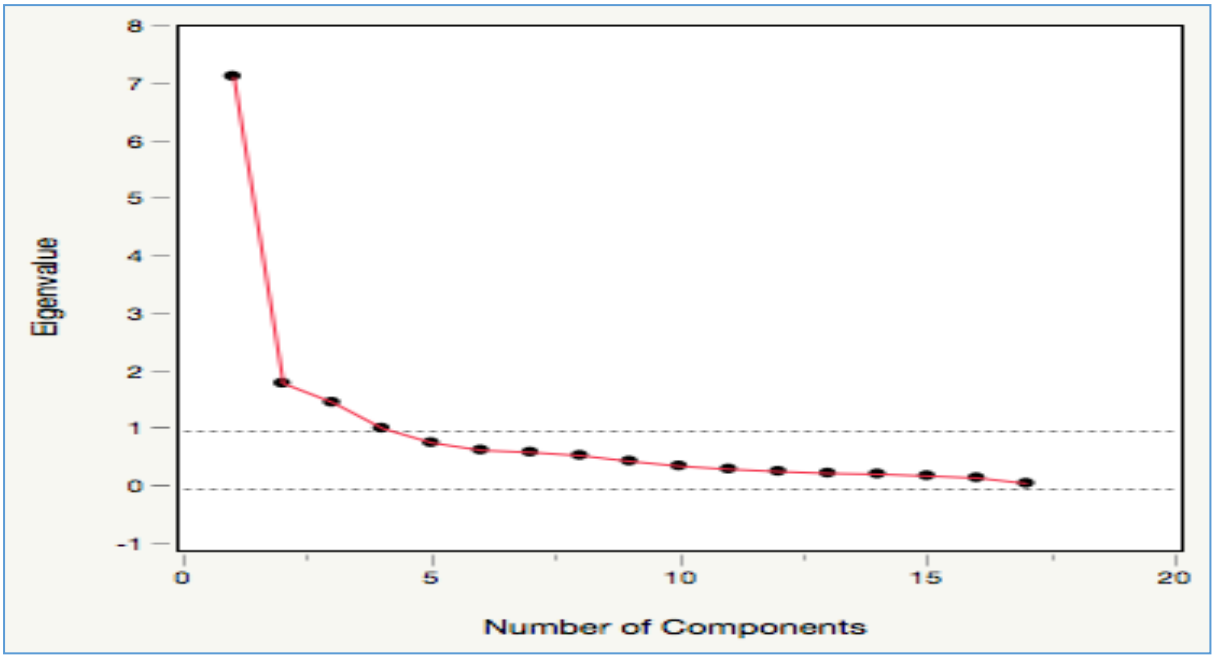
	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
SECTION D: ENVIRONMENT					
D1. Mining companies have effective Environmental management Plan to reduce the negative impact of mining on the ecosystem.					
D2. Mining companies report the effectiveness of Environmental Management Plan to reduce the negative impact of mining on the ecosystem.					
D3. Mining companies effectively implement the Environmental Management Plan to reduce the negative impact of mining on the ecosystem.					
D4. Mining companies report effective implementation of Environmental management Plan to reduce the negative impact of mining on the ecosystem.					
D5. Mining companies undertake effective environmental management initiatives to promote greater environmental responsibility.					
D6. Mining companies report the effectiveness of environmental management initiatives to promote greater environmental responsibility.					
D7. Mining companies have effective emission reduction strategies.					
D8. Mining companies report the effectiveness of emission reduction strategies.					
D9. Mining companies undertake effective environmental management initiatives to conserve natural resources.					
D10. Mining companies report the effectiveness of initiatives to conserve natural resources.					
D11. Mining companies undertake effective environmental management plan to prevent pollution.					
D12. Mining companies report the effectiveness of environmental management plan to prevent pollution.					
D13. Mining companies are involved in effective air pollution reduction programmes.					
D14. Mining companies report effectiveness of air pollution reduction programmes that they undertake.					
D15. Mining companies are involved in effective water pollution reduction programmes.					
D16. Mining companies report the effectiveness of water pollution reduction programmes.					
D17. Mining companies are involved in effective land pollution reduction programmes.					
D18. Mining companies report the effectiveness of land pollution reduction programmes.					
D19. Mining companies have effective Environmental Management Plan to minimise waste generation.					
D20. Mining companies report the effectiveness of environmental management Plan to minimise waste generation.					

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
D21. Mining companies are effectively involved in stewardship for climate change.					
D22. Mining companies report stewardship for climate change.					
D23. Mining companies effectively mitigate the influence of climate/weather conditions on the environment.					
D24. Mining companies report the effectiveness of strategies to mitigate the influence of climate/weather conditions on the environment.					
D25. Mining companies invest in research and development initiatives to reduce the impact of mining operations on the environment.					
D26. Mining companies report the effectiveness of research and development initiatives in reducing the impact of mining operations on the environment.					
D27. Mining companies contribute towards the development of environmentally friendly technologies.					
D28. Mining companies report the effectiveness of contribution towards the development of environmentally friendly technologies.					
D29. Mining companies are involved in the diffusion of environmentally friendly technologies.					
D30. Mining companies report involvement in the diffusion of environmentally friendly technologies.					
D31. Mining companies effectively undertake responsible use of materials.					
D32. Mining companies report the effectiveness of responsible use of materials.					
D33. Mining companies effectively undertake responsible use water.					
D34. Mining companies report responsible use of water.					
D35. Mining companies effectively undertake responsible use of land.					
D36. Mining companies report responsible use of land.					
D37. Mining companies effectively undertake responsible use of energy.					
D38. Mining companies report responsible use of energy.					
D39. Mining companies effectively undertake initiatives to develop renewable energy alternatives.					
D40.Mining companies report initiatives to develop renewable energy alternatives.					
D41. Mining companies effectively undertake rehabilitation and revegetation activities.					
D42. Mining companies report involvement in rehabilitation and revegetation activities.					

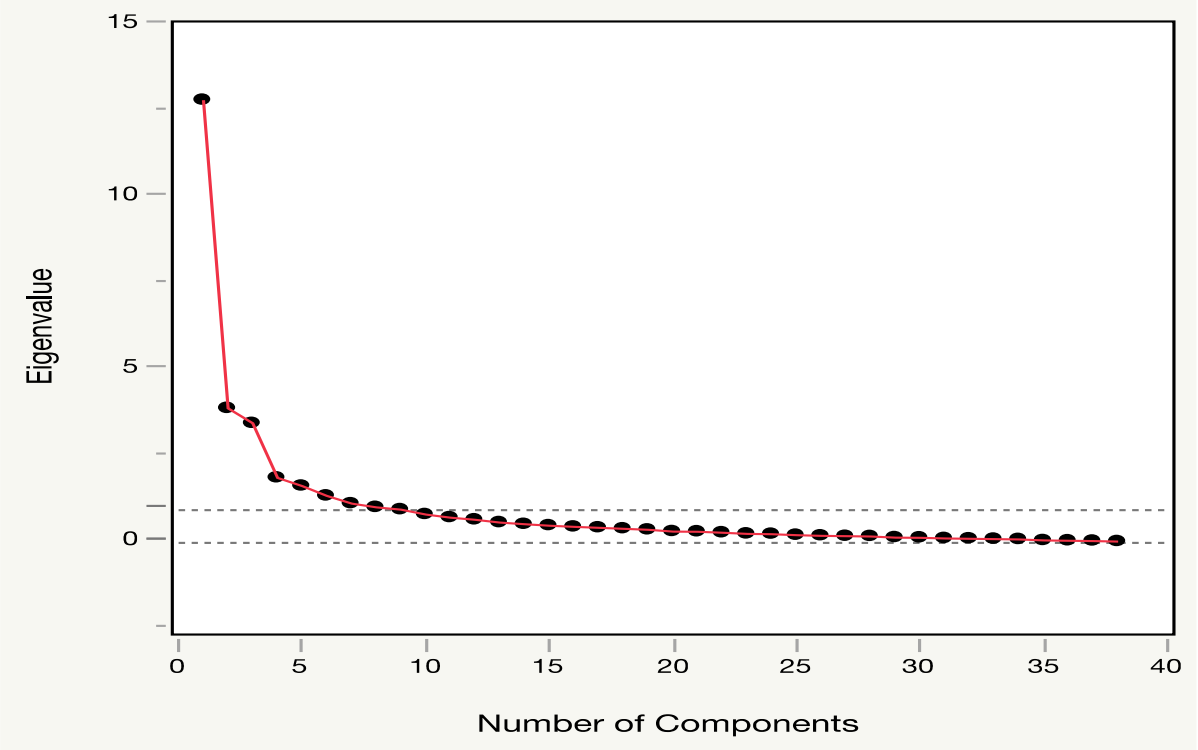
APPENDIX D: SCREE PLOTS



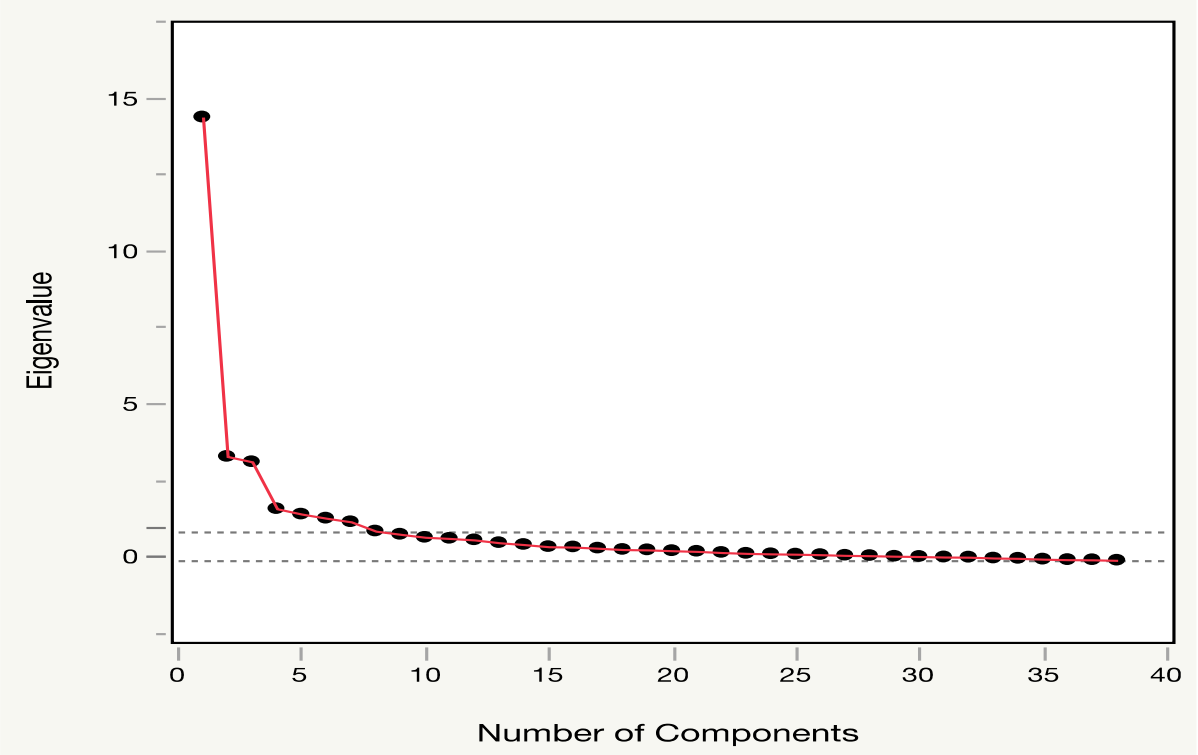
Scree plot for SP – Community Development



