Sustainability reporting beyond the business case and its impact on sustainability performance: UK evidence

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ABSTRACT

We explore Landrum and Ohsowski (2018)'s development model, which positions each company's sustainability reporting with multiple worldviews of corporate sustainability. We investigate the impact of sustainability report communicative actions on corporate sustainability performance. We argue that companies that comply with the reporting guidelines and adopt the business case for corporate sustainability may not capture all sustainability aspects, and therefore may not have a real impact on sustainability performance. Employing a computer-based textual analysis on a sample of UK firms that published sustainability reports during the period 2014–2018, we find that sustainability reports that communicate the message that firms understand sustainability to mean maintaining production and consumption patterns within resources capacity of the planet and coexisting in harmony with nature are likely to have a positive effect on sustainability performance. On the other hand, communicating compliance and the business-centred approach as their understanding of sustainability will negatively affect sustainability performance. Our findings offer important implications for companies who need to change their approach towards sustainability reporting and shift from the business case approach to advance to the next stage of sustainability reporting which should guide corporate decisions and actions.

1. Introduction

Companies' approach towards sustainability reporting is quite varied. Society demands sustainable development and requires evidence that companies are taking their sustainability responsibilities seriously through better information provision (Bowen, 2014). Different worldviews of sustainability guide corporate decisions and actions (Landrum, 2018) and affect businesses' implementation of sustainability practices. According to Dyllick and Muff (2016), businesses' understanding of sustainability has been misguided as most businesses are engaging in reducing unsustainability. Landrum (2018) questioned the fact that companies are increasingly engaging in sustainability, yet environmental conditions continue to disintegrate. The lack of focus on ethical aspects of sustainability reporting means that truly sustainable responsible firms are difficult to identify. Some organisations that follow reporting standards do not behave in a responsible way concerning sustainability (Moneva et al., 2006). Prior literature argues that corporate sustainability reporting that is driven by the business case approach of sustainability and is progressed by compliance levels represents weak sustainability (Landrum, 2018; Landrum and Ohsowski, 2018).

We investigate the impact of sustainability reporting on corporate sustainability performance. We argue that companies that comply with the reporting guidelines and adopt the business case for corporate sustainability may not capture all sustainability aspects, and therefore may not have a real impact on sustainability performance. Signalling theory helps to understand the association between sustainability reporting and sustainability performance. Companies will give signals to stakeholders by issuing sustainability reports to help them making better decisions. Sustainability reports that communicate proactive sustainability strategies could send a positive signal indicating more genuine reporting with less obfuscation (Wang et al., 2018). Thus, the effect of signalling effective sustainability communications to stakeholders can be seen as an indicator of superior sustainability performance.

Sustainability textual analysis literature has mostly examined the readability and tone of sustainability reports in examining the association between sustainability reporting and sustainability performance (e. g., Nazari et al., 2017; Wang et al., 2018; Clarkson et al., 2020). Clarkson et al. (2020) argue that it is not the level of information disclosed in sustainability reports or '*how much they say*', that is important for the identification of sustainability performance, but it is the language and

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verbal tone or '*how they say it*'. In this paper, we argue that it is about '*what companies say*' that helps identify sustainability performance. We argue that to better understand, and therefore assess sustainability performance, it is important to know sustainability practices that firms are actively engaged in, and how these practices are communicated through sustainability reports.

Prior sustainability textual analysis literature has mostly employed word lists by Loughran and McDonald (2011) which are developed from financial reports (e.g., Nazari et al., 2017; Wang et al., 2018). There is a need for more research that investigates sustainability narratives and generates word lists focusing on the sustainability context (Du and Yu, 2020; Karim et al., 2021) to analyse sustainability reporting and investigate their impact on corporate sustainability performance. This study provides the first attempt to explore Landrum and Ohsowski' (2018)'s development model, which positions each company's sustainability reporting with the multiple worldviews of corporate sustainability and develop a new measure for sustainability reporting. Landrum and Ohsowski (2018) propose a five-stage of corporate sustainability model where the first three stages are clustered around the business-oriented models and the final two stages are grouped around the ecological models. The first stage is the compliance stage which represents how companies follow sustainability reporting format and regulations; the second stage is the business-centred stage which represents investing in sustainability to improve firm value and developing business models to increase company competitiveness. These two stages have been described as 'very weak' and 'weak' sustainability. The third stage is the systemic stage which represents engaging with others in a collaborative partnership to achieve systemic change. The fourth stage is the regenerative stage which represents the need for a company to maintain production and consumption patterns within the carrying capacity of the planet. The fifth stage is the coevolutionary stage which represents engaging in practices that are in harmony with nature to create the best condition for mutual survival. The final two stages have been described as 'strong' and 'very strong' sustainability as they assume natural capital cannot be replaced and needs to be maintained and enhanced. In constructing the sustainability performance measure, the study follows existing studies (e.g., Ioannou and Serafeim, 2012; Lys et al., 2015; Clarkson et al., 2020) by totalling the social and environmental scores as captured in the Environmental, Social and Corporate Governance (ASSET4 ESG) database.

