Linking sustainability reporting to sustainability performance through regulation

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Abstract: Greenwashing tendencies within a highly regulated mining industry may be a challenge. Therefore, underpinned by stakeholder theory, this study evaluates whether sustainability reporting (SR) by South African mining companies is linked to actual sustainability performance (SP). The study is confined to three sustainability dimensions namely, community development, employee welfare, and environmental protection. The objectives of the study were to create linkages between SR and SP; and to understand the SR-SP factor structure. Descriptive statistics, exploratory factor analysis, the pairwise t-test, a structural equation model and Cohen's D were employed. Regulation on its own has a small effect on reducing greenwashing, therefore, arguably there is a need to explore other stakeholder-centric regulatory mechanisms to reduce the perceived SR-SP gap. Future research could investigate the effects of greenwashing from a multi-stakeholder perspective.

Keywords: business leadership; greenwashing; highly regulated; mining industry; sustainable development; sustainability reporting; sustainability performance, stakeholders; stakeholder theory.

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1 Introduction

The proliferation of greenwashing (superficial and misleading sustainability information) has undermined corporate accountability towards those who claim a stake in the business and the credibility of legitimate sustainability performance activities. It is no longer justifiable for companies to generate negative externalities and yet secure their social licence to operate (SLO), however, it is ironic that companies that perpetuate negative externalities in pursuit of profits can simultaneously exhort sustainable development in the fight against them (Montecchia et al., 2016), without government's intervention.

Underpinned by stakeholder theory, the study adds a regulatory stakeholders' perspective to the sustainable development arena aimed at developing a conceptual framework to create linkages between sustainability reporting (SR) and sustainability performance (SP) to close potential gaps in the accountability chain.

Recent studies show that sustainability principles can ameliorate the impact of negative externalities if well-embedded into the strategy of the business using stakeholder-centric approaches (Maas et al., 2016; Armindo et al., 2019; Vitale et al., 2019; Shahzad et al., 2020).

The study enhances the relationship between business and society through the promotion of responsible business practices. The researchers concur with Harrison and van der Laan Smith (2015) that managers can better navigate the interconnections between business and society by mainstreaming sustainability through stakeholder engagement initiatives. This approach should create a win-win scenario for both business and society (Hah and Freeman, 2014; Haffar, 2017). The researchers agree that profitability and sustainability objectives can co-exist in a regulated environment and stakeholders' monetary goals should be pursued in tandem with the needs of society at large (Singh, 2014). Since businesses are closely interwoven with the society in which they operate, the interconnection calls for appropriate corporate societal behaviour (Harrison and Wicks, 2017).

Despite the number of academic works on sustainability, there may still be a gap in literature to examine complementary SP and SR when accounting to stakeholders. Greenwashing activities may deliberately be used to conceal negative externalities using corporate rhetoric to persuade stakeholders to a company's favour, therefore deliberately confusing them with information asymmetry. Literature suggests a sharp increase in greenwashing practices (Torelli and Balluchi, 2020). Greenwashing is an umbrella term used to characterise superficial and misleading sustainability information (Testa et al., 2018) and according to de Freitas Netto et al. (2020), there is no generally accepted

definition of greenwashing owing to its multidisciplinary character. It may hold different denotations to different people as greenwashing is in the eye of the beholder and in this respect the phenomenon may be perceived by the observer (Gatti et al., 2019).

Delmas and Burbano (2011, p.65) viewed greenwashing as the combination of a company's poor environmental performance and positive communication about the very company's environmental performance. According to Jones (2019), greenwashing emerges only when SR claims are contradicted by a company's actual environmental performance track record. Furthermore, there are scholars who consider only environmental issues when considering greenwashing, distinguishing it from the term blue washing which normally addresses social issues, whereas other researchers consider greenwashing a social and environmental phenomenon (de Freitas Netto et al., 2020). Greenwashing 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 their impact on society (Dienes et al., 2016; Lukinović and Jovanović, 2019). In this research greenwashing is used as an umbrella term that refers to the gap between a company's SR and its SP.

Regrettably, the proliferation of greenwashing tendencies tends to undermine stakeholder accountability (Testa et al., 2018). Voluntary sustainability reports provided to stakeholders are being criticised for facilitating diffusion of greenwashing practices (Gatti et al., 2019; Lukinović and Jovanović, 2019; Yu et al., 2020). Companies use greenwashing as a legitimacy tool to enhance their environmental and social image without marshalling significant financial investments to improve actual SP (Wang and Sarkis, 2017; Karaman et al., 2020). SR is being negatively perceived as a conduit of greenwashing to conceal negative externalities and poor social and environmental performance to obtain legitimacy (Torelli and Balluchi, 2020).