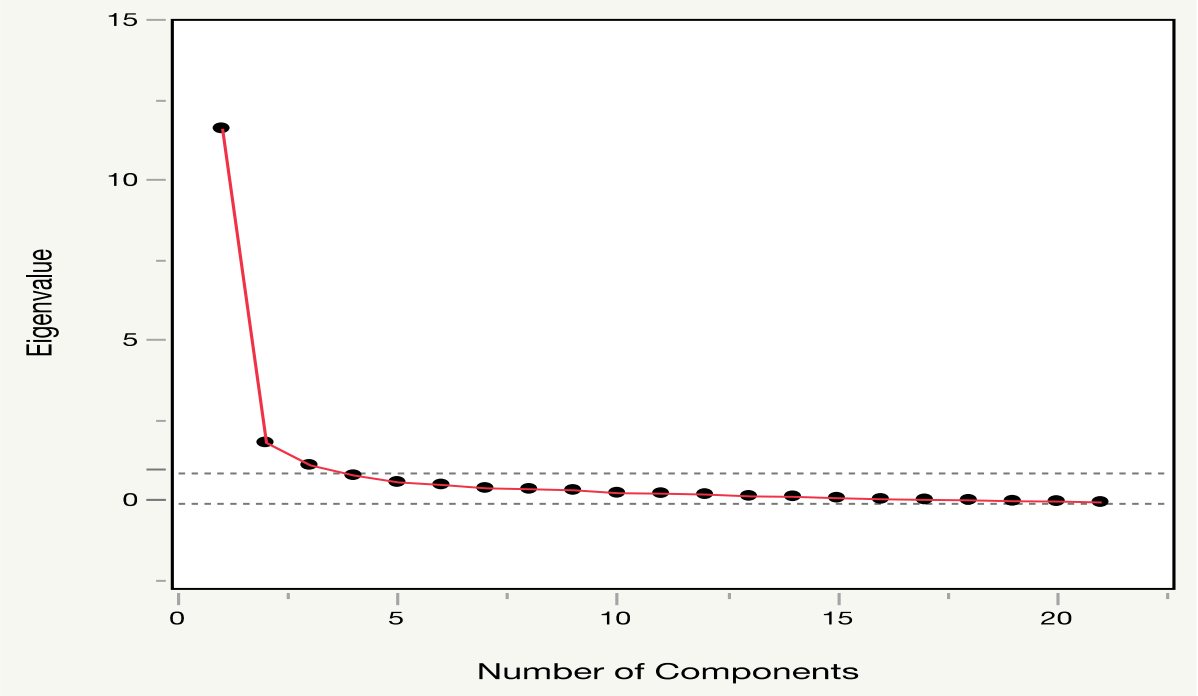
Scree plot for SR- Community Development



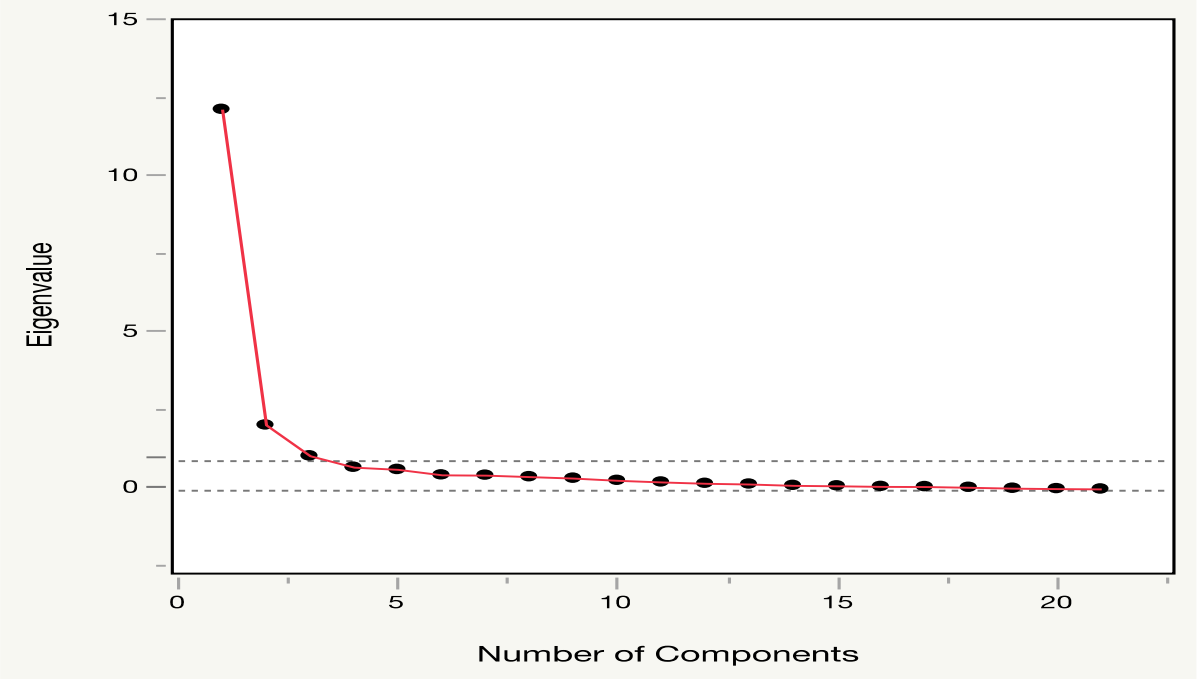
Scree plot for SP- Employee Welfare



Scree Plot for SR - Employee Welfare



Scree Plot for SP – Environmental Protection



Scree Plot for SR - Environmental Protection

APPENDIX E: RELIABILITY

Reliability if an item is dropped: SP - Community

Sustainability performance	Construct Cronbach alpha	Item	raw_alpha	std. alpha	G6(smc)	average_r	S/N	alpha se	var. r	med. r
Local enterprise development	0.89	B27	0.87	0.87	0.84	0.69	6.8	0.019	0.0167	0.66
		B29	0.87	0.87	0.84	0.69	6.8	0.018	0.0154	0.63
		B31	0.84	0.84	0.78	0.64	5.3	0.023	0.0029	0.63
		B33	0.85	0.85	0.79	0.65	5.7	0.021	0.0016	0.66
Infrastructure Development	0.84	B7	0.81	0.82	0.79	0.53	4.4	0.025	0.0095	0.51
		B9	0.83	0.83	0.8	0.55	4.8	0.023	0.0088	0.51
		B11	0.82	0.82	0.8	0.53	4.6	0.024	0.0113	0.49
		B13	0.8	0.8	0.75	0.49	3.9	0.027	0.0011	0.49
		B15	0.81	0.81	0.77	0.51	4.2	0.026	0.0041	0.5
Skills development	0.8	B21	0.77	0.78	0.64	0.64	3.5	0.036	NA	0.64
		B23	0.58	0.58	0.41	0.41	1.4	0.068	NA	0.41
		B25	0.82	0.82	0.69	0.69	4.5	0.029	NA	0.69
Local Housing and living conditions	0.83	B1	0.8	0.8	0.67	0.67	4	0.033	NA	0.67
		B3	0.71	0.72	0.56	0.56	2.5	0.046	NA	0.56
		B5	0.78	0.78	0.64	0.64	3.6	0.035	NA	0.64

Item Statistics for SP - Community

	Item	n	raw. r	std. r	r.cor	r. drop	mean	SR
Local enterprise development	B27	150	0.85	0.85	0.77	0.72	2.8	0.92
	B29	150	0.85	0.85	0.77	0.72	2.9	0.93
	B31	150	0.9	0.9	0.87	0.81	2.7	0.93
	B33	150	0.88	0.88	0.85	0.78	2.8	0.95
Infrastructure Development	B7	150	0.78	0.78	0.7	0.65	3.3	0.9
	B9	150	0.76	0.75	0.65	0.6	2.9	1
	B11	150	0.77	0.77	0.68	0.63	2.8	0.94
	B13	150	0.83	0.83	0.8	0.71	3.1	0.95
	B15	150	0.8	0.8	0.75	0.68	3	0.9
Skills development	B21	150	0.82	0.83	0.71	0.6	3.5	0.84
	B23	150	0.91	0.92	0.88	0.79	3.5	0.79
	B25	150	0.81	0.8	0.65	0.56	3.1	0.89
Local Housing and living conditions	B1	150	0.84	0.85	0.72	0.66	3	0.88
	B3	150	0.89	0.89	0.82	0.74	2.8	0.89
	B5	150	0.87	0.86	0.74	0.67	2.6	0.98

Reliability if an item is dropped: SR - Community

Sustainability reporting	Cronbach's alpha	Item	raw_alpha	std. alpha	G6(smc)	average_r	S/N	alpha se	var. r	med. r
Local enterprise development	0.9	B28	0.87	0.87	0.85	0.7	7	0.018	0.0185	0.65
		B30	0.89	0.89	0.86	0.72	7.9	0.016	0.0132	0.68
		B32	0.86	0.86	0.81	0.67	6	0.021	0.0039	0.68
		B34	0.86	0.86	0.8	0.67	6	0.02	0.0019	0.65
Infrastructure Development	0.84	B8	0.82	0.82	0.8	0.54	4.6	0.024	0.0114	0.52
		B10	0.81	0.81	0.78	0.52	4.3	0.025	0.0142	0.52
		B12	0.81	0.81	0.79	0.52	4.3	0.026	0.0121	0.49
		B14	0.79	0.79	0.75	0.48	3.7	0.028	0.0067	0.48
		B16	0.8	0.8	0.77	0.5	3.9	0.027	0.0061	0.52
Skills development	0.8	B22	0.72	0.73	0.57	0.57	2.6	0.045	NA	0.57
		B24	0.62	0.62	0.45	0.45	1.7	0.061	NA	0.45

Sustainability reporting	Cronbach's alpha	Item	raw_alpha	std. alpha	G6(smc)	average_r	S/N	alpha se	var. r	med. r
		B26	0.83	0.83	0.71	0.71	4.9	0.028	NA	0.71
Housing and living conditions	0.79	B2	0.76	0.76	0.62	0.62	3.2	0.038	NA	0.62
		B4	0.59	0.59	0.42	0.42	1.5	0.066	NA	0.42
		B6	0.77	0.77	0.62	0.62	3.3	0.038	NA	0.62