The UK is an important market to investigate. Britain remains one of only 14 nations around the world with reporting rates above 90% according to Klynveld Peat Marwick Goerdeler (KPMG) International's Survey of Sustainability Reporting 2020.[1] In recent years, UK companies are accelerating efforts to tackle the environment, social, and governance challenges and they are achieving positive development in sustainability reporting and assurance that goes far further than a box-ticking exercise (KPMG, 2020). This study employs a computer-based textual analysis and uses a sample of UK firms that published sustainability reports during the period 2014–2018. Our findings show firms that communicate the message in their sustainability reports that they understand sustainability to mean maintaining production and consumption patterns within resources capacity of the planet and coexisting in harmony with nature are likely to have a positive effect on sustainability performance. On the other hand, communicating compliance and the business case as their understanding of sustainability will negatively affect sustainability performance.

The remainder of this paper is structured as follows. Section 2 reviews the literature. Section 3 develops our hypothesis. Section 4 describes the methodology. Section 5 discusses the findings and sensitivity tests. Section 6 concludes.

2. Literature review

Prior literature investigates the relationship between corporate social responsibility (CSR) disclosure and CSR performance. Cho et al. (2010) use content analysis to analyse the language and verbal tone used in corporations' environmental disclosures and show that worst environmental performers use a positive verbal tone in their reports than their better-performing counterparts. van Staden and Hooks (2007) find that companies' environmental disclosure reflects their environmental responsiveness. Recent literature has used computer-aided textual analysis to assess the linguistic features of sustainability reports and investigate the association between sustainability reporting and sustainability performance. Nazari et al. (2017) find a positive association between the readability of CSR reports and CSR performance suggesting that poor performers may be deliberately reducing the readability of their narrative disclosures. Similarly, Wang et al. (2018) find that companies with stronger CSR performance are likely to publish CSR reports with higher readability and Du and Yu (2020) find that readable texts with a positive tone are indicative of better CSR performance. Clarkson et al. (2020) examine disclosure patterns for a sample of US CSR reports and show that disclosure patterns can be used to predict future CSR performance.

The aforementioned literature provides evidence on the association between sustainability reporting and sustainability performance by looking at various characteristics of sustainability disclosure such as the level of information disclosed (*how much companies say)* and tone and readability of the reports (*how things are said and whether the reader can comprehend the message reported)*. It is equally important to investigate sustainability practices that are communicated through sustainability reports by looking at '*what companies say in their reports*'. Thus, our paper adds to the existing sustainability reporting literature by analysing what companies communicate in sustainability narratives using the textual analysis approach and developing a bag-of- words specifically tailored to the sustainability context.

3. Hypotheses development

Sustainability needs to capture societal concerns shaped by the global nature of a business. Since sustainability reporting is voluntary, corporate managers have significant discretion in deciding what sustainability information to report (Du and Yu, 2020). The disclosure of sustainability information can be considered by the public as a positive signal that a firm makes a particular effort in CSR activities and demonstrates a good CSR performance (Axjonow et al., 2018). However, the complexity and the lack of clarity of objectives around sustainability reporting increase ambiguities (Joseph, 2012). Some organisations implement their sustainability strategies thoroughly by enhancing their organisation structure and achieve good CSR performance. Other firms may engage in sustainability practices at a symbolic level which can be seen as a window dressing activity (Kim et al., 2012). Kuo and Yi-Ju Chen (2013) suggest that investing resources in sustainable actions (e.g., pollution prevention strategies and energy-saving program) will achieve legitimacy. Although such strategies are widely used, stakeholders' ability to distinguish between genuine action and symbolic actions remains limited. Stakeholders will be misled about companies' sustainability performance when a specific subset of actions that are merely symbolic do not match substantive sustainability engagements (Delmas and Burbano, 2011). Putting minimal efforts to address CSR issues may lead to inferior CSR performance (Wang et al., 2018).

Joseph (2012) argues that GRI sustainability standards seem to be widely spread and grant companies much flexibility on how they carry out their sustainable activities. Moneva et al. (2006, p.122) state that "GRI guidelines could be considered as an administrative reform that is insufficient to enable new accountability relationships". Companies may increase their symbolic performance by being able to tick more boxes to show their compliance with reporting frameworks (Boiral, 2013; Hahn

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[1] For more information, please visit: The Time Has Come: The KPMG Survey of Sustainability Reporting (2020) (assets.kpmg).

and Lülfs, 2014; De Villiers and Alexander, 2014). Moreover, Joseph (2012) argues that firms' adoption of the business case approach causes sustainability to be vulnerable to manipulation as it represents the short-term goals of the firm's profitability. The business case approach of sustainability manages stakeholders based on how relevant they are to the overall profitability of the firm (Joseph, 2012). As a result, compliance with reporting formats and the business case approach is less likely to address ambiguity underlying sustainability (Joseph, 2012).