Self-laudatory corporate rhetoric can be hard for stakeholders to verify themselves given the diversity and complexity of the issues reported (Boiral and Heras-Saizarbitoria, 2020). Though there is a significant increase in the number and coverage of SR, such disclosures continue to be largely voluntary, selective, self-laudatory and public relations driven (Gray and Bebbington, 2015; Sierra-García et al., 2015; Thijssens et al., 2015). Owing to their voluntary nature, the credibility of these reports may be questionable (Lee et al., 2016).

Nonetheless, companies utilise voluntary SR to promote transparency by reducing information asymmetry with stakeholders through accurate accounts of their true SR information (Barkemeyer et al., 2014; Hahn and Lülfs, 2014; Orazalin and Mahmood, 2019: Karaman et al., 2020). Whilst previous studies do not fully confirm the effectiveness of a legal framework in ensuring SP, Gatti et al. (2019) established that a combination of voluntary and mandatory sustainability aspects could address the diffusion of greenwashing activities. There is also inconclusive evidence on the impact of regulation on SR. However, Sriyani et al. (2017) found that SR motives are highly related to regulations, standards, legitimacy and stakeholder engagement. Chen et al. (2018) established that mandatory disclosures alter the behaviour of a company and generate positive externalities to society but at the expense of stakeholders.

There is some evidence that regulatory pressure can act as a deterrent to corporate misconducts through its authoritative and inhibitory legal mode (Zhao, 2017). In agreement, Kim et al. (2016) established that regulatory pressures drive companies to innovate green technologies and to improve their SP. In this regard, corporate law has the potential to promote sustainability by linking contradictory interests of financial and non-financial stakeholders (Zhao, 2017). Park and Berger-Walliser (2015) found that trusting companies to self-regulate sustainability matters is not the best possible solution for society at large whereas Lopatta et al. (2016) established a negative relationship between SR and the risk of corporate corruption triggered by stringent rules and laws which companies have to comply with. Moreover, existing regulations and accounting standards are not explicit about the content of SR and the way in which such information should be presented (Barbu et al., 2014).

On the other hand, market forces alone have not been successful to enforce optimal levels of SR (Liu et al., 2017). Governments and other active stakeholders developed a series of regulatory mechanisms to reduce the proliferation of greenwashing (de Jong et al., 2019; Ginder et al., 2019; Nguyen et al., 2019; Pizzetti et al., 2019; Torelli and Balluchi, 2020). Sun and Zhang (2019) established that although government's regulations are not sufficient, they have an excellent inhibitory effect on the greenwashing practices of both dominant and smaller companies.

Diouf and Boiral (2017) determined that when SR is not regulated companies explore opportunities to withhold bad news from the market whilst others simply employ impression management strategies to project selective self-laudatory corporate achievements. This is compounded by weaknesses in existing regulations which have little or no specific constraints on the type of information to be released for each sustainability dimension (Barbu et al., 2014).

The objective of the study is to unpack the relationship between business and society through the promotion of responsible business practices. The researchers concur with Harrison and van der Laan Smith (2015) that managers can navigate the interconnections between business and society better by mainstreaming sustainability through stakeholder engagement initiatives. This paper argues that profitability and sustainability objectives can co-exist within a regulated environment and stakeholders' monetary goals should be pursued in tandem with societal needs. To understand how the businesses are closely interwoven with society, key measures such as sustainability reporting (SR) and sustainability performance (SP) are measured against key indicators, for example, skills development, community development, housing and living conditions, environmental responsibility, environmental leadership, and issues of occupational health and safety.

The layout of the rest of the paper is: a literature review and methods are discussed in the following sections. These include testing where the paired t-test and the associated p-values are used to derive statistical inferences and determine the outcomes of the study. This is followed by the results and discussions. The last parts of the paper constitute a conclusion and the references.

2 Literature review

Owing to its applicability and richness this research draws on stakeholder theory (Jones, 1995; Miles, 2017) to conceptualise the work. As claimed by Jones (1995) stakeholder theory is a central paradigm for business and society. Therefore, applying the merits of

stakeholder theory calls for a progressive legislative approach in the endeavour to seek a delicate balance when holding businesses accountable for societal obligations. Stakeholder theory has been used previously to analyse SR because of shared ideologies with sustainability (Hörisch et al., 2014; Dumay et al., 2016; Sama-lang and Njonguo, 2016; Stoelhorst, 2016; Bradford et al., 2017; Miles, 2017; Ranängen, 2017).

Stakeholders demand governments to play a more active role towards sustainable development, instead of regarding regulation as an ad-hoc function (Sierra-García et al., 2015). Abugre and Nyuur (2015) concede that to enhance Corporate Social Responsibility (CSR) practice, additional efforts are required upfront. This agrees with O'Faircheallaigh (2015), who calls for a dialogue between companies, industries and salient stakeholders as additional legislation may not be warranted.