Item Statistics for SR - Community

Sustainability reporting	Item	n	raw. r	std. r	r.cor	r. drop	mean	SR
Local enterprise development	B28	150	0.86	0.87	0.8	0.76	2.9	0.86
	B30	150	0.85	0.85	0.77	0.72	2.9	0.9
	B32	150	0.9	0.9	0.87	0.81	2.8	0.88
	B34	150	0.89	0.89	0.87	0.8	2.9	0.9
Infrastructure Development	B8	150	0.74	0.74	0.64	0.58	3.2	0.89
	B10	150	0.78	0.77	0.69	0.63	2.9	0.97
	B12	150	0.77	0.77	0.69	0.63	2.8	0.87
	B14	150	0.82	0.82	0.79	0.7	3.1	0.87
	B16	150	0.79	0.8	0.75	0.67	3	0.87
Skills development	B22	150	0.85	0.85	0.76	0.65	3.5	0.84
	B24	150	0.89	0.9	0.84	0.75	3.5	0.77
	B26	150	0.81	0.8	0.61	0.55	3.1	0.87
Housing and living conditions	B2	150	0.8	0.81	0.66	0.57	3	0.86
	B4	150	0.89	0.89	0.83	0.73	2.9	0.87
	B6	150	0.83	0.81	0.66	0.58	2.6	0.95

Reliability if an item is dropped: SP - Employees

Sustainability Performance	Cronbach Alpha	Item	raw_alpha	std. alpha	G6(smc)	average_r	S/N	alpha se	var. r	med. r
Health and Safety	0.96	C51	0.96	0.96	0.97	0.62	22	0.0053	0.0085	0.63
		C53	0.95	0.95	0.96	0.61	21	0.0056	0.0076	0.61
		C55	0.95	0.95	0.97	0.62	21	0.0055	0.0081	0.62
		C57	0.95	0.95	0.97	0.62	21	0.0055	0.0078	0.61
		C59	0.95	0.95	0.96	0.62	21	0.0055	0.0079	0.61
		C61	0.96	0.96	0.97	0.62	21	0.0054	0.009	0.61
		C63	0.96	0.96	0.97	0.63	22	0.0053	0.009	0.62
		C65	0.96	0.96	0.97	0.63	22	0.0053	0.0093	0.64
		C67	0.96	0.96	0.97	0.64	23	0.0051	0.0075	0.64
		C69	0.95	0.95	0.97	0.62	21	0.0055	0.0092	0.61
		C71	0.96	0.96	0.96	0.62	22	0.0053	0.0079	0.63
		C73	0.96	0.96	0.96	0.63	22	0.0052	0.0074	0.63
		C75	0.95	0.95	0.97	0.62	21	0.0054	0.0091	0.61
		C77	0.96	0.96	0.97	0.63	22	0.0052	0.0089	0.64
Labour practices, diversity and Inclusion	0.9	C1	0.89	0.89	0.93	0.36	8.3	0.013	0.02	0.33
		C3	0.89	0.89	0.93	0.36	8.5	0.013	0.02	0.34
		C7	0.89	0.89	0.93	0.36	8.3	0.013	0.02	0.34
		C9	0.89	0.89	0.92	0.35	8	0.013	0.02	0.33
		C11	0.89	0.89	0.93	0.35	8.1	0.013	0.02	0.33
		C13	0.89	0.89	0.93	0.36	8.5	0.013	0.021	0.34
		C15	0.89	0.89	0.92	0.35	8.1	0.013	0.02	0.33
		C17	0.89	0.89	0.92	0.35	8.1	0.013	0.021	0.33
		C19	0.89	0.89	0.92	0.35	8	0.013	0.019	0.33
		C21	0.89	0.89	0.92	0.35	8.1	0.013	0.019	0.34
		C23	0.89	0.89	0.92	0.34	7.8	0.014	0.018	0.33
		C27	0.89	0.89	0.92	0.35	8	0.013	0.018	0.34
		C29	0.89	0.89	0.92	0.35	8.2	0.013	0.018	0.34
		C31	0.89	0.89	0.92	0.35	8	0.013	0.02	0.34
		C37	0.89	0.89	0.92	0.35	8.2	0.013	0.02	0.34
		C45	0.9	0.9	0.93	0.37	8.8	0.012	0.017	0.35
Employment Equity	0.82	C25	0.8	0.8	0.79	0.44	3.9	0.026	0.016	0.48
		C33	0.79	0.8	0.78	0.44	3.9	0.027	0.013	0.46

Sustainability Performance	Cronbach Alpha	Item	raw_alpha	std. alpha	G6(smc)	average_r	S/N	alpha se	var. r	med. r
		C35	0.8	0.81	0.8	0.45	4.2	0.025	0.019	0.47
		C43	0.77	0.77	0.77	0.4	3.4	0.03	0.022	0.36
		C47	0.78	0.78	0.79	0.42	3.6	0.029	0.021	0.43
		C39	0.81	0.81	0.8	0.46	4.3	0.024	0.016	0.47

Item Statistics for SP - Employees

Sustainability Performance	Item	n	raw. r	std. r	r.cor	r. drop	mean	SR
Health and Safety	C51	150	0.8	0.8	0.78	0.76	3.6	0.92
	C53	150	0.88	0.87	0.87	0.85	3.4	0.97
	C55	150	0.84	0.84	0.83	0.81	3.5	0.9
	C57	150	0.84	0.84	0.84	0.82	3.3	0.89
	C59	150	0.86	0.86	0.86	0.84	3.4	0.87
	C61	150	0.82	0.82	0.81	0.79	3.5	0.82
	C63	150	0.79	0.78	0.76	0.75	3.3	0.9
	C65	150	0.78	0.78	0.76	0.74	3.3	0.89
	C67	150	0.72	0.72	0.7	0.67	3.2	0.92
	C69	150	0.85	0.85	0.83	0.82	3.4	0.9
	C71	150	0.79	0.79	0.79	0.76	3.4	0.85
	C73	150	0.75	0.75	0.74	0.7	3.3	0.87
	C75	150	0.83	0.83	0.81	0.79	3.4	0.88
	C77	150	0.75	0.76	0.73	0.71	3.3	0.82
Labour practices, diversity and inclusion	C1	150	0.59	60%	0.56	0.53	3	0.85
	C3	150	0.54	0.54	0.5	0.46	3.3	0.92
	C7	150	0.6	0.6	0.57	0.53	2.4	0.98
	C9	150	0.68	0.68	0.66	0.62	2.5	0.95
	C11	150	0.66	0.66	0.63	0.6	2.5	0.94
	C13	150	0.54	0.54	0.49	0.46	3	0.95
	C15	150	0.65	0.65	0.63	0.59	3.3	0.82
	C17	150	0.65	0.66	0.64	0.59	2.8	0.9
	C19	150	0.68	0.68	0.67	0.62	2.8	1
	C21	150	0.65	0.66	0.65	0.59	2.4	0.81
	C23	150	0.74	0.73	0.72	0.68	3.1	1.03

Sustainability Performance	Item	n	raw. r	std. r	r.cor	r. drop	mean	SR
	C27	150	0.68	0.68	0.67	0.62	3	0.94
	C29	150	0.62	0.63	0.62	0.57	2.5	0.79
	C31	150	0.7	0.68	0.67	0.63	3.2	1.08
	C37	150	0.6	0.61	0.59	0.54	2.6	0.86
	C45	150	0.44	0.44	0.41	0.35	2.9	0.96
Employment equity	C25	150	0.73	0.72	0.66	0.58	4.1	1.01
	C33	150	0.73	0.72	0.67	0.59	4	0.93
	C35	150	0.67	0.69	0.6	0.53	3.5	0.86
	C43	150	0.8	0.8	0.76	0.69	3.6	0.92
	C47	150	0.77	0.77	0.71	0.64	3.9	0.93
	C39	150	0.67	0.67	0.58	0.51	3.4	0.97

Reliability if an item is dropped: SR - Employees

Sustainability reporting	Cronbach's Alpha	Item	raw_alpha	std. alpha	G6(smc)	average_r	S/N	alpha se	var. r	med. r
Health and Safety	0.96	C52	0.96	0.96	0.97	0.62	21	0.0055	0.0104	0.61
		C54	0.95	0.95	0.97	0.62	21	0.0055	0.0099	0.61
		C56	0.96	0.96	0.97	0.62	22	0.0054	0.0092	0.61
		C58	0.96	0.96	0.97	0.62	21	0.0055	0.0098	0.61
		C60	0.96	0.96	0.97	0.62	21	0.0055	0.0104	0.6
		C62	0.95	0.95	0.97	0.62	21	0.0056	0.0106	0.61
		C64	0.96	0.96	0.97	0.62	21	0.0055	0.0108	0.61
		C66	0.96	0.96	0.98	0.62	21	0.0055	0.0115	0.6
		C68	0.96	0.96	0.98	0.62	21	0.0055	0.0109	0.6
		C70	0.95	0.95	0.97	0.61	21	0.0058	0.0113	0.59
		C72	0.96	0.96	0.97	0.62	21	0.0055	0.009	0.61
		C74	0.96	0.96	0.97	0.63	22	0.0054	0.0085	0.61
		C76	0.95	0.95	0.98	0.62	21	0.0056	0.011	0.6
		C78	0.96	0.96	0.98	0.62	21	0.0055	0.0109	0.61
Labour practices, diversity and inclusion	0.91	C2	0.91	0.91	0.94	0.4	10	0.011	0.016	0.38
		C4	0.91	0.91	0.94	0.42	10.7	0.01	0.015	0.4
		C8	0.91	0.91	0.94	0.4	10.1	0.011	0.016	0.39
		C10	0.91	0.91	0.94	0.4	10.2	0.011	0.015	0.39
		C12	0.91	0.91	0.94	0.41	10.3	0.011	0.015	0.39

Sustainability reporting	Cronbach's Alpha	Item	raw_alpha	std. alpha	G6(smc)	average_r	S/N	alpha se	var. r	med. r
		C14	0.91	0.91	0.94	0.41	10.3	0.011	0.017	0.39
		C16	0.91	0.91	0.93	0.4	10	0.011	0.016	0.39
		C18	0.91	0.91	0.93	0.4	10.1	0.011	0.015	0.39
		C20	0.91	0.91	0.93	0.4	10	0.011	0.015	0.38
		C22	0.91	0.91	0.93	0.4	10	0.011	0.015	0.39
		C24	0.91	0.91	0.93	0.4	10.1	0.011	0.014	0.39
		C28	0.91	0.91	0.93	0.4	9.9	0.011	0.014	0.39
		C30	0.91	0.91	0.93	0.4	10.1	0.011	0.014	0.39
		C32	0.91	0.91	0.93	0.4	10.1	0.011	0.015	0.39
		C38	0.91	0.91	0.93	0.41	10.4	0.011	0.015	0.4
		C46	0.92	0.92	0.94	0.42	10.9	0.01	0.013	0.4
Employment equity	0.85	C26	0.83	0.83	0.83	0.5	5	0.022	0.012	0.48
		C34	0.83	0.84	0.83	0.5	5.1	0.022	0.013	0.53
		C36	0.84	0.84	0.84	0.52	5.3	0.02	0.016	0.53
		C44	0.81	0.82	0.82	0.47	4.4	0.024	0.017	0.45
		C48	0.82	0.82	0.82	0.48	4.5	0.024	0.016	0.48
		C40	0.84	0.84	0.83	0.51	5.1	0.021	0.014	0.48