Signalling theory helps to understand the relationship between voluntary sustainability reporting and corporate sustainability performance. According to signalling theory, companies provide sustainability information as a substantive signal of their commitment to sustainability to their stakeholders (Hodge et al., 2009). Substantive sustainability practices bring internal changes to the firm which transform into improved sustainability performance (Khan et al., 2020). Companies with proactive sustainability strategies have an incentive to provide comprehensive disclosures to signal their positive actions to stakeholders (Clarkson et al., 2011). Sustainability communications need to be evident and clear to be able to send appropriate signals indicating higher reporting quality and less obfuscation (Nazari et al., 2017; Wang et al., 2018). Thus, the effect of signalling effective sustainability communications to stakeholders can be seen as an indicator of superior sustainability performance. Companies with better sustainability performance try to signal the superiority of their performance by publishing sustainability reports that communicate the message that they understand sustainability to mean engaging in collaborative partnerships to influence systemic change and view nature for its intrinsic value where humans coexist in solidarity with the natural world. Landrum and Ohsowski (2018) refer to sustainability reports that communicate engagements in sustainability practices that represent the preservation of natural resources and are in harmony with nature as 'strong' and 'very strong' sustainability. Based on the aforementioned, we propose our hypothesis:

Hypothesis: Sustainability reports that communicate the very strong and strong sustainability are positively associated with future sustainability performance.

4. Research method

4.1. Sample

This study uses a sample of UK firms that published sustainability reports during the period 2014–2018. The study's time period allows us to investigate changes in sustainability reporting practices over the last five years and provide a sample that is more recent than are the samples used in prior research. The sustainability reports include textual narratives regarding firms' sustainable policies, practices, and performance (Du and Yu, 2020). As a result, the use of these reports is more likely to mitigate concerns that the content of CSR information might be affected by the presence of financial information compared to using corporate annual reports (Clarkson et al., 2020). Sustainability-related data are collected from Thomson Reuters ASSET4. Financial data and industry affiliations are collected from Datastream. We lose some observations due to missing data on some of the variables collected from Datastream. Our final sample consists of a balanced dataset of 280 firm-year observations (56* 5 years) distributed into 10 industrial sectors based on the Industrial Classification Benchmark (ICB).[2]

4.2. Variables definitions and measurement

4.2.1. The dependent variable

The ASSET4 database provides a thorough evaluation of the firm's CSR performance and includes scores as pillars of CSR (Ioannou and Serafeim, 2012; Eccles et al., 2014; Duque-Grisales and Aguilera-Caracuel, 2019; Clarkson et al., 2020).[3] This study uses the ESG scores collected from Thomson Reuters ASSET 4 database. In constructing the sustainability performance measure, we follow existing studies (e.g., Ioannou and Serafeim, 2012; Lys et al., 2015; Clarkson et al., 2020) by totalling social and environmental factors as captured in the ASSET4 database (SUS_*performance*). We also use social scores (SOC_*performance*) and environmental scores (ENV_*performance*) separately in regression tests to reflect on the impact of worldviews of sustainability reports on each performance dimension.

4.2.2. The independent variable

This paper adds to the existing literature by using bag-of- words approach specifically tailored to the sustainability context. Landrum (2015, 2018) reviews the literature on corporate sustainability and provides a five-stage model that serves as a framework for categorizing the rhetoric of corporate sustainability reports.[4] According to Landrum (2018), 'weak' and 'very weak' sustainability represent compliance and economic value principles and attempt to integrate the environment into businesses, 'strong' sustainability represents the preservation of natural resources, and 'very strong' sustainability assumes that firms understand the place of humans, corporations and societies as existing in solidarity and balance with nature. This study uses the five stages of corporate sustainability and develops bag-of-words based on Landrum's (2015, 2018) model discourse of corporate sustainability and Landrum and Ohsowski's (2018) keyword list for categorizing the rhetoric of corporate sustainability reports. We use the Linguistic Inquiry and Word Count (LIWC) 2015 software to scan the text of sustainability reports for keywords from our data dictionary and identify the word frequency concerning each stage of sustainability reporting (keywords for each stage are provided in appendix 2). We assessed the reliability and validity of our scores by manually checking the score for a random sample of sustainability reports, and the outcomes remained consistent. We also used Nvivo 12 pro to re-score a random sample of sustainability reports and the scores remained consistent.[5]

4.2.3. The control variables

We include both external and internal governance-related variables in line with prior literature (e.g., Hodge et al., 2009; Pflugrath et al., 2011; Zorio et al., 2013). We include a composite measure of the adoption of sustainability reporting assurance and the choice of assurer, which represents the quality of sustainability report assurance (SRA_*quality*). Following Al-Shaer and Zaman (2016) and Al-Shaer (2020), we assign a score of 0 in the case of no assurance of sustainability reports, 1 if sustainability reports are externally assured by a non-accounting firm, 2 if the report is externally assured by a non-Big Four accounting firm,

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[2] We are aware that our study might suffer from a sample selection bias due to only using firms with sustainability reports, hence dropping those with other types of reporting (e.g., website disclosure or integrated reports). We control for this issue using the Heckman correction in the result section.

[3] The ASSET4 database provides objective, relevant, and systematic environmental, social, and governance (ESG) information based on key performance indicators. Research analysts of ASSET4 collect data from sources including stock exchange filings, annual financial and sustainability reports, nongovernmental organisations' websites, and various news sources (Eccles et al., 2014).

[4] It is noteworthy that Landrum and Ohsowski (2017) used this model in categorizing the content of introductory sustainable business courses.

[5] LIWC is a text analysis software program that processes a series of text files word by word and identifies the category to which these texts belong. The program can calculate the degree to which people use different categories of words across a wide array of texts. Users can produce their custom dictionary and loaded it into the software. More details about the software can be found at http://www.liwc.net.

and 3 if the external assurer is a Big Four firm.