The study is premised on the assumption that whether mandatory or voluntary, the system permits reporting companies the flexibility to be creative when expressing their SP in their corporate documents (Merkl-Davies and Brennan, 2007). The flexibility encourages compliance creativity which verges on greenwashing when reporting to stakeholders. According to Hora and Subramanian (2019), there are companies that choose to do positive discretionary SR to steer attention away from their negative externalities (greenwashing), while others disclose information about their environmental efforts to legitimately improve their overall environmental performance indicators. Furthermore, Cheng (2015) observed that companies engage in sustainability not to benefit multiple stakeholders, but more because of policy compliance. Therefore, balancing stakeholder and societal value becomes a rather delicate task should stakeholder-centric issues be resolved through regulatory mechanisms that aim to maximise value for all stakeholders (Orlitzky, 2013).

Stakeholder-centric solutions should be enforced for business to maintain its SLO (Pizzetti et al., 2019). As stakeholders' interests are interwoven in a system of value creation, the best value would be the value perceived by all stakeholders (Böhling et al., 2019). This means that companies' business operations should add enough value to guarantee all stakeholders a decent life without damaging the ecological system to an extent that the survival of future generations is endangered in pursuit of profits (Harrison and Wicks, 2017). Therefore, governments and other active stakeholders developed a series of regulatory mechanisms to reduce the proliferation of greenwashing (de Jong et al., 2019; Ginder et al., 2019; Nguyen et al., 2019; Pizzetti et al., 2019). Wang and Sarkis (2017) and Gatti et al. (2019) found that government regulation can reduce and prevent the diffusion of greenwashing activities.

Braam et al. (2016) elicited that in an unregulated setting, environmental information contained in SR may not be indicative of how companies address potentially negative environmental externalities of their operations. According to Aragon-Correa et al. (2019), mandatory regulation was found to have a strong and positive influence on companies' environmental performance, whereas voluntary pressures by themselves are unlikely to foster significant improvement in environmental outcomes. Consequently, whether mandatory or voluntary, the accountability system permits reporting companies the flexibility to be creative when disclosing their SP to stakeholders (Merkl-Davies et al., 2007). Such flexibility is problematic since it encourages compliance creativity which may verge on greenwashing; hence the motivation for this study.

3 Methodology

A positivist ontological stance is usually associated with deductive reasoning (Garvare and Johansson, 2010). This approach assumes there is one objective truth which is independent of the researchers' bias or influence. A large amount of quantitative data was collected and analysed using software, devoid of the researchers' intellectual interference. Epistemologically, the researchers were detached from the unit of study to maintain independence and objectivity throughout the quantitative enquiry. Logic flowed from specific statistical analyses to understand the greenwashing phenomenon before generalisations were concluded.

The study quantitatively examined the regulatory stakeholders' assessment to determine the effect that the regulation of sustainability dimensions has on both SP and SR. This work elicits a shift in curbing the proliferation of unsustainable business practices camouflaged by greenwashing under the guise of accountability. Given the descriptive aspects of stakeholder theory and the above epistemological stance, the study utilised an exploratory quantitative research choice. Perspectives of the regulatory stakeholder on the sustainability practices of South African Mining Companies (SAMC) were quantitatively examined. A deductive research approach was used, starting from theory to specific logical conclusions on sustainability dimensions. A questionnaire, informed by an extensive literature review was used as the instrument for data collection and allowed for the exploration and description of the link between SR and SP, aimed at understanding the effect that regulation of sustainability dimensions has on both SR and SP. Participants rated mining companies on both SR and SP focusing on the three (3) sustainability dimensions: Community, Employees, and Environment. Each item was ranked on a five-point Likert-scale ranging from "Strongly Disagree" to "Strongly Agree".

The questionnaire comprised 154 investigative statements: The community dimension was composed of 34 items, while employees and environment comprise 78 and 42 items respectively. Theoretical underpinnings informed the validity of the questions and the researchers' subjectivity was mitigated by theory, the nature of the study, and measurements employed for conducting the research. Through a pilot study six (6) experts individually inspected potential shortcomings in the instrument to ensure preliminary validity and reliability of the questionnaire. The interpretation of the results can be confirmed or corroborated by prior studies.

The researchers applied a deductive approach, starting with stakeholder theory and sustainability concepts applicable to the study and operationalised the constructs and measures. A cross-sectional time horizon was employed to assess greenwashing practices of SAMC by drawing data from a cross-sectional sample of 150 regulatory stakeholders from three (3) divisions of the Department of Mineral Resources (DMR) which represents 28% of the population. The DMR as a regulator for all mining houses in South Africa regulates the sector, analyse reports and provides a regulatory stakeholder perspective on both SR and SP. Moreover, the respondents were spread across various designated divisions in the DMR and covered various positions and work experiences (years working) within DMR. It was concluded that the results and conclusions of this cross-sectional study can be generalised as representative of the views of the DMR staff involved in sustainability aspects.