Item Statistics for SR - Employees

Sustainability Reporting	Item	n	raw. r	std. r	r.cor	r. drop	mean	SR
Health and Safety	C52	150	0.79	0.8	0.78	0.76	3.7	0.78
	C54	150	0.81	0.81	0.8	0.77	3.7	0.8
	C56	150	0.78	0.79	0.78	0.74	3.6	0.81
	C58	150	0.8	0.8	0.8	0.77	3.5	0.79
	C60	150	0.8	0.8	0.8	0.77	3.5	0.77
	C62	150	0.81	0.81	0.81	0.78	3.5	0.79
	C64	150	0.81	0.81	0.8	0.77	3.4	0.8
	C66	150	0.8	0.8	0.78	0.77	3.4	0.78
	C68	150	0.8	0.8	0.78	0.76	3.4	0.81
	C70	150	0.86	0.86	0.85	0.84	3.5	0.86
	C72	150	0.8	0.79	0.79	0.76	3.4	0.82
	C74	150	0.78	0.77	0.77	0.74	3.4	0.84
	C76	150	0.82	0.82	0.81	0.79	3.4	0.82
	C78	150	0.8	0.8	0.78	0.76	3.3	0.84

Sustainability Reporting	Item	n	raw. r	std. r	r.cor	r. drop	mean	SR
Labour practices, diversity and inclusion	C2	150	0.72	0.72	0.69	0.67	3.2	0.82
	C4	150	0.55	0.55	0.5	0.48	3.3	0.85
	C8	150	0.7	0.7	0.67	0.64	2.8	1
	C10	150	0.67	0.66	0.64	0.61	2.9	0.95
	C12	150	0.63	0.63	0.6	0.57	2.7	0.91
	C14	150	0.65	0.65	0.61	0.59	3.2	0.85
	C16	150	0.7	0.7	0.68	0.65	3.3	0.79
	C18	150	0.69	0.69	0.68	0.64	3	0.86
	C20	150	0.71	0.71	0.69	0.65	3	0.9
	C22	150	0.7	0.71	0.7	0.66	2.6	0.81
	C24	150	0.7	0.7	0.69	0.64	3.2	0.95
	C28	150	0.74	0.74	0.74	0.69	3.1	0.85
	C30	150	0.68	0.69	0.69	0.64	2.7	0.75
	C32	150	0.68	0.68	0.66	0.62	3.3	0.96
	C38	150	0.61	0.62	0.6	0.55	2.8	0.82
	C46	150	0.49	0.5	0.46	0.41	2.9	0.88
Employment equity	C26	150	0.78	0.75	0.7	0.64	3.6	1.05
	C34	150	0.76	0.74	0.69	0.63	3.6	0.96
	C36	150	0.68	0.71	0.64	0.57	3.5	0.74
	C44	150	0.81	0.82	0.78	0.72	3.6	0.87
	C48	150	0.81	0.8	0.76	0.7	3.7	0.96
	C40	150	0.71	0.74	0.68	0.59	3.5	0.83

Reliability if an item is dropped: SP - Environment

Sustainability Performance	Cronbach Alpha	Item	raw_alpha	std. alpha	G6(smc)	average_r	S/N	alpha se	var. r	med. r
Environmental Management	0.95	D1	0.95	0.95	0.96	0.69	20	0.006	0.0046	0.69
		D3	0.95	0.95	0.96	0.67	19	0.0063	0.0065	0.69
		D5	0.95	0.95	0.95	0.66	18	0.0067	0.0068	0.65
		D7	0.95	0.95	0.96	0.67	18	0.0065	0.0065	0.66
		D9	0.95	0.95	0.96	0.66	18	0.0066	0.0063	0.65
		D11	0.95	0.95	0.95	0.66	18	0.0066	0.0064	0.66
		D13	0.95	0.95	0.95	0.66	18	0.0066	0.0058	0.65
		D15	0.95	0.95	0.96	0.67	18	0.0065	0.0055	0.66

Sustainability Performance	Cronbach Alpha	Item	raw_alpha	std. alpha	G6(smc)	average_r	S/N	alpha se	var. r	med. r
		D17	0.94	0.94	0.95	0.66	17	0.0068	0.005	0.65
		D19	0.95	0.95	0.96	0.67	18	0.0065	0.0064	0.69
Environmental Leadership	0.91	D21	0.89	0.89	0.87	0.66	7.9	0.015	0.0137	0.64
		D23	0.9	0.9	0.89	0.7	9.4	0.013	0.0067	0.68
		D25	0.89	0.89	0.91	0.68	8.5	0.015	0.0152	0.64
		D27	0.88	0.88	0.88	0.65	7.6	0.016	0.0092	0.63
		D29	0.89	0.89	0.89	0.66	7.9	0.016	0.0111	0.65
Environmental Responsibility	0.8	D37	0.74	0.74	0.59	0.59	2.9	0.042	NA	0.59
		D41	0.75	0.75	0.6	0.6	3	0.04	NA	0.6
		D33	0.69	0.69	0.53	0.53	2.2	0.05	NA	0.53

Item Statistics for SP - Environment

Sustainability Performance	Item	n	raw. r	std. r	r.cor	r. drop	mean	SR
Environmental Management	D1	150	0.75	0.75	0.71	0.69	3.3	0.93
	D3	150	0.81	0.81	0.79	0.77	3	0.92
	D5	150	0.86	0.86	0.85	0.83	3	0.92
	D7	150	0.83	0.83	0.82	0.79	2.9	0.9
	D9	150	0.85	0.85	0.83	0.81	3	0.88
	D11	150	0.85	0.85	0.84	0.81	3	0.92
	D13	150	0.85	0.85	0.84	0.81	3	0.89
	D15	150	0.84	0.84	0.83	0.8	3	0.93
	D17	150	0.89	0.89	0.89	0.86	3	0.9
	D19	150	0.83	0.83	0.81	0.78	3.1	0.93
Environmental Leadership	D21	150	0.87	0.87	0.84	0.79	2.8	0.87
	D23	150	0.81	0.82	0.78	0.71	2.8	0.84
	D25	150	0.86	0.85	0.79	0.76	2.9	0.99
	D27	150	0.89	0.88	0.86	0.81	3	0.9
	D29	150	0.87	0.87	0.84	0.8	2.9	0.8
Environmental Responsibility	D37	150	0.84	0.84	0.71	0.63	3.2	0.85
	D41	150	0.84	0.83	0.7	0.62	3.2	0.91
	D33	150	0.85	0.86	0.76	0.68	3.2	0.81

Reliability if an item is dropped: SR - Environment

Sustainability reporting	Cronbach's alpha	Item	raw_alpha	std. alpha	G6(smc)	average_r	S/N	alpha se	var. r	med. r
Environmental Management	0.96	D2	0.96	0.96	0.97	0.75	27	0.0044	0.0046	0.76
		D4	0.96	0.96	0.97	0.74	26	0.0046	0.0057	0.75
		D6	0.96	0.96	0.96	0.73	24	0.0049	0.0059	0.71
		D8	0.96	0.96	0.97	0.73	25	0.0048	0.0063	0.75
		D10	0.96	0.96	0.97	0.74	25	0.0047	0.0058	0.74
		D12	0.96	0.96	0.97	0.72	23	0.0051	0.0052	0.71
		D14	0.96	0.96	0.97	0.73	24	0.005	0.0054	0.71
		D16	0.96	0.96	0.97	0.74	25	0.0047	0.005	0.74
		D18	0.96	0.96	0.97	0.72	24	0.005	0.0051	0.71
		D20	0.96	0.96	0.97	0.73	25	0.0048	0.006	0.74
Environmental Leadership	0.91	D22	0.9	0.9	0.88	0.69	9	0.014	0.0097	0.66
		D24	0.9	0.9	0.88	0.68	8.6	0.014	0.0116	0.67
		D26	0.89	0.89	0.9	0.68	8.3	0.015	0.0151	0.61
		D28	0.89	0.89	0.88	0.66	7.9	0.015	0.0075	0.62
		D30	0.88	0.89	0.87	0.66	7.7	0.016	0.007	0.62
Environmental Responsibility	0.75	D38	0.7	0.7	0.54	0.54	2.4	0.048	NA	0.54
		D42	0.74	0.74	0.58	0.58	2.8	0.043	NA	0.58
		D34	0.57	0.57	0.4	0.4	1.3	0.069	NA	0.4

Item Statistics for SR - Environment

Sustainability reporting		n	raw. r	std. r	r.cor	r. drop	mean	SR
Environmental Management	D2	150	0.8	0.8	0.77	0.75	3.4	0.87
	D4	150	0.83	0.83	0.81	0.79	3.2	0.88
	D6	150	0.9	0.9	0.9	0.87	3.2	0.86
	D8	150	0.87	0.87	0.86	0.84	3.1	0.83
	D10	150	0.85	0.85	0.84	0.82	3.2	0.81
	D12	150	0.92	0.92	0.91	0.9	3.2	0.88
	D14	150	0.9	0.9	0.89	0.88	3.1	0.86
	D16	150	0.86	0.85	0.84	0.82	3.2	0.89
	D18	150	0.91	0.91	0.91	0.89	3.2	0.89

Sustainability reporting		n	raw. r	std. r	r.cor	r. drop	mean	SR
	D20	150	0.88	0.88	0.86	0.85	3.2	0.9
Environmental Leadership	D22	150	0.83	0.84	0.79	0.74	2.9	0.84
	D24	150	0.85	0.85	0.81	0.76	2.9	0.86
	D26	150	0.86	0.86	0.8	0.77	2.9	0.9
	D28	150	0.87	0.87	0.85	0.8	3	0.86
	D30	150	0.88	0.88	0.87	0.81	3	0.83
Environmental Responsibility	D38	150	0.79	0.81	0.65	0.55	3.2	0.82
	D42	150	0.81	0.79	0.61	0.53	3.3	0.95
	D34	150	0.86	0.86	0.77	0.67	3.3	0.84