We control for board size (*BODSIZE*) measured by the total number of directors serving on the board. Larger boards tend to have members from diverse backgrounds and experiences and may reflect a greater commitment to sustainable activities (De Villiers et al., 2011; Zaid et al., 2020), and it is expected to be positively associated with CSR performance. We control for board independence (*BODIND*) measured by the proportion of independent directors to the total number of directors on the board. Boards with a greater proportion of independent directors are likely to provide more monitoring over management to build corporate reputation and improve performance (Al-Shaer and Zaman, 2018). We control for board diversity (*BODDIV*) measured by the percentage of female directors on the board as it is more likely that having female directors on board helps improve the reporting discipline and increase stakeholder confidence and corporate engagement (Al-Shaer and Zaman, 2016).

Finally, following prior research (e.g., Nazari et al., 2017; Wang et al., 2018; Du and Yu, 2020), we control for firm-specific variables. These are firm size (*SIZE*) measured by the natural logarithm of total assets; leverage (*LEV*) measured by the ratio of total liabilities scaled by total assets; firm profitability (*ROA*) measured by net income before extraordinary items divided by total assets; *CROSSLIST* measured as the total number of countries in which the firm's securities are cross-listed; and industry and year dummies.

4.3. Econometric model

Sustainability performance is a prolonged process, and it may take time for the changes to be implemented (Omran et al., 2021). As a result, we use the lagged value for our explanatory variables and test how communicating on various worldviews of corporate sustainability may affect sustainability future performance. We, therefore, construct the multivariate regression model below to examine the association between sustainability reports and corporate sustainability performance. The variables used in this study are defined in Appendix 1.

$SUS\_performance_t = \beta_0 + \beta_1 SUS\_communicate_{t-1} + \beta_2 SRA\_quality_{t-1} + \beta_3 BODIND_{t-1} + \beta_4 BODDIV_{t-1} + \beta_5 BODSIZE_{t-1} + \beta_6 LEV_{t-1} + \beta_7 SIZE_{t-1} + \beta_8 ROA_{t-1} + \beta_9 CROSSLIST_{t-1} + \beta_{10} Industry + \beta_{11} Year + \mathcal{E}it$

5. Empirical results

5.1. Descriptive statistics

Table 1 provides the descriptive analysis. It shows that the mean value of SUS_ performance_t is 132.13. The mean value of ENV_ performance_t is 63.86 and the mean value of social score (SOC_ performance_t) is 68.26. The mean value of *Coevolutionary* is 10.22, the mean value of *Regenerative* is 23.75, the mean value of *Systemic* is 76.68, the mean value of *Business- Centred* is 227.48, and the mean value of *Compliance* is 88.76. Fig. 1 depicts the change in the average of the five stages of sustainability reporting during the years of our sample period. The figure shows an increase in the reporting of the coevolutionary stage in recent years. However, on average and over the five-year period, the sample firms report more on the business case of sustainability which represents the weak sustainability than on the strong and very strong sustainability stages.

The mean value of SRA_ quality is 3.64, the mean value of *BODSIZE* is 9.96, and the mean value of *BODIND* is 0.63. On average, 24.3% of

Table 1
Summary statistics.

Variables	Mean	SD	Min	Max
SUS_ performance	132.133	32.93	57.64	192.65
ENV_ performance	63.868	20.843	16.07	96.33
SOC_ performance	68.264	15.371	33.15	97.1
Coevolutionary	10.222	22.4	2	237
Regenerative	23.749	33.857	6	259
Systemic	76.688	69.48	29	593
Business-Centred	227.483	267.365	86	1799
Compliance	88.763	103.422	16	607
CPI	0.519	0.5	0	1
ESI	0.456	0.456	0	1
EOI	0.48	0.48	0	1
IOI	0.495	0.495	0	1
SRA_ quality	3.646	0.774	1	4
BODIND	0.63	0.132	0.0833	0.9286
BODDIV	0.243	0.088	0	0.5
BODSIZE	9.962	2.255	5	19
LEV	0.263	0.164	0	0.733
SIZE	16.144	1.777	13.210	20.771
ROA	5.364	10.143	−22.11	30.12
CROSSLIST	0.484	0.501	0	1

Variables winsorised to adjust for outliers. Variables are as defined in Appendix 1.
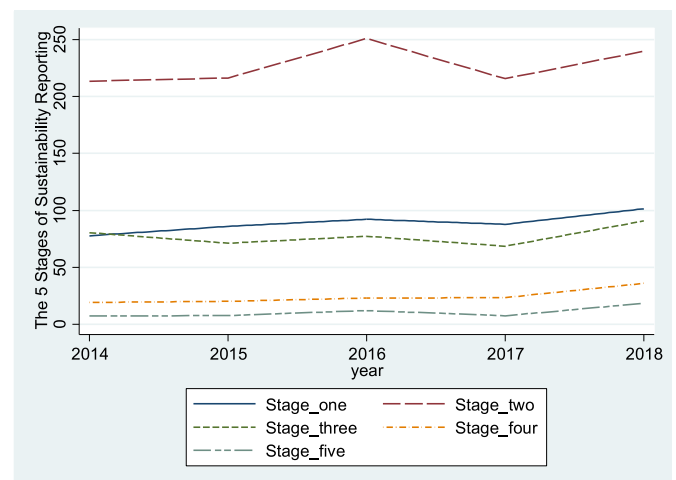
Fig. 1. The average frequency of the five stages of sustainability reporting between 2014 and 2018.

corporate boards are female directors.[6] Finally, Table 1 also shows that, on average, the sample firms are relatively large, profitable, cross-listed, and leveraged.