Descriptive statistics and exploratory factor analysis (EFA) were used to analyse the data. Various tests were conducted. The Principal Axis Factoring method to perform the extraction, Oblimin Rotation was employed to fit the data onto the underlying structure of

the inter-relationships among the variables into a set of common dimensions. Oblimin rotation was chosen because of theoretical grounds for assuming the factors might correlate. The Principal Axis Factoring method determined which items were answered most similarly by the participants. The main aim was to reduce the dimensionality of a dataset comprising many inter-related items while retaining as much as possible of the variation present in the data. Such reduction was achieved by transforming the variables to a new set of factors. The researchers performed exploratory factor analyses (EFA) which extracted the dimension of the relationships among SR and SP items. The research results were interpreted and reported, and conclusions and recommendations from the study were generated.

4 Results

In this section, the key results of the quantitative study are reported. Firstly, the EFA factor structures are reported, followed by results of the reliability test. Thereafter, statistical analyses are performed, the results are interpreted, and conclusions are drawn.

4.1 Exploratory factor analysis

The first objective of the study was to comprehend the factor structure of sustainability dimensions in a regulated setting and therefore EFA was used to determine the underlying factor structure by grouping variables and identifying overlapping measurement characteristics as suggested by Hair et al. (1998). Scree plots were used to determine the best structure with the most accurate number of factors to retain in the factor solution. All the factors to the left of the inflexion point were retained while all the factors to the right of the elbow were dropped. Factors with an eigenvalue greater than 1 were retained in line with Kaizer criteria. A total of 154 items were ranked by respondents based on their personal experiences with SAMC. The respondents ranked both SR and SP on a 5-point Likert scale indicating whether they strongly disagree, disagree, neutral, agree or strongly agree with the statements. These rankings were used to compute the SR and SP factor structures based on regulatory stakeholders' perceptions of SAMC's SR and SP.

The first EFA results showed that SP factor loadings were inconsistent when matched with their SR counterpart. There were SP items that loaded heavily on one factor whilst their SR equivalent loaded onto a different factor altogether. The second rotation achieved an improved and simpler factor structure than the items loaded on the theorised factor. However, to enhance interpretability and coding of factors, the researchers applied the Joliffe criterion, wherein factor-loadings above 0.4 were considered. The results for the SP Factor are presented in Table 1 and the SR factor structure in Table 2.

EFA uncovered 10 sustainability factors, namely, local economic development, infrastructure development; skills development; local housing and living conditions; occupational health and safety; labour practices, diversity and inclusion; employment equity; environmental management; environmental leadership; and environmental responsibility.

Table 1 SP factor structure structures

Dimension	*Factors*	*Eigenvalue*	*Total explained variance*	*Cumulative explained total variance*
Community development	Local economic development	7.3432	43.195	43.195
	Infrastructure development	1.8752	11.031	54.226
	Skills development	1.4033	8.255	62.48
	Local housing and living conditions	1.0894	6.408	68.889
Employees welfare	Occupational health and safety	12.8455	33.804	33.804
	Diversity and Inclusion	3.9213	10.319	44.123
	Employment Equity	3.4898	9.184	53.307
Environment protection	Environmental Management	11.7261	55.838	55.838
	Environmental Leadership	1.9283	9.182	65.021
	Environmental Responsibility	1.2276	5.846	70.867

Table 2 SR factor structure

Dimension	*Factors*	*Eigenvalue*	*Total explained variance*	*Cumulative explained total variance*
Community development	Local economic development	7.1779	42.223	42.223
	Infrastructure development	1.8455	10.856	53.079
	Skills development	1.5138	8.905	61.983
	Local housing and living conditions	1.0638	6.258	68.241
Employee welfare	Occupational health and safety	14.5102	38.185	38.185
	Labour practices, diversity and inclusion	3.4276	9.020	47.205
	Employment equity	3.2538	8.563	55.768
Environment protection	Environmental management	12.2270	58.224	58.224
	Environmental leadership	2.1202	10.096	68.320
	Environmental responsibility	1.1311	5.386	73.706

4.2 Reliability

The study used a common heuristic for internal consistency where a Cronbach's alpha of ≥0.9 was deemed excellent; $0.9 > \alpha \geq 0.8$ deemed good; $0.8 > \alpha \geq 0.7$ considered acceptable; $0.7 > \alpha \geq 0.6$ is questionable or weak; $0.6 > \alpha \geq 0.5$ is poor and $0.5 > \alpha$ is unacceptable (Flo et al., 2018). The Cronbach alpha for SP is 0.91 while the α for SR is 0.94 indicating that all SR and SP constructs were found to be reliable.