Frequency Table for SR - Environment

Sustainability reporting	Item	1	2	3	4	5	miss
Environmental Management	D2	0.03	0.11	31%	0.5	0.05	0.01
	D4	0.04	0.15	0.39	0.39	0.03	0.01
	D6	0.04	0.14	0.41	0.39	0.02	0.01
	D8	0.05	0.13	0.5	0.31	0.01	0.01
	D10	0.04	0.11	0.49	0.33	0.02	0.01
	D12	0.05	0.13	0.41	0.39	0.02	0.01
	D14	0.05	0.13	0.46	0.33	0.02	0.01
	D16	0.05	0.15	0.41	0.37	0.02	0.01
	D18	0.05	0.15	0.4	0.38	0.02	0.01
	D20	0.05	0.13	0.39	0.4	0.03	0.01
Environmental Leadership	D22	0.07	0.2	0.51	0.21	0.01	0.01
	D24	0.06	0.23	0.49	0.2	0.02	0.01
	D26	0.09	0.18	0.48	0.24	0.01	0.01
	D28	0.06	0.16	0.51	0.25	0.02	0.01
	D30	0.05	0.15	0.54	0.23	0.02	0.01
Environmental Responsibility	D38	0.03	0.13	0.45	0.37	0.02	0.01
	D42	0.06	0.12	0.35	0.42	0.05	0.01
	D34	0.03	0.14	0.43	0.37	0.04	0.01

APPENDIX F: SEM OUTPUT – FULL MODEL

Lavaan (0.6-1) normally converged after 119 iterations		
	Used	**Total**
Number of observations	150	152
Estimator	**ML**	**Robust**
Model fit test statistic	266.337	197.994
Degrees of freedom	151	151
p-value (chi-square)	0	0.006
Scaling correction factor for the Satorra-Bentler correction		1.345
Model test baseline model:		
Minimum function test statistic	2968.948	2054.205
Degrees of freedom	190	190
p-value	0	0
User model versus baseline model:		
Comparative fit index (CFI)	0.958	0.975
Tucker-Lewis Index (TLI)	0.948	0.968
Robust CFI		0.977
Robust TLI		0.97

Loglikelihood and Information Criteria:		
Loglikelihood user model (H0)	-1885.39	-1885.39
Loglikelihood unrestricted model (H1)	-1752.22	-1752.22
Number of free parameters	59	59
Akaike (AIC)	3888.778	3888.778
Bayesian (BIC)	4066.405	4066.405
Sample-size adjusted Bayesian (BIC)	3879.682	3879.682

Root Mean Square Error of Approximation (RMSEA):						
RMSEA			0.071	0.046		
90 Percent confidence interval		0	57 0.085	0.029	0.06	
p-value RMSEA <= 0.05			0.008	0.678		
Robust RMSEA				0.053		
90 Percent confidence interval				0.029	0.072	
Standardised Root Mean Square Residual (SRMR):						
SRMR			0.086	0.086		
Parameter Estimates:						
Information	Expected					
Information saturated (h1) model	Structured					
Standard Errors	Robust. SEM					
	Estimate	**Std. Err**	**z-value**	**P(>|z|)**	**Std.lv**	**Std. all**

Latent Variables:						
Community R =~						
B1R	1.000				0.515	0.662
B2R	1.105	0.123	9.003	-	0.570	0.828
B3R	0.746	0.095	7.879	-	0.385	0.587
B4R	1.027	0.116	8.873	-	0.529	0.686
Community P =~						
B1P	1.000				0.565	0.684
B2P	1.064	0.108	9.877	-	0.601	0.828
B3P	0.659	0.092	7.134	-	0.372	0.559
B4P	0.997	0.098	10.192	-	0.563	0.677
Employee R =~						
C1R	1.000				0.462	0.745
C2R	0.990	0.119	8.343	-	0.457	0.801
C3R	0.512	0.126	4.050	-	0.236	0.356
Employee P =~						
C1P	1.000				0.477	0.695
C2P	1.027	0.141	7.296	-	0.490	0.799
C3P	0.350	0.111	3.151	0.002	0.167	0.248
Environment R =~						
D1R	1.000				0.689	0.897
D2R	0.804	0.087	9.230	-	0.554	0.735
D3R	0.748	0.103	7.290	-	0.516	0.735
Environment P =~						
D1P	1.000				0.694	0.905
D2P	0.867	0.093	9.343	-	0.601	0.798
D3P	0.713	0.103	6.902	-	0.495	0.695
Regressions:						
Community R ~						
Community P	0.690	0.105	6.598	-	0.756	0.756
Employee R ~						
Employee P	0.746	0.081	9.213	-	0.771	0.771
Environment R ~						
Environment P	0.778	0.075	10.343	-	0.782	0.782
Covariances:						
B1R ~~ B1P	0.305	0.046	6.623	-	0.305	0.866
B2R ~~ B2P	0.121	0.029	4.122	-	0.121	0.769
B3R ~~ B3P	0.269	0.042	6.449	-	0.269	0.919
B4R ~~ B4P	0.278	0.069	4.017	-	0.278	0.808
C1R ~~ C1P	0.167	0.030	5.594	-	0.167	0.819
C2R ~~ C2P	0.083	0.026	3.201	0.001	0.083	0.661

C3R ~~ C3P	0.292	0.042	6.948	-	0.292	0.723
D1R ~~ D1P	0.077	0.047	1.634	0.102	0.077	0.690
D2R ~~ D2P	0.209	0.041	5.155	-	0.209	0.902
D3R ~~ D3P	0.170	0.035	4.792	-	0.170	0.698
Community P ~~						
Employee P	0.193	0.041	4.759	-	0.718	0.718
Environment P	0.240	0.047	5.060	-	0.613	0.613
Employee P ~~						
Environment P	0.236	0.043	5.441	-	0.713	0.713
Community R ~~						
Employee R	0.069	0.030	2.275	0.023	0.698	0.698
Environment R	0.065	0.042	1.561	0.119	0.450	0.450
Employee R ~~						
Environment R	0.109	0.033	3.345	0.001	0.863	0.863
Variances						
B1R	0.341	0.046	7.345	-	0.341	0.562
B2R	0.149	0.030	5.018	-	0.149	0.315
B3R	0.282	0.040	7.062	-	0.282	0.656
B4R	0.316	0.070	4.484	-	0.316	0.530
B1P	0.363	0.048	7.534	-	0.363	0.532
B2P	0.166	0.034	4.816	-	0.166	0.315
B3P	0.305	0.047	6.527	-	0.305	0.687
B4P	0.375	0.077	4.888	-	0.375	0.542
C1R	0.170	0.026	6.671	-	0.170	0.444
C2R	0.117	0.024	4.933	-	0.117	0.359
C3R	0.385	0.041	9.424	-	0.385	0.873
C1P	0.244	0.041	5.990	-	0.244	0.518
C2P	0.136	0.038	3.610	-	0.136	0.362
C3P	0.424	0.047	9.035	-	0.424	0.938
D1R	0.116	0.051	2.250	0.024	0.116	0.196
D2R	0.261	0.048	5.465	-	0.261	0.460
D3R	0.226	0.043	5.289	-	0.226	0.459
D1P	0.107	0.049	2.178	0.029	0.107	0.182
D2P	0.205	0.041	5.065	-	0.205	0.362
D3P	0.262	0.049	5.371	-	0.262	0.517
Community R	0.114	0.044	2.562	0.010	0.428	0.428
Community P	0.319	0.063	5.025	-	1.000	1.000
Employee R	0.086	0.023	3.700	-	0.405	0.405
Employee P	0.227	0.049	4.653	-	1.000	1.000
Environment R	0.184	0.055	3.359	0.001	0.388	0.388
Environment P	0.481	0.072	6.711	-	1.000	1.000

Source: *Survey data (2019)*

Lavaan (0.6-1) normally converged after 50 iterations						
	Used	Total				
Number of observations	150	152				
Estimator	ML	Robust				
Model Fit Test Statistic	24.512	19.631				
Degrees of freedom	15	15				
p-value (Chi-square)	0.057	0.187				
Scaling correction factor for the Satorra-Bentler correction		1.249				
Model test baseline model:						
Minimum Function Test Statistic	1100.272	757.612				
Degrees of freedom	28	28				
p-value	0	0				
User model versus baseline model:						
CFI	0.991	0.994				
TLI	0.983	0.988				
Robust CFI		0.995				
Robust TLI		0.99				
Loglikelihood and information criteria:						
Loglikelihood user model (H0)	-807.432	-807.432				
Loglikelihood unrestricted model (H1)	-795.176	-795.176				
Number of free parameters	21	21				
Akaike (AIC)	1656.864	1656.864				
Bayesian (BIC)	1720.087	1720.087				
Sample-size-adjusted Bayesian (BIC)	1653.626	1653.626				
Root means square error of approximation:						
RMSEA			0.065	0.045		
90 Percent confidence interval		-	0.11	-	0.09	
p-value RMSEA <= 0.05		0.269	0.522			
Robust RMSEA			0.051			
90 Percent confidence interval				-	0.106	
Standardised root means square residual:						
SRMR			0.079	0.079		
Information	Expected					
Information saturated (h1) model	Structured					
Standard Errors	Robust.sem					
Parameter estimates:						

Information	Expected					
Information saturated (h1) model	Structured					
Standard Errors	Robust.sem					
	Estimate	**Std. Err**	**z-value**	**P(>|z|)**	**Std.lv**	**Std. All**
Latent Variables:						
Community R =~						
B1R	1				0.497	0.642
B2R	1.18	0.146	8.063	-	0.587	0.846
B3R	0.746	0.1	7.434	-	0.371	0.56
B4R	1.066	0.126	8.457	-	0.53	0.689
Community P =~						
B1P	1				0.529	0.647
B2P	1.174	0.143	8.212	-	0.621	0.852
B3P	0.669	0.104	6.414	-	0.354	0.53
B4P	1.092	0.109	10.052	-	0.578	0.7
Regression						
Community R ~						
Community P	0.708	0.121	5.824	-	0.754	0.754
Covariances:						
.B1R ~~.B1P	0.317	0.048	6.58	-	0.317	0.854
.B2R ~~.B2P	0.114	0.033	3.411	0.001	0.114	0.805
.B3R ~~.B3P	0.286	0.041	7.022	-	0.286	0.918
.B4R ~~.B4P	0.266	0.069	3.872	-	0.266	0.807
Variances						
.B1R	0.353	0.05	7.099	-	0.353	0.588
.B2R	0.137	0.033	4.109	-	0.137	0.284
.B3R	0.301	0.04	7.566	-	0.301	0.687
.B4R	0.312	0.07	4.431	-	0.312	0.526
.B1P	0.39	0.051	7.697	-	0.39	0.581
.B2P	0.146	0.04	3.64	-	0.146	0.275
.B3P	0.322	0.045	7.134	-	0.322	0.72
.B4P	0.348	0.077	4.523	-	0.348	0.51
.Community R	0.107	0.044	2.405	0.016	0.432	0.432
Community P	0.28	0.065	4.33	-	1	1