Table 2 shows the correlation analysis and does not evidence serious multicollinearity problems as correlation coefficient values are below the concerned level of 0.8 (Gujarati and Porter, 2009). The table shows that SUS_ performance has a negative and statistically significant correlation with *Business _Centred* while SUS_ performance is positively and significantly correlated with *Regenerative* and *Coevolutionary*. It also shows that SRA_ quality, *BODDIV*, *BODSIZE*, and firm size are positively and significantly correlated with SUS_ performance. The variance inflation factor (VIF) values range from 1.04 to 1.70 with a mean value of 1.20.

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[6] Most of the sample firms (97.21%) have sustainability committees operating on boards. This variable was dropped from regression tests due to a lack of statistical variations.

Table 2
Correlation matrix.

	Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1	SUS_performance	1													
2	Compliance	−0.0316	1												
3	Business-Centred	−0.1649	0.0346	1											
4	Systemic	0.1003	0.1038	0.1798	1										
5	Regenerative	0.1648	−0.1783	−0.2893	−0.2525	1									
6	Coevolutionary	0.1605	−0.0407	−0.0195	0.2153	−0.0496	1								
7	SRA_quality	0.3489	0.0349	−0.0172	−0.0901	0.1689	−0.0156	1							
8	BODIND	0.0892	0.1511	0.0822	0.108	−0.0487	0.0469	0.0056	1						
9	BODDIV	0.2123	0.0376	0.3034	0.1073	−0.0877	0.0532	−0.0246	0.0452	1					
10	BODSIZE	0.2904	0.0916	−0.1462	0.0036	0.1225	0.0273	0.1825	−0.0179	0.0378	1				
11	LEV	0.023	0.1884	−0.1072	−0.1246	−0.0935	−0.1835	0.0093	0.0686	0.0868	−0.0719	1			
12	SIZE	0.4282	0.3002	−0.0115	0.1307	−0.0287	0.1112	0.1882	0.2963	0.0469	0.5430	−0.027	1		
13	ROA	0.0721	−0.0667	0.0151	0.0426	−0.024	0.0779	−0.0025	0.0053	0.0206	0.1216	−0.0811	0.053	1	
14	CROSSLIST	−0.0928	−0.0263	0.1219	−0.0253	0.021	−0.1271	−0.0802	0.0958	−0.0859	−0.0781	−0.0436	−0.0155	0.0159	1

This table reports the Pearson correlation matrix between the variables used in the analyses, where coefficients in bold indicate significance at the 5% level or better. Variables are as defined in Appendix 1.

5.2. Multivariate analysis

Table 3 presents the results of the multivariate regression using the OLS estimator as a baseline model in investigating the association between sustainability report communicative actions (SUS_ *communicate*$_{t-1}$) and sustainability reporting (SUS_ *performance*$_t$).[7] We run the primary model (OLS) separately for each explanatory variable i.e., the five stages of sustainability reporting (Models 3.1–3.5). It is likely that individual companies are not going to exclusively use words associated with their apparent worldviews of corporate sustainability and they may distribute words across the five stages of sustainability. Thus, we include all independent variables (i.e., all five sustainability stages) in Model 3.6. The results show that the coefficients for *Coevolutionary* and *Regenerative* are positive and significant at the 1% level. On the other hand, the coefficients for *Business_ Centred* and *Compliance* are negative and significant at the 1% level, and the coefficient for *Systemic* does not show a significant association with SUS_ *performance*$_t$. When including all explanatory variables in the regression model (Model 3.6), the result shows that the coefficient for *Coevolutionary* is positive and significant at the 5% level and the coefficients for *Regenerative* and *Systemic* are positive and significant at the 10% level.

The results for the control variables show that the coefficient for SRA_ *quality* is positive and significant at the 5% level suggesting that the voluntary adoption of SRA and the choice of assurer are likely to improve the completeness of information by providing a rigorous independent reporting process (Simnett et al., 2009; Pflugrath et al., 2011) which is more likely to enhance sustainability performance. The coefficient for *BODDIV* is positive and significant at the 1% level suggesting that female directors are more likely to be stakeholder- oriented and concerned about socially responsible behaviour (Jain and Jamali, 2016) which will impact corporate engagement in sustainability (Liao et al., 2015). Finally, the coefficient of *SIZE* is positive and significant at 1% suggesting that larger firms tend to report more on social and environmental activities and help promote the firm's sustainability performance.

These findings support our hypothesis and suggest that companies that report on sustainability beyond compliance and the business case to include communicative messages that they understand sustainability to mean improving resource efficiency, prevention of environmental damage, and the coexistence in a mutually beneficial relationship with nature are more likely to have superior sustainability performance. On the contrary, companies that follow compliance requirements and the business approach to sustainability run the risk of losing sight of the big picture for sustainability (Moneva et al., 2006) which will affect their sustainable behaviour and progress towards sustainability. Organisations that categorise themselves as GRI reporters do not act in a responsible way concerning sustainability (Moneva et al., 2006). We find that companies that used a broad span of the language of all five sustainability stages, suggesting different forms of understanding regarding corporate sustainability are likely to enhance sustainability performance.