4.3 Paired t-tests

The second objective was to quantitatively determine which SR-SP composite pairs are statistically significantly different from each other (signalling greenwashing). The study employed paired t-tests to investigate linkages between SP and SR. A Matched-Pairs t-test involving ten pairs of validated SR and SP constructs was conducted. It was conducted to determine whether there was a difference between SP mean scores and SR mean scores. The test was conducted at a 0.05 significance level.

Descriptive statistics for each pair were employed to first check for normality using a histogram and skewness measures. Where the data were not normally distributed, the Wilcoxon signed rank was used which is a non-parametric test (Bhimani et al., 2016). The difference between SR and SP for each matched pair of constructs was calculated to measure greenwashing. Table 3 displays a summary of the matched pairs' results comparing SP and SR, descriptive statistics for paired constructs as well as the statistical tests for the SR and SP paired t-test.

From Table 3, the overall mean difference ranges from 0.02 to 0.19. To understand linkages between SR and SP, the study investigated whether there are statistically significant differences between SR and SP means. In this regard p-values greater than 0.05 indicate that there is no significant difference between the mean scores of SR and SP and vice versa (Bhagat and College, 2018). It is evident from Table 3 that there are mixed results; five of the 10 constructs showed statistical significance while five did not. The results are discussed next for each dimension starting with community development.

Table 3 Descriptive statistics and summary of comparison pairwise results

Matched pairs	*SR Mean*	*SP Mean*	*Mean Diff*	*Corr.*	*t-ratio*	*P-value*	*Decision*
Local economic development	2.88	2.81	0.07	0.805	1.813	0.072	Fail to reject
Infrastructure development	3.00	3.02	–0.02	0.772	–0.504	0.615	Fail to reject
Skills development	3.37	3.39	–0.03	0.891	–0.993	0.322	Fail to reject
Housing and living conditions	2.83	2.81	0.02	0.745	0.444	0.658	Fail to reject
Occupational health and safety	3.48	3.37	0.11	0.825	3.159	0.0019*	Reject
Labour practices, diversity and inclusion	3.00	2.87	0.13	0.712	3.679	0.0003*	Reject
Employment equity	3.57	3.77	–0.19	0.751	–4.897	<0.0001*	Reject
Environmental management	3.20	3.04	0.16	0.749	3.649	0.0004*	Reject
Environmental leadership	2.95	2.87	0.07	0.823	2.017	0.0455*	Reject
Environmental responsibility	3.24	3.18	0.07	0.760	1.641	0.103	Fail to reject

* represent significance at 0.05.

4.4 Community development

The lack of significance of the gap is reflected in a p-value that is greater than 0.05. The test further revealed p-values greater than 0.05 for the following matched constructs: local economic development ($t = 1.812957$; p, 0.0719), infrastructure development ($t = –0.5041$; p, 0.6925) skills development ($t = –0.99308$; p, 0.3223), housing and living conditions ($t = 0.443829$; p, 0.6578). Since all the p-values are greater than 0.05, it implies there is no statistically significant differences between the mean scores of SP and SR at a 95.05% confidence level. These results are in contrast with Torelli and Balluchi (2020), Boiral and Heras-Saizarbitoria (2020), Sierra-García et al. (2015), Gray and Bebbington (2015) and Thijssens et al. (2015) indicating that there is no indication of greenwashing.

4.5 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; occupational health and safety ($t = 3.159071$; p, 0.0019*); labour practices, diversity and inclusion ($t = 3.678553$; p, 0.0003*); and employment equity ($t = – 4.89689$; p, <0.0001*). The p-values (*) 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 SR and SP means. This is consistent with Merkl-Davies and Brennan's (2007) and Hora and Subramanian's (2019) assertions that companies sometimes indicate positive discretionary SR to steer attention away from their negative externalities (greenwashing). In agreement with Wang and Sarkis (2017), Testa et al. (2018), Gatti et al. (2019), Lukinović and Jovanović (2019), Yu et al. (2020) and Karaman et al. (2020), regulatory enforcement may be required to curb the diffusion of greenwashing.

4.6 Environment protection

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 ($t = 3.649477$; p, 0.0004*), and environmental leadership ($t = 2.01668$; p, 0.0455*). Environmental responsibility ($t = 1.640967$; p, 0.1029) produced weak evidence and the p-values for environmental management and environmental leadership are less than 0.05. Jones (2019) established that greenwashing emerges only when SR claims are contradicted by a company's actual environmental performance track record. In this case it is evident that the mining industry's track record on environmental management and environmental leadership warrants more regulatory enforcement.