Source: *Survey data (2019)*

Lavaan (0.6-1) normally converged after 38 iterations

	Used	Total
Number of observations	150	152
Estimator	ML	Robust
Model Fit Test Statistic	8.6	9.492
Degrees of freedom	5	5
p-value (Chi-square)	0.126	0.091
Scaling correction factor for the Satorra-Bentler correction		0.906
Model test baseline model:		
Minimum Function Test Statistic	562.583	355.366
Degrees of freedom	15	15
p-value	0	0
User model versus baseline model:		
CFI	0.993	0.987
TLI	0.98	0.96
Robust CFI		0.992
Robust TLI		0.977
Loglikelihood and information criteria:		
Loglikelihood user model (H0)	-609.12	-609.12
Loglikelihood unrestricted model (H1)	-604.82	-604.82
Number of free parameters	16	16
Akaike (AIC)	1250.239	1250.239
Bayesian (BIC)	1298.409	1298.409
Sample-size adjusted Bayesian (BIC)	1247.772	1247.772

Root mean square error of approximation:						
RMSEA			0.069	0.077		
90 Percent confidence interval		-	0.146	-	0.156	
p-value RMSEA <= 0.05		0.283	0.232			
Robust RMSEA			0.074			
90 Percent confidence interval				-	0.145	
Standardised root mean square residual:						
SRMR			0.048	0.048		
Parameter estimates:						
Information	Expected					
Information-saturated (h1) model	Structured					
Standard Errors	Robust.sem					
	Estimate	**Std. Err**	**z-value**	**P(>|z|)**	**Std.lv**	**Std. All**

Latent Variables:						
Employee R =~						
C1R	1				0.526	0.799
C2R	0.854	0.171	4.999	-	0.449	0.778
C3R	0.542	0.128	4.234	-	0.285	0.429
EmployeeP =~						
C1P	1				0.503	0.698
C2P	0.939	0.216	4.346	-	0.472	0.795
C3P	0.454	0.122	3.708	-	0.228	0.341
Regression						
Employee R ~						
EmployeeP	0.843	0.109	7.741	-	0.806	0.806
Covariances:						
.C1R ~~.C1P	0.182	0.05	3.615	-	0.182	0.894
.C2R ~~.C2P	0.074	0.036	2.034	0.042	0.074	0.566
.C3R ~~.C3P	0.268	0.041	6.577	-	0.268	0.708
Variances						
.C1R	0.156	0.053	2.942	0.003	0.156	0.361
.C2R	0.132	0.038	3.449	0.001	0.132	0.395
.C3R	0.362	0.041	8.806	-	0.362	0.816
.C1P	0.266	0.067	3.957	-	0.266	0.513
.C2P	0.13	0.048	2.713	0.007	0.13	0.368
.C3P	0.396	0.045	8.862	-	0.396	0.884
.Employee R	0.097	0.034	2.879	0.004	0.351	0.351
.EmployeeP	0.253	0.076	3.323	0.001	1	1

Source: *Survey data (2019)*

Lavaan (0.6-1) normally converged after 55 iterations		
	Used	Total
Number of observations	150	152
Estimator	ML	Robust
Model Fit Test Statistic	5.174	2.417
Degrees of freedom	5	5
p-value (Chi-square)	0.395	0.789
Scaling correction factor for the Satorra-Bentler correction		2.141
Model test baseline model:		

Minimum Function Test Statistic	810.166	445.286
Degrees of freedom	15	15
p-value	0	0
User model versus baseline model:		
CFI	1	1
TLI	0.999	1.018
Robust CFI		1
Robust TLI		1.021
Loglikelihood and information criteria:		
Loglikelihood user model (H0)	-602.776	-602.776
Loglikelihood unrestricted model (H1)	-600.188	-600.188
Number of free parameters	16	16
Akaike (AIC)	1237.551	1237.551
Bayesian (BIC)	1285.721	1285.721
Sample-size adjusted Bayesian (BIC)	1235.084	1235.084

Root mean square error of approximation:						
RMSEA			0.015	0		
90 Percent confidence interval		0	0.115	0	0.034	
p-value RMSEA <= 0.05		0.595	0.975			
Robust RMSEA			0			
90 Percent confidence interval				0	0.108	
Standardised root mean square residual:						
SRMR			0.038	0.038		
Parameter estimates:						
Information	Expected					
Information saturated (h1) model	Structured					
Standard Errors	Robust.sem					
	Estimate	**Std. Err**	**z-value**	**P(>|z|)**	**Std.lv**	**Std. All**
Latent Variables:						
Environment R =~						
D1R	1				0.641	0.835
D2R	0.887	0.133	6.684	0	0.569	0.776
D3R	0.815	0.13	6.272	0	0.522	0.757
Environment P =~						
D1P	1				0.672	0.869
D2P	0.935	0.121	7.739	0	0.628	0.841

D3P	0.734	0.117	6.271	0	0.494	0.693
Regression						
Environment R ~						
Environment P	0.741	0.098	7.541	0	0.777	0.777
Covariances:						
.D1R ~~.D1P	0.122	0.055	2.207	0.027	0.122	0.751
.D2R ~~.D2P	0.17	0.042	4.011	0	0.17	0.911
.D3R ~~.D3P	0.157	0.037	4.297	0	0.157	0.678
Variances						
.D1R	0.179	0.068	2.638	0.008	0.179	0.303
.D2R	0.214	0.052	4.078	0	0.214	0.398
.D3R	0.204	0.042	4.822	0	0.204	0.428
.D1P	0.147	0.06	2.465	0.014	0.147	0.245
.D2P	0.164	0.045	3.604	0	0.164	0.293
.D3P	0.264	0.054	4.915	0	0.264	0.52
.Environment R	0.163	0.056	2.935	0.003	0.397	0.397
Environment P	0.452	0.08	5.654	0	1	1

Source: *Survey data (2019)*

Lavaan (0.6-1) converged normally after 55 iterations		
	Used	Total
Number of observations	150	152
Estimator	ML	Robust
Model Fit Test Statistic	5.174	2.417
Degrees of freedom	5	5
p-value (Chi-square)	0.395	0.789
Scaling correction factor for the Satorra-Bentler correction		2.141
Model test baseline model:		
Minimum Function Test Statistic	810.166	445.286
Degrees of freedom	15	15
p-value	0	0
User model versus baseline model:		
CFI	1	1
TLI	0.999	1.018
Robust CFI		1
Robust TLI		1.021

Loglikelihood and information criteria:		
Loglikelihood user model (H0)	-602.776	-602.776
Loglikelihood unrestricted model (H1)	-600.188	-600.188
Number of free parameters	16	16
Akaike (AIC)	1237.551	1237.551
Bayesian (BIC)	1285.721	1285.721
Sample-size adjusted Bayesian (BIC)	1235.084	1235.084

Root mean square error of approximation:						
RMSEA			0.015	0		
90 Percent confidence interval		0	0.115	0	0.034	
p-value RMSEA <= 0.05		0.595	0.975			
Robust RMSEA			0			
90 Percent confidence interval				0	0.108	
Standardised root mean square residual:						
SRMR			0.038	0.038		
Parameter estimates:						
Information	Expected					
Information saturated (h1) model	Structured					
Standard Errors	Robust.sem					
	Estimate	**Std. Err**	**z-value**	**P(>|z|)**	**Std.lv**	**Std. All**
Latent Variables:						
Environment R =~						
D1R	1				0.641	0.835
D2R	0.887	0.133	6.684	0	0.569	0.776
D3R	0.815	0.13	6.272	0	0.522	0.757
Environment P =~						
D1P	1				0.672	0.869
D2P	0.935	0.121	7.739	0	0.628	0.841
D3P	0.734	0.117	6.271	0	0.494	0.693
Regression						
Environment R ~						
Environment P	0.741	0.098	7.541	0	0.777	0.777
Covariances:						
.D1R ~~.D1P	0.122	0.055	2.207	0.027	0.122	0.751
.D2R ~~.D2P	0.17	0.042	4.011	0	0.17	0.911
.D3R ~~.D3P	0.157	0.037	4.297	0	0.157	0.678

Variances						
.D1R	0.179	0.068	2.638	0.008	0.179	0.303
.D2R	0.214	0.052	4.078	0	0.214	0.398
.D3R	0.204	0.042	4.822	0	0.204	0.428
.D1P	0.147	0.06	2.465	0.014	0.147	0.245
.D2P	0.164	0.045	3.604	0	0.164	0.293
.D3P	0.264	0.054	4.915	0	0.264	0.52
.Environment R	0.163	0.056	2.935	0.003	0.397	0.397
Environment P	0.452	0.08	5.654	0	1	1

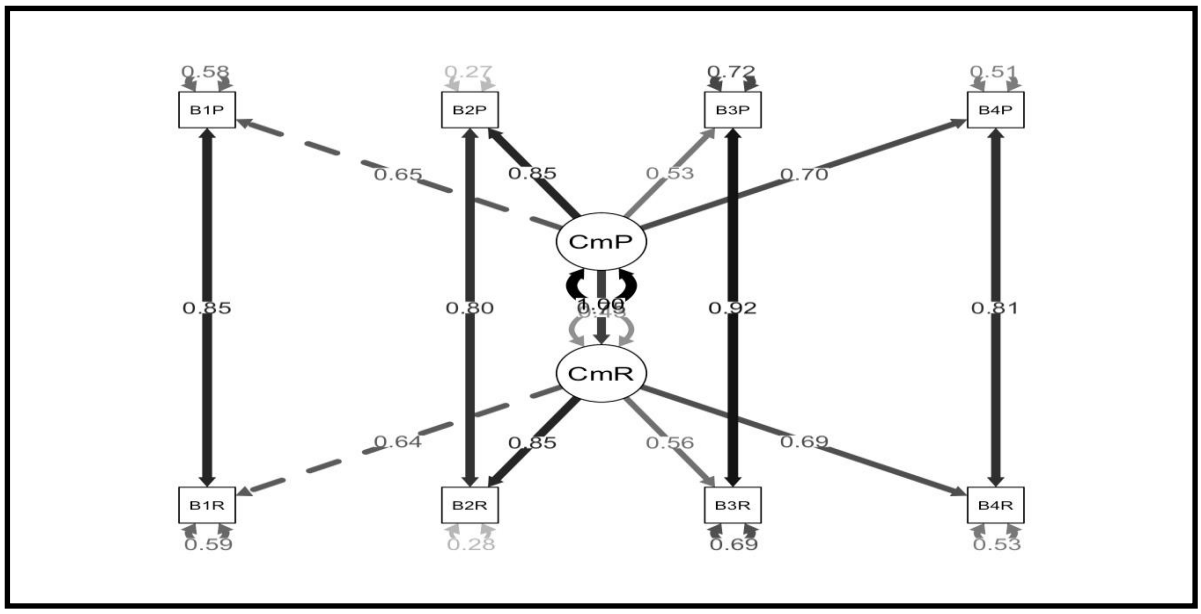
Source: *Survey data (2019)*

```
# Fit full model
Mod1 <- '
CommunityR =~ B1R + B2R + B3R + B4R
CommunityP =~ B1P + B2P + B3P + B4P
EmployeeR =~ C1R + C2R + C3R
EmployeeP =~ C1P + C2P + C3P
EnvironmentR =~ D1R + D2R + D3R
EnvironmentP =~ D1P + D2P + D3P
# regressions
 CommunityR ~ CommunityP
 EmployeeR ~ EmployeeP
 EnvironmentR ~ EnvironmentP
 # residual correlations
B1R ~~ B1P
B2R ~~ B2P
B3R ~~ B3P
B4R ~~ B4P
C1R ~~ C1P
C2R ~~ C2P
C3R ~~ C3P
D1R ~~ D1P
D2R ~~ D2P
D3R ~~ D3P
fit.Mod1 <- sem(Mod1, data = dat1, estimator = "MLM")
summary(fit.Mod1, fit.measures = TRUE, standardized = TRUE)

# COMMUNITY
Mod1a <- '
CommunityR =~ B1R + B2R + B3R + B4R
CommunityP =~ B1P + B2P + B3P + B4P
# regressions
 CommunityR ~ CommunityP
 # residual correlations
B1R ~~ B1P
B2R ~~ B2P
B3R ~~ B3P
B4R ~~ B4P
fit.Mod1a <- sem(Mod1a, data = dat1, estimator = "MLM")
summary(fit.Mod1a, fit.measures = TRUE, standardized = TRUE)

# EMPLOYEE
Mod1b <- '
EmployeeR =~ C1R + C2R + C3R
EmployeeP =~ C1P + C2P + C3P
# regressions
 EmployeeR ~ EmployeeP
 # residual correlations
C1R ~~ C1P
C2R ~~ C2P
C3R ~~ C3P
fit.Mod1b <- sem(Mod1b, data = dat1, estimator = "MLM")
summary(fit.Mod1b, fit.measures = TRUE, standardized = TRUE)
```