Table 4 and 5 test the individual effects of social and environmental factors as captured in the ASSET4 database to reflect on the impact of

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[7] Our data meets the various assumptions of a linear regression: (i) the dependent variable is measured at a continuous level (ii) independent variables are measured at the continuous or categorical level (iii) we create a scatterplot using Stata where we plot the dependent variable against independent variables and scatterplot confirms linearity (iv) our data show homoscedasticity. We employ the breusch-pagan test using the 'hettest' command in Stata to test for homoscedasticity. The test shows that the p-value is insignificant. Hence, we fail to reject the null hypothesis of the breusch-pagan test and conclude that heteroscedasticity is not present. We would like to note that despite the absence of heteroscedasticity, all tests use robust standard errors. We also winsorize some of the continuous variables at 1% level to adjust for outliers.

Table 3
The impact of sustainability communicative actions on sustainability performance.

Variables	SUS_perf	SUS_perf	SUS_perf	SUS_perf	SUS_perf	SUS_perf
	Model 3.1	Model 3.2	Model 3.3	Model 3.4	Model 3.5	Model 3.6
Coevolutionary	1.1858***					0.9404**
	[2.69]					[2.18]
Regenerative		0.4195**				0.2438*
		[2.11]				[1.18]
Systemic			0.1839			0.2630*
			[1.27]			[1.85]
Business-Centred				−0.1244**		−0.0930*
				[-2.56]		[-1.85]
Compliance					−0.3407***	−0.2587**
					[-3.48]	[-2.58]
SRA_quality	0.0791***	0.0713***	0.0822***	0.0766***	0.0716***	0.0753***
	[3.26]	[2.89]	[3.30]	[3.15]	[2.99]	[3.20]
BODIND	−0.2423	−0.2195	−0.2550*	−0.2096	−0.1796	−0.1963
	[-1.63]	[-1.46]	[-1.68]	[-1.41]	[-1.22]	[-1.37]
BODDIV	0.8185***	0.8941***	0.8200***	1.0321***	1.0331***	1.0092***
	[3.61]	[3.92]	[3.51]	[4.40]	[4.54]	[4.40]
BODSIZE	0.0031	−0.0006	0.0042	−0.0029	0.0058	−0.0009
	[0.30]	[-0.06]	[0.40]	[-0.27]	[0.57]	[-0.08]
LEV	0.0202	−0.0188	−0.0136	−0.0636	−0.0119	0.0624
	[0.18]	[-0.17]	[-0.12]	[-0.57]	[-0.11]	[0.56]
SIZE	0.0548***	0.0606***	0.0505***	0.0590***	0.0652***	0.0585***
	[3.44]	[3.75]	[3.01]	[3.70]	[4.11]	[3.68]
ROA	0.0011	0.0012	0.001	0.0012	−0.0001	0.0007
	[0.66]	[0.74]	[0.58]	[0.71]	[-0.03]	[0.44]
CROSSLIST	−0.049	−0.0668*	−0.0586	−0.0617	−0.0537	−0.027
	[-1.26]	[-1.72]	[-1.48]	[-1.60]	[-1.41]	[-0.71]
Industry	Included	Included	Included	Included	Included	Included
Year	Included	Included	Included	Included	Included	Included
Intercept	3.2467***	3.2288***	3.2466***	3.3947***	3.1109***	3.1199***
	[9.98]	[9.82]	[9.78]	[10.34]	[9.60]	[9.71]
R-squared	0.4426	0.433	0.4228	0.4404	0.459	0.5048
N	280	280	280	280	280	280

***$p < 0.01$; **$p < 0.05$; *$p < 0.1$. Variables are as defined in Appendix 1.

sustainability communicative actions on each performance dimension separately. Table 4 tests the impact of SUS_communicate$_{t-1}$ on environmental performance (ENV_performance$_t$) and shows that, consistent with finding in Table 3, the coefficients for *Coevolutionary* and *Regenerative* are positive and significant at 1% level. On the other hand, the coefficients for *Business_Centred* and *Compliance* are negative and significant at 1% level, and the coefficient for *Systemic* does not show a significant association with ENV_performance$_t$. When including all explanatory variables in the regression test (Model 4.6), the result shows that the coefficients for *Coevolutionary*, *Regenerative,* and *Systemic* are positive and significant at 5% level while the coefficients for *Business_Centred* and *Compliance* are negative and significant at 5% level. Table 5 uses SOC_performance$_t$ as the dependent variable and shows that the coefficient for *Coevolutionary* is positive and significant at 10% level with social performance (Models 5.1 and 5.6) while the coefficient for *Compliance* is negative and significant at 5% level (Models 5.5 and 5.6).

Our finding suggests that sustainability information that reflects the need of a company to maintain production and consumption patterns with the carrying capacity of the planet and engagement in practices that are in harmony with nature are likely to enhance their environmental performance. On the other hand, companies that comply with reporting frameworks by being able to tick more boxes and follow the business case approach may not reflect managers' intentions with regards to social and environmental issues (De Villiers and Alexander, 2014) and this will affect their social and environmental performance.