On the other hand, environmental responsibility returned a p-value greater than 0.05, which indicates no statistically significant differences between the mean scores of SP and SR at a 95.05% confidence level. This can be interpreted in relation to Braam et al. (2016) who established that in an unregulated setting, environmental information contained in SR may not be an indication of a company's mechanism to address possible negative externalities of their operations on the environment. According to Aragon-Correa et al. (2020), mandatory regulation was found to have a strong and positive influence on companies' environmental performances, whereas voluntary pressures by themselves are unlikely to foster significant improvement for environmental outcomes.

5 Discussion

The mixed results obtained above should be interpreted in the light of previous studies; market forces alone have not been successful to effect optimal levels of SR, so this study agrees with Liu et al.'s (2017) sentiments that government regulation is still warranted. Based on the above results, a conceptual framework to create linkages between SP and SR is developed. The core of the framework is interpreted within the following parameters:

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

By conversion, the interpretation of the framework is based on the above parameters. As previously indicated, a p-value less than 0.05 signals greenwashing while a p-value greater than 0.05 signals the absence of greenwashing. Signals for greenwashing seems prevalent within the Employee and Environment dimensions (with the exception of environmental responsibility). Figure 1 presents the envisaged framework.

Figure 1 depicts the interconnections between the SR and SP constructs. Overall the results indicate that regulatory stakeholders perceive that to a certain extent companies' sustainability practices are positive in areas such as local economic development; local housing; skills development; and local infrastructure development while occupational health and safety; labour practices, labour practices, diversity and inclusion; employment equity; environmental management; and environmental leadership signal greenwashing activities. However, mere signals of greenwashing fail to sufficiently explain the phenomenon, a deeper analysis is required to fully determine the extent of the effectiveness of regulation in reducing the gap between SP and SR as perceived by the stakeholders. Consequently, the study further analysed the relationships between the two (2) constructs using structural equation modelling (SEM).

5.1 Structural equation modelling (SEM)

The third research objective was to quantitatively elucidate the relationships between SR and SP constructs. SEM was conducted to determine the framework's fitness and to test the relationship between SP and SR means. SEM evaluated relationships between the observed data with special reference to the mean, variance, and covariance expectations. Comparisons between the SEM and the conceptual framework revealed useful relationships amongst variables indicating how best the model accounts for the contribution of data and the extent to which the implied and observed variables align with theory. The model accounted for specified relationships among latent variables.

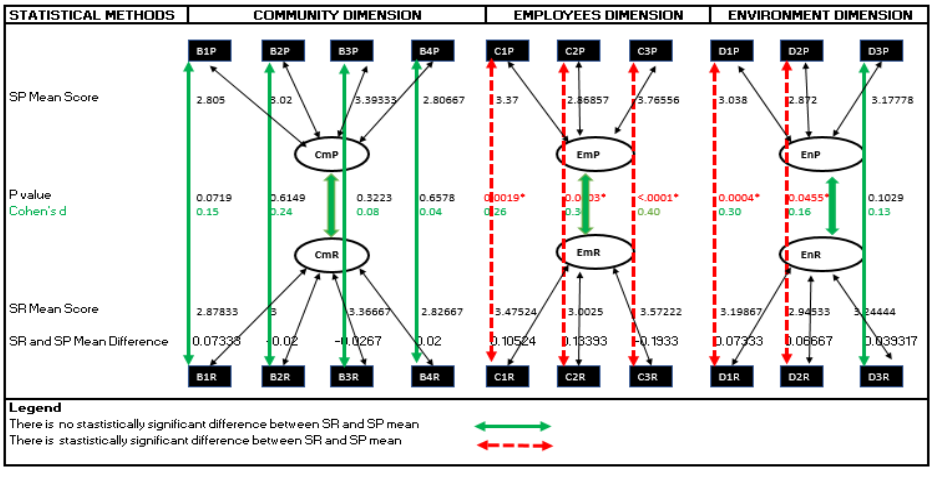
The SEM specifications were done using Lavaan 0.6-1. EFA as a measurement for the structural model was used to investigate whether second-order factors would load successfully. The graphical presentation of the full model is depicted in Figure 2.

Figure 2 shows that the structural model comprises six (6) main constructs, 20 observed variables and 20 paths. There are 20 factor loadings between the observed variables and latent variables represented by square boxes. There are also six (6) path coefficients between the main sustainability constructs, these are represented by circles which make the total number of specified directional relationships 26. Construct scores are all endogenous as they all depend on their main constructs.