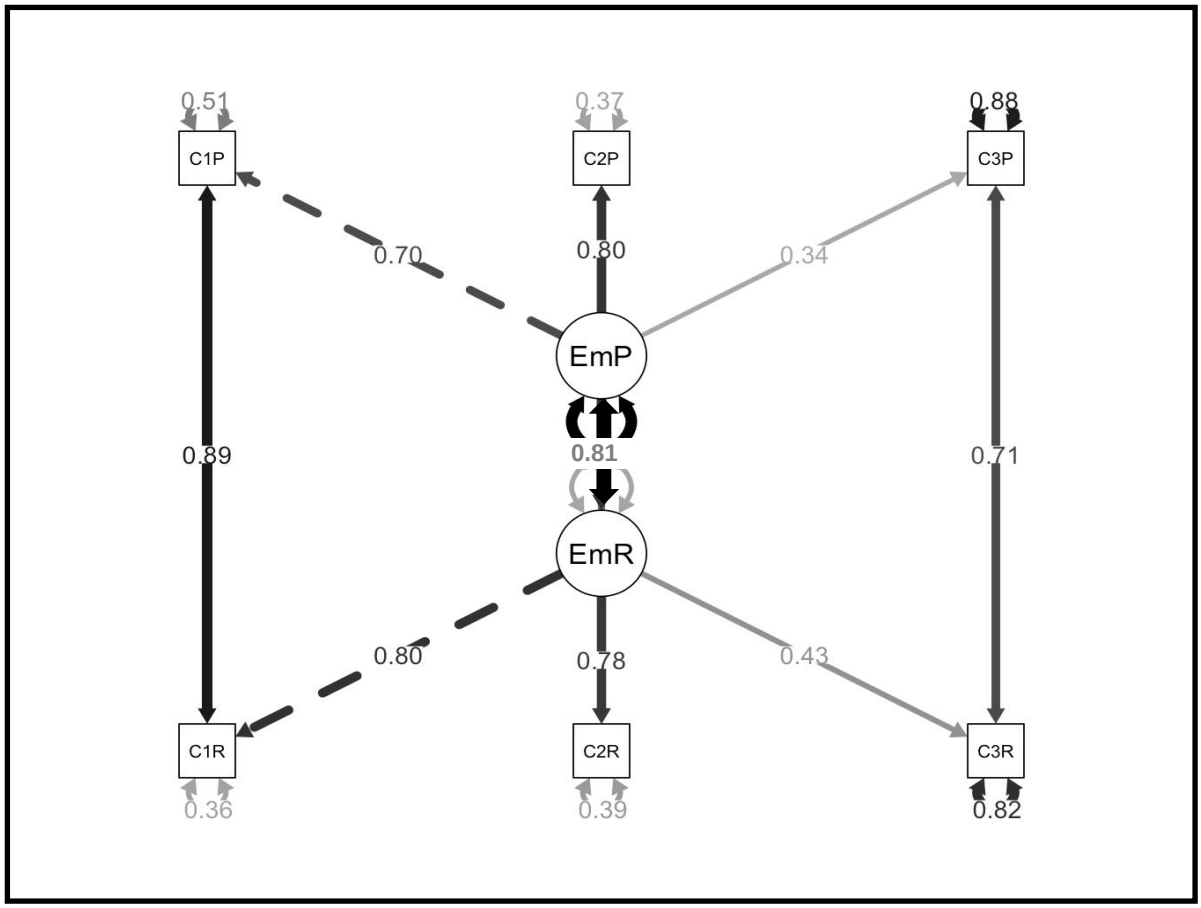
```
# ENVIRONMENT
Mod1c <- '
EnvironmentR =~ D1R + D2R + D3R
EnvironmentP =~ D1P + D2P + D3P
# regressions
 EnvironmentR ~ EnvironmentP
 # residual correlations
D1R ~~ D1P
D2R ~~ D2P
D3R ~~ D3P
fit.Mod1c <- sem(Mod1c, data = dat1, estimator = "MLM")
summary(fit.Mod1c, fit.measures = TRUE, standardized = TRUE)
```



Notes: ↔ *Covariances;* → *regression coefficients;* ↗ ↙ *Path loadings; B1P = Local enterprise development-Sustainability Performance; B2P = Local Infrastructure development-Sustainability Performance; B3P = Skills development- Sustainability Performance; B4P = Housing and living conditions-Sustainability Performance;B1R = Local enterprise development-Sustainability Reporting; B2R = Local infrastructure development- Sustainability Reporting; B3R = Skills development-Sustainability Reporting; B4R = Housing and living conditions- Sustainability Reporting.*

Mod1a – Path model for Community Development

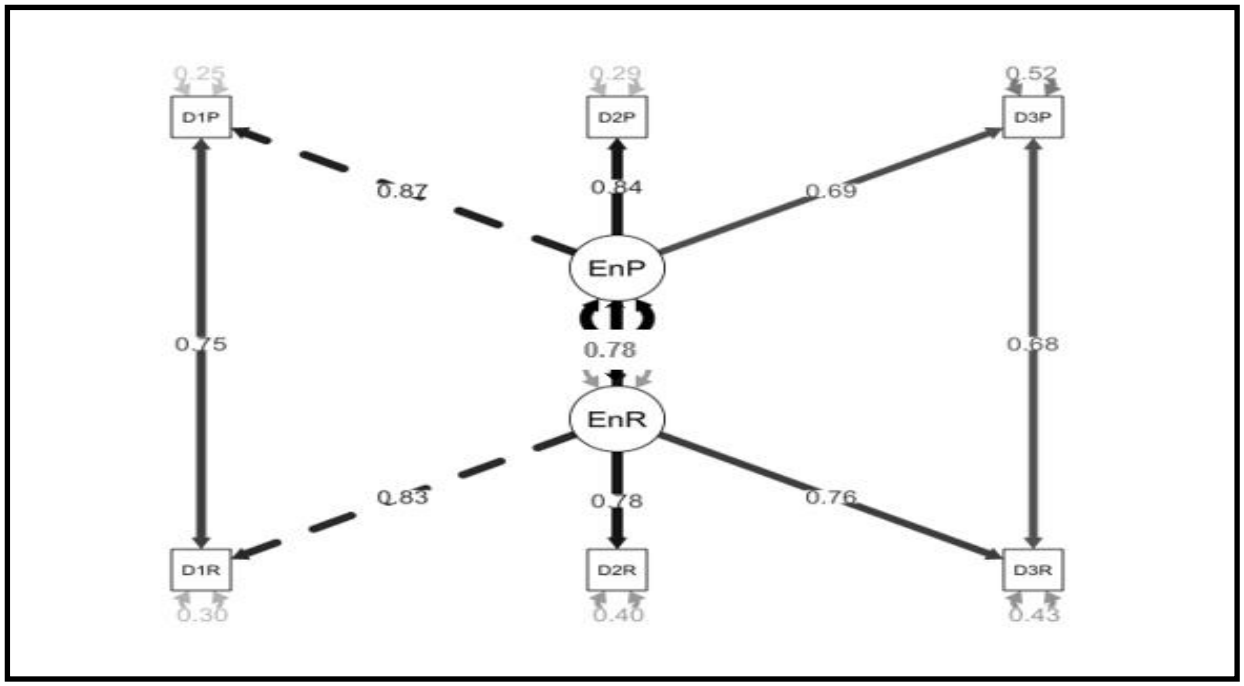
Source: *Survey data (2019)*



Notes: ↔ *Covariances;* → *regression coefficients;* ↙ ↗ *Path loadings; EmP= Employee Welfare- Sustainability Performance; EmR=Sustainability Reporting - Employee Welfare; C1P = Occupational Health and Safety-Sustainability Performance; C2P = Labour practices, diversity and inclusion-Sustainability Performance; C3P = Employment Equity-Sustainability Performance; C1R = Occupational Health and Safety- Sustainability Reporting; C2R = Labour practices, diversity and inclusion- Sustainability Reporting; C3R = Employment equity- Sustainability Reporting;*

Mod1b – Path model for Employee Welfare

Source: *Survey data (2019)*



Notes: ↔ *Covariances;* → *regression coefficients;* ↙↗*Path loadings; EnP=Environmental protection-Sustainability Performance; EnR= Environmental protection-Sustainability Reporting; D1P=SP-environmental management-Sustainability Performance; D2P=SP-environmental leadership; D3P=SP-Environmental Responsibility-Sustainability Performance; D1R=SR-environmental management- Sustainability Reporting; D2R=environmental leadership - Sustainability Reporting; and D3R=Environmental Responsibility- Sustainability Reporting.*