5.3. Additional analysis: industry effects

Prior literature argues that there is an association between sustainability report quality and the firm membership to a particular industry in which there is strong pressure from one or more stakeholders (Deegan and Gordon, 1996; Prado-Lorenzo et al., 2009). We follow

Fernandez-Feijoo et al. (2014) and create four categories of industries based on pressures of four main groups of stakeholders viz. Customers, employees, environment, and investors. We create four dichotomous variables: (i) Customer proximity industries variable (*CPI*) that takes a value of 1 if the company belongs to an industry well known for the general public as a consumer of its products or services, for all the other industries the variable adopts a value of 0, (ii) Employee-oriented industries (*EOI*) variable which is measured using the size of a company as a proxy for pressures from the employees. Managers of large companies are more likely to listen to the demands and pressures of their employees (Aldama et al., 2009; Fernandez-Feijoo et al., 2014), (iii) Environmentally sensitive industries (*ESI*) that takes a value of 1 if the activities of the company have an important impact on the environment, for all the other industries the variable adopts a value of 0; (iv) Investor-oriented industries variable (*IOI*) that takes a value of 1 if the company is in an industry with a high level of pressure from their investors, for all the other industries the variable takes a value of 0.[8] Industry dummies are created based on the SIC two-digit industry classification.

The results reported in Table 6 show that companies that publish sustainability reports that follow 'very strong' and 'strong' sustainability are more likely to enhance their sustainability performance while companies that publish standardised sustainability reports and follow the business case approach will impact negatively their sustainability performance. These findings are consistent with those reported in Table 3. Results also show that the coefficient of *ESI* is positive and significant at 5% level (Models 6.1–6.4) and 1% level (Models 6.5 and 6.6) with SUS_performance$_t$ and the coefficient of *CPI* is positive and significant at 5% level (Models 6.1–6.5) and 1% level (Model 6.6) with

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[8] Please see Fernandez-Feijoo et al. (2014, p.58) for industries' list for each stakeholder group.

Table 4
The impact of sustainability communicative actions on environmental performance.

Variables	ENV_ *perf*	ENV_ *perf*	ENV_ *perf*	ENV_ *perf*	ENV_ *perf*	ENV_ *perf*
	Model 4.1	*Model 4.2*	*Model 4.3*	*Model 4.4*	*Model 4.5*	*Model 4.6*
Coevolutionary	1.9983***					1.6454**
	[2.94]					[2.55]
Regenerative		1.0219***				0.7566**
		[3.39]				[2.46]
Systemic			0.324			0.5081**
			[1.44]			[2.39]
Business-Centred				−0.2585***		−0.1959**
				[-3.50]		[-2.60]
Compliance					−0.5022***	−0.3041**
					[-3.31]	[-2.03]
SRA_ *quality*	0.0926**	0.0745**	0.0982**	0.0879**	0.0814**	0.0844**
	[2.48]	[1.99]	[2.55]	[2.38]	[2.19]	[2.40]
BODIND	−0.3328	−0.282	−0.3556	−0.2673	−0.239	−0.2623
	[-1.45]	[-1.24]	[-1.51]	[-1.18]	[-1.04]	[-1.23]
BODDIV	1.2394***	1.3833***	1.2379***	1.6621***	1.5672***	1.5456***
	[3.54]	[4.00]	[3.43]	[4.65]	[4.44]	[4.51]
BODSIZE	−0.0098	−0.0191	−0.0079	−0.0222	−0.0057	−0.0224
	[-0.61]	[-1.18]	[-0.48]	[-1.37]	[-0.36]	[-1.45]
LEV	−0.1657	−0.2152	−0.2205	−0.3159*	−0.2257	−0.0826
	[-0.95]	[-1.26]	[-1.24]	[-1.86]	[-1.32]	[-0.50]
SIZE	0.0717***	0.0848***	0.0641**	0.0800***	0.0874***	0.0770***
	[2.93]	[3.46]	[2.47]	[3.29]	[3.54]	[3.24]
ROA	−0.0002	0.0002	−0.0004	0	−0.002	−0.0001
	[-0.09]	[0.09]	[-0.16]	[0.00]	[-0.76]	[-0.06]
CROSSLIST	−0.0609	−0.0909	−0.0765	−0.0804	−0.0717	−0.0235
	[-1.01]	[-1.55]	[-1.25]	[-1.37]	[-1.21]	[-0.42]
Industry	Included	Included	Included	Included	Included	Included
Year	Included	Included	Included	Included	Included	Included
Intercept	1.9122***	1.8407***	1.9091***	2.2050***	1.7199***	1.7398***
	[3.81]	[3.70]	[3.72]	[4.41]	[3.42]	[3.62]
R-squared	0.3966	0.407	0.3717	0.4096	0.405	0.4966
N	280	280	280	280	280	280

***$p < 0.01$; **$p < 0.05$; *$p < 0.1$. Variables are as defined in Appendix 1.

Table 5

The impact of sustainability communicative actions on social performance.