Since the SR-SP construct scores were first analysed in a pairwise t-test, an explicit assumption for the model is that the SR and SP variables would be related as they measure the same subjects. The measured factor loadings demonstrate satisfactory results with significant loadings, it is anticipated that the structural parameter estimates linking the observed variables would also be significantly and strongly linked.

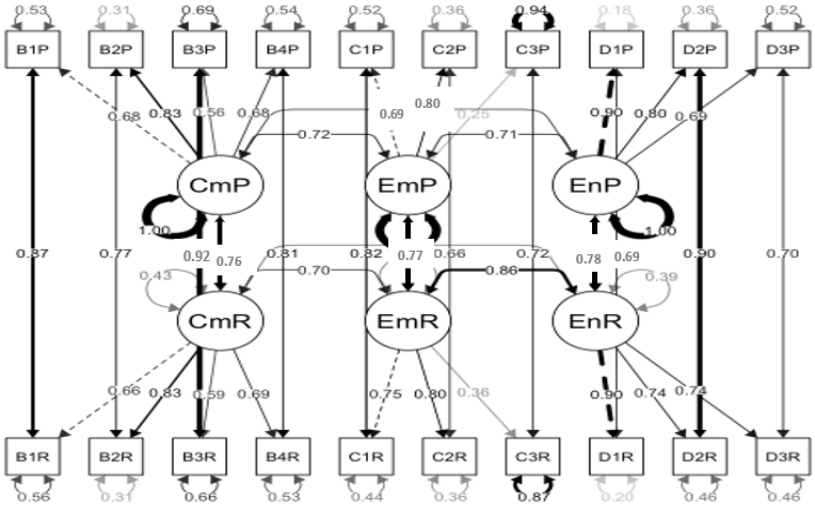
Below are parameter estimates for a full model with the total degrees of freedom greater than 1 with at least three (3) observed variables per construct to account for error. The path model identification was satisfied because all errors associated with endogenous variables are uncorrelated and all causal effects are unidirectional, therefore the model sufficiently meets the identification condition. The identification status of the model is, therefore, overidentified, hence a model-fit assessment is required.

Figure 1 The conceptual framework to link SR and SP (see online version for colours)



CmP: SP-Community; CmR: SR-Community; EmP: SP-Employees; EmR: SR-Employees; EnP: SP-Environment; EnR: SR-Environment; B1P: SP- local economic development; B2P: SP-infrastructure development; B3P: SP-Skills development; B4P: SP-Hosing and living conditions; C1P: SP-occupational health and safety; C2P: SP-Labour practices, diversity and inclusion, C3P: SP-employment equity; D1P: SP-environmental management; D2P: SP-environmental leadership; D3P: SP-environmental responsibility; B1R: SR-local economic development; B2R: SR-infrastructure development, B3R: SR-Skills development; B4R: SP-Housing and living conditions; C1R: SR-occupational health and safety; C2R: SR-Labour practices, diversity and inclusion; C3R: SR-employment equity; D1R: SR-environmental management; D2R: environmental leadership and D3R: SR-environmental responsibility.

Figure 2 Graphical presentation of the full SEM



↔ Covariances ; → regression coefficients; ↗ ↙ Path loadings ; CmP: SP-Community; CmR: SR-Community; EmP: SP-Employees; EmR: SR-Employees; EnP: SP-Environment; EnR: SR-Environment; B1P: SP-local economic development; B2P: SP-infrastructure development; B3P: SP-Skills development; B4R: SP-Hosing and living conditions; C1P: SP-occupational health and safety; C2P: SP-Labour practices, diversity and inclusion, C3P: SP-Employment equity; D1P: SP-environmental management; D2P: SP-environmental leadership; D3P: SP-Environmental Responsibility; B1R: SR-local economic development; B2R: SR-infrastructure development, B3R: SR-Skills development; B4R: SP-Hosing and living conditions; C1R: SR-occupational health and safety; C2R: SR-Labour practices, diversity and inclusion; C3R: SR-Employment equity; D1R: SR-environmental management; D2R: environmental leadership and D3R: SR-Environmental Responsibility.

Five statistical tests to determine the adequacy of the model fit were employed. Data were analysed to determine the parameters of the full structural model. All the indicators loaded significantly as expected. The model-fit statistics applied for the full model shows a p-value of 0.006; a Comparative Fit Index (CFI) of 0.975; a Robust Tucker-Lewis Index (TLI) of 0.968, a Root Mean Square Error of Approximation (RMSEA) of 0.046 and a Standardised Root Mean Square Residual (SRMR) of 0.086. The model fitted the data satisfactorily, although the chi square statistic was significant. The comparative fit index (CFI) and the non-normed fit index (NNFI) should both exceed 0.90, the closer to 1.00, the better. This criterion is met by the model.