Mod1c – Path model for Environmental Protection

Source: *Survey data (2019)*

APPENDIX G: SUMMARY OF SUSTAINABILITY INDICATORS

SUSTAINABILITY INDICATORS
Local Economic Development
Enterprise development initiatives for host communities
Supplier development initiatives for host communities
Procurement of goods from host communities
Procurement of services from host communities
Local Infrastructure Development
Educational infrastructure projects as part of community development
Road infrastructure projects in host communities
Water and sanitation infrastructure as part of community development
Health infrastructure projects in host communities
Sports and recreation infrastructure projects as part of community development
Skills development
Learnership programmes for people in host communities
Internship programmes for people in host communities
Skills transfer to host communities
Local Housing Development
Housing infrastructure projects to improve living conditions of employees
Housing infrastructure projects to improve living conditions in host communities
Housing infrastructure projects to improve living conditions in labour-sending areas
Health and Safety
Existence of Mine safety strategies to prevent employee harm and exposure to risk and danger
Implementation of Mine safety strategies to prevent harm
Health and safety management systems to protect the health and safety of employees in mines
Safety monitoring systems to prevent harm, exposure to risk and danger
Existence of effective controls to protect the health and safety of mining employees
Existence of effective safety improvement plans to reduce incidents in mines
Timeous implementation of safety improvement plans to eliminate incidents in mines
Appropriate resources allocation to ensure Health and Safety of employees
Effective preventative measures to eliminate fatalities
Effective training and educational programmes about Health and Safety.
Effective training and educational programmes about communicable diseases
Effective training and educational programmes about non-communicable diseases
Existence of effective wellness programmes
Existence of effective disease management programmes
Diversity and Inclusion
Fair labour relations practices
Freedom of association for employees
Equal job opportunities
Fair and equal benefits
Equal pay for equal work
Living wage
Implementation of employee development programmes

SUSTAINABILITY INDICATORS
Investment in long term employment growth of employees
Employment of women in executive management positions
Employment of disabled people in executive management positions
Employment of Black people in executive management positions
Employment of women in senior management positions
Employment of disabled people in senior management positions
Employment of Black people in senior management positions
Employment of disabled people in middle management positions
Employment of disabled people in junior positions
Employment equity
Employment of white people in executive management positions
Employment of white people in senior management positions
Employment of women in middle management positions
Employment of women in junior positions
Employment of Black people in junior positions
Employment of Black people in middle management positions
Environmental Management
Existence of effective environmental management plan to reduce the negative impact of mining on the ecosystem
Effective implementation of the Environmental Management Plan to reduce the negative impact of mining on the ecosystem
Effective implementation of environmental management initiatives to promote greater environmental responsibility
Existence of effective emission reduction strategies
Effective implementation of environmental management initiatives to conserve natural resources
Effective execution of environmental management plan to prevent pollution
Involvement in effective air pollution reduction programmes
Involvement in effective water pollution reduction programmes
Involvement in effective land pollution reduction programmes
Existence of effective Environmental Management Plan to minimise waste generation
Environmental Leadership
Stewardship for climate change
Mitigation of influence of climate/weather conditions on the environment
Investment in research and development initiatives to reduce the impact of mining operations on the environment
Contribution towards the development of environmentally friendly technologies
Involvement in the diffusion of environmentally friendly technologies
Environmental Responsibility
Responsible use water
Responsible use of energy
Rehabilitation and revegetation

APPENDIX H: ETHICS FORMS

GRADUATE SCHOOL OF BUSINESS LEADERSHIP (SBL)

To my knowledge I have addressed all aspects in my application for research ethics approval set forth in the University of South Africa's Policy for Research Ethics. I confirm that the form is complete.I will ensure that I notify the committee in writing if any changes to the research are proposed that may affect the methodology and any of the study-related risks for the research participants.

Signing of declaration

Name in Print Rendani Mavis Mafeleanye Signature: _____ Date signed: 14-02-2019

Applicant (Principal Researcher) _____

Approved by supervisor (if applicable) _____

To my knowledge the student has addressed all aspects in his/her application for research ethics approval set forth in the University of South Africa's Policy for Research Ethics. I confirm that the form is complete.I will ensure that the student notify the committee in writing if any changes to the research are proposed that may affect the methodology and any of the study-related risks for the research participants. Subsequently, I approve the submission and recommend that approval is granted for the research.

Name in Print Prof HM vd Poll Signature: _____ Date signed: 13 February 2019

Please complete the rest of the form below.

SBL – Form 1 Full Application reviewed 1 May 2017 adapted from URERC from 1 approved Jan 2017

mineral resources
Department:
Mineral Resources
REPUBLIC OF SOUTH AFRICA

DMR 10

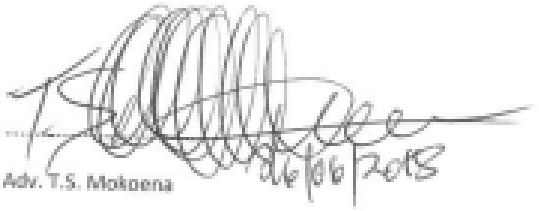
GRANTING OF INSTITUTIONAL PERMISSION FOR RESEARCH

Dear Rendani Mavis Matakanye

I, Thabo Shadrack Mokoena, the Director General of the Department of Mineral Resources grant permission to collect data at this site for your research project titled A conceptual framework for linking sustainability disclosures to actual sustainability performance. I grant this permission as the authorized person to do so in this Department and am aware of the following.

1. The study is conducted as a UNISA researcher and remains the property of UNISA
2. You (can use), (not use) the name of the Department in your research project
3. All data and information collected will be solely in the possession of the researcher
4. I will (require), (not require) feedback of the research.
5. The research may be published in the public domain under the supervision of the supervisor

I wish the best and success in this research



Adv. T.S. Mokoena

Director General

Ms. M. Modipa

012 444 3880

University of South Africa, PO Box 392, Unisa, 0003, South Africa
Cnr Janadel and Alexandra Avenues, Midrand, 1685. Tel: +27 11 652 0000. Fax: +27 11 652 0299
E-mail: sbl@unisa.ac.za Website: www.unisa.ac.za/sbl

SCHOOL OF BUSINESS LEADERSHIP

RESEARCH ETHICS REVIEW COMMITTEE (GSBL CRERC)

22 October 2021

Ref #: 2019_SBL_DBL_001_FA
Name of applicant: Mrs RM Matakanye
Student #: 73060550

Dear Mrs Matakanye

Decision: Ethics Approval

Student: Mrs RM Matakanye, (Rendymatakanye@gmail.com , 082 4479 815)

Supervisor: Prof HM Van der Poll, (vdpolhm@unisa.ac.za , 073 2966 397)

Old Project Title: A Conceptual Framework for linking sustainability disclosures with sustainability performance

New Project Title: A framework for linking sustainability performance to sustainability reporting: Using regulation as a compliance mechanism.

Date Amended: 14 October 2021

Qualification: Doctor of Business Leadership (DBL)

Expiry Date: December 2023

Thank you for applying for research ethics clearance, SBL Research Ethics Review Committee reviewed your application in compliance with the Unisa Policy on Research Ethics.

Outcome of the SBL Research Committee: Approval is granted for the duration of the Project

The application was reviewed in compliance with the Unisa Policy on Research Ethics by the SBL Research Ethics Review Committee on the 14/10/2021.

The proposed research may now commence with the proviso that:

1) The researcher will ensure that the research project adheres to the relevant guidelines set out in the Unisa Covid-19 position statement on research ethics attached
2) The researcher/s will ensure that the research project adheres to the values and principles expressed in the UNISA Policy on Research Ethics.
3) Any adverse circumstance arising in the undertaking of the research project that is relevant to the ethicality of the study, as well as changes in the methodology, should be communicated in writing to the SBL Research Ethics Review Committee.
4) An amended application could be requested if there are substantial changes from the existing proposal, especially if those changes affect any of the study-related risks for the research participants.
5) The researcher will ensure that the research project adheres to any applicable national legislation, professional codes of conduct, institutional guidelines and scientific standards relevant to the specific field of study.

45 Building leaders who go beyond

SBL GRADUATE SCHOOL OF BUSINESS LEADERSHIP UNISA

Graduate School of Business Leadership, University of South Africa PO Box 392 Unisa 0003 South Africa
Cnr Smuts and First Avenue Midrand 1685 Tel: +27 11 652 0000 Fax: +27 11 652 0299
Email: sbl@unisa.ac.za Website: www.sblunisa.ac.za

Informed consent for participation in an academic research project

A conceptual framework to link sustainability disclosures and actual sustainability performance

Dear Respondent

You are herewith invited to participate in an academic research study conducted by Rendani Mavis Matakanye, a student in the Doctor of Business Leadership at UNISA's Graduate School of Business Leadership (SBL).

The purpose of the study is to develop a framework to create linkages between companies' sustainability disclosures and actual sustainability performance on the ground. The framework will become a useful tool for all stakeholders to develop an informed view of the company's corporate social responsibility programme(s) and sustainability projects as purported in their reporting documents.

The researcher investigates the extent to which regulatory enforcement influence company's involvement in corporate social responsibility performance activities purported in their sustainability disclosures; the degree to which regulation affects company's stakeholder orientation for sustainability performance activities and to measure the extent to which company's sustainability disclosures account for stakeholders' legitimate concerns and interests.

All your answers will be treated as confidential, and you will not be identified in any of the research reports emanating from this research.

Your participation in this study is very important to us. You may however choose not to participate, and you may also withdraw from the study at any time without any negative consequences. however, you will not be able to withdraw from the study once you submit the completed questionnaire.

Please answer the questions in the attached questionnaire as completely and honestly as possible. This should not take more than 45 minutes of your time.

The results of the study will be used for academic purposes only and may be published in an academic journal. We will provide you with a summary of our findings on request.

Please contact my supervisor, Professor Jan Kruger, at Krugejw@unisa.ac.za, if you have any questions or comments regarding the study. Please sign below to indicate your willingness to participate in the study.

Yours sincerely

Rendani Mavis Matakanye

APPENDIX I: DECLARATION OF PROFESSIONAL EDITING

Blue Diamonds Professional Editing Services (Pty) Ltd
Polishing **your** brilliance
Tel: 031 916 1420
Website: www.jaybe9.wixsite.com/bluediamondsediting

27 January 2023

Declaration of professional edit

A FRAMEWORK FOR LINKING SUSTAINABILITY REPORTING TO SUSTAINABILITY PERFORMANCE: USING REGULATION AS A MECHANISM

by

RENDANI MAVIS MATAKANYE

I declare that I have edited and proofread this thesis. My involvement was restricted to language usage and spelling, completeness and consistency and referencing style. I did no structural re-writing of the content.

I am qualified to have done such editing, being in possession of a Bachelor's degree with a major in English, having taught English to matriculation, and having a Certificate in Copy Editing from the University of Cape Town. I have edited more than 200 Masters and Doctoral theses, as well as articles, books and reports.

As the copy editor, I am not responsible for detecting, or removing, passages in the document that closely resemble other texts and could thus be viewed as plagiarism. I am not accountable for any changes made to this document by the author or any other party subsequent to the date of this declaration.

Sincerely,

UNISA: D. Ed. Education Management
University of Cape Town: Certificate in Copy Editing
University of Cape Town: Certificate in Corporate Coaching
Full member: Professional Editors Guild (BAU001)
Intermediate Member: Charted Institute of Editors and Proofreaders (Membership Number 21858)