SEM found significant relationships between SR and SP pairs with the exception of environmental management. However, this study is not just concerned about the practical effect of the results. For that reason, the practical effect was explored further to shed light on the effectiveness of regulatory enforcement in narrowing the gap between SR and SP and to ultimately address potential deficiencies within the accountability chain.

5.2 Effect size

The last objective was to establish and quantify the practical effect size of the differences between SR-SP pairs. The effect size was calculated using Cohen's D to derive the

practical or theoretical meaning (usefulness of the results). Unlike probability tests, Cohen's D is independent of the sample size and this provided greater detail about the magnitude of the mean difference expressed in standard deviation units. A heuristic to interpret the effect size was based on the following conversions for interpretation: An effect size of 0.2 is considered small, 0.5 is medium or moderate and 0.8 large (Sawilowsky, 2009). The effect sizes of mean differences ranged from 0.04 for local housing development to 0.40 for employment equity.

5.3 Contribution

The study's novel contribution to the body of knowledge is the conceptual framework to create linkages between SP and SR. The use of stakeholder theory enabled the researcher to identify new insights gathered from primary data sourced from regulatory stakeholders. Since this research is conducted in the developing domain of sustainability regulation, the conceptual framework can be used by regulatory authorities; sustainability leaders; sustainability practitioners in any industry; and other stakeholders interested in sustainability initiatives.

The results can be useful for government policy. Policymakers may use the outcomes of this study to develop or review legislation aimed at conciliating SR and SP. This may significantly ameliorate negative externalities and social injustices on communities, employees, and the environment. International organisations, for example the African Union and the United Nations can use this study to develop legislation aimed at harmonising SR and SP across countries by advancing the sustainable development agenda as captured in the Agenda 2063: The Africa we want as well as the SDGs. The results are also useful in addressing the challenges of greenwashing at policy level. While the study establishes an important role of regulation in influencing linkages between SR and SP, it is not without limitations.

The results should be interpreted cognisant of the following limitations:

Only three dimensions, namely, community development, employee welfare, and environment protection were tested. Hence the conclusions are limited to the dimensions observed and should be understood within this limitation.

Only the views from one regulatory stakeholder (DMR) were solicited and the conclusions should be understood within such limitation.

The results are viewed from a practical relevance of South African mining regulations and from the regulatory stakeholder's perspective. It would be well worth the effort to solicit other stakeholders' perceptions about the measured variables.

The influence of regulation on the inter-relationships between the sustainability dimensions was not fully explored, for example, a change in regulatory reform affecting one sustainability dimension might have an impact on another dimension, justifying further investigation.

6 Conclusions

The research is on greenwashing, and the thrust was to determine whether regulation plays a role in reducing the gap between SR and SP. The overall results are inconclusive in this respect, however, the study found signals of greenwashing practices under the

employee welfare and environmental protection, while the community dimension showed no evidence of greenwashing.

The key conclusion of the study is that with its inhibitive effects, regulation on its own has a small effect in reducing greenwashing. Therefore, there is a need to explore more mechanisms to reduce the SR-SP gap. This implies that it cannot be left to business alone to determine what sustainability dimensions to comply with. Moreover, effective enforcement of regulations ought to be explored to move sustainability performance to distinct levels.

In the long run, greenwashing should be avoided, because if discovered, the company risks its legitimacy in society – its licence to operate can be revoked; greenwashing compromises the sustainable development agenda in the guise of accountability to stakeholders; greenwashing amounts to counter-sustainability as society is misled into supporting unsustainable business practices camouflaged as green. Business leadership ought to be proactive in addressing the stakeholders' concerns and perceptions on sustainability measures and should become a leading role player in the prevention of greenwashing. Sustainability leadership is required, and profitability should not be the only objective of business, rather business is a corporate citizen.

This study is approached from the perspective of stakeholder theory; it incorporates the views of regulatory stakeholders to sustainability literature. The results add unique knowledge to the weakly-developed perspective of stakeholder theory as it amplifies dyadic SR-SP assessments in a quest to resolve the business-society conundrum, rather than relying on self-laudatory SR-SP assessments from a company's vantage point. This suggests that the SR-SP gap may be resolved within the context of dyadic company-stakeholder dialogues. It should assist both companies and stakeholders to iron out grey areas which may have opened up gaps between SR and SP. Employing pluralistic assessments based on the moral grounds of the theory may facilitate distinct levels of sustainability that go beyond obligatory requirements. Future studies on multi-stakeholder surveys on the linkages between SR and SP in the mining industry or other sectors are recommended to equip society as a stakeholder with a practical instrument to discern and authenticate SP information purported in SR.

This research highlights the quest for the emerging phenomenon of sustainability leadership which calls for governments and business leaders to lead from the front if significant SP improvements and the much-desired handprint at global scale are to be achieved.

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