Variables	SOC_ perf	SOC_ perf	SOC_ perf	SOC_ perf	SOC_ perf	SOC_ perf
	Model 5.1	*Model 5.2*	*Model 5.3*	*Model 5.4*	*Model 5.5*	*Model 5.6*
Coevolutionary	0.6537*					0.486*
	[1.68]					[1.22]
Regenerative		−0.0964				−0.1846
		[-0.55]				[-0.97]
Systemic			0.1138			0.0992
			[0.90]			[0.76]
Business-Centred				−0.0136		−0.0128
				[-0.31]		[-0.28]
Compliance					−0.1940**	−0.2056**
					[-2.23]	[-2.23]
SRA_ quality	0.0644***	0.0652***	0.0663***	0.0636***	0.0601***	0.0655***
	[3.00]	[3.00]	[3.05]	[2.94]	[2.82]	[3.03]
BODIND	−0.1742	−0.1744	−0.1824	−0.1678	−0.1385	−0.1541
	[-1.33]	[-1.32]	[-1.37]	[-1.26]	[-1.06]	[-1.17]
BODDIV	0.4870**	0.5116**	0.4842**	0.5340**	0.6083***	0.5703***
	[2.43]	[2.54]	[2.37]	[2.56]	[3.00]	[2.70]
BODSIZE	0.0167*	0.0178*	0.0173*	0.0162*	0.0182**	0.0197**
	[1.82]	[1.89]	[1.88]	[1.70]	[2.00]	[2.07]
LEV	0.1735*	0.1353	0.1567	0.1377	0.1564	0.1847*
	[1.73]	[1.36]	[1.56]	[1.39]	[1.60]	[1.81]
SIZE	0.0447***	0.0444***	0.0419***	0.0457***	0.0506***	0.0456***
	[3.18]	[3.11]	[2.86]	[3.22]	[3.58]	[3.12]
ROA	0.0018	0.0016	0.0017	0.0017	0.0011	0.0011
	[1.19]	[1.07]	[1.14]	[1.14]	[0.74]	[0.70]
CROSSLIST	−0.0407	−0.0505	−0.0454	−0.05	−0.043	−0.0303
	[-1.18]	[-1.48]	[-1.31]	[-1.46]	[-1.27]	[-0.87]
Industry	Included	Included	Included	Included	Included	Included
Year	Included	Included	Included	Included	Included	Included
Intercept	2.9649***	2.9982***	2.9623***	2.9975***	2.8868***	2.8811***
	[10.32]	[10.33]	[10.21]	[10.26]	[10.00]	[9.75]
R-squared	0.4194	0.4101	0.412	0.4093	0.4272	0.4412
N	280	280	280	280	280	280

***$p < 0.01$; **$p < 0.05$; *$p < 0.1$. Variables are as defined in Appendix 1.

SUS_ *performance*. On the other hand, the coefficients of *EOI* and *IOI* are insignificant and do not show an effect on sustainability performance. Our finding suggests that companies operating in environmentally sensitive industries and consumer proximity industries seem to push towards the very strong and strong sustainability reporting which impact positively on sustainability performance. On the other hand, companies operating in the employee-oriented and investor-oriented industries seem to accept the business case approach of sustainability and compliance with sustainability frameworks which seem to damage the firm's image and negatively affect sustainability performance.

5.4. Endogeneity analysis

We recognise that the multivariate model may be subject to the endogeneity problem. Although we run one-year lagged regression for all independent variables to address the potential problem of simultaneity (Omran et al., 2021) and introduced a comprehensive set of control variables that have been used in the sustainability reporting literature to avoid omitted variables issue, there might still be some unobserved factors that drive the results. To test for omitted variable bias, the study applies Ramsey's regression equation specification error test (*ovtest*). In our Equation, the *p*-values for the omitted variable test are 0.572 for SUS_ *performance,* 0.131 for ENV_ *performance*, and 0.155 for SOC_ *performance* suggesting that findings do not suffer from omitted variable bias.

Studies examining voluntary disclosures face selection bias issues (e.

g., Katmon and Al Farooque, 2017; Muslu et al., 2019). To solve sample selection bias, we employ the Heckman (1979) two-step approach. We run the first-stage probit model of a firm decision to issue a comprehensive sustainability report where the dependent variable is an indicator variable (*Length_indicator*), which equals one for observations where *Length_indicator* is greater than the median value and zero for observations where it is less than the median value. We use the length of the sustainability report as an instrumental variable and we expect that the content of the sustainability report to be correlated with its length since the size of a document measures the overall complexity of firm's operations (Loughran and McDonald, 2016) and provide comprehensive and in-depth information about firms' social and environmental information (Du and Yu, 2020). On the other hand, it is unlikely that the document length to be correlated with sustainability performance. We regress *Length_indicator* on SRA_ *quality*, board and firm-specific variables. We then compute the Inverse Mills Ratio (*IMR*) and include it in the second-stage regressions reported in Table 7 to control for the sample selection bias in the dataset. Our inferences remain unchanged when using the Heckman (1979) two-step approach.

We furnish an appendix of 6 additional tables (untabulated) in which we further test the sensitivity of our main findings. We argue that sustainability performance is a prolonged process, and one-year lag might be short in terms of seeing performance changes, especially that intensive efforts are required under the regenerative and coevolutionary sustainability stages. We therefore test the robustness of our results in Tables 3–5 using 2-year lag and 3-lag of sustainability performance

Table 6
Additional analysis: Industry effects.

Variables	SUS_ perf	SUS_ perf	SUS_ perf	SUS_ perf	SUS_ perf	SUS_ perf
	Model 6.1	Model 6.2	Model 6.3	Model 6.4	Model 6.5	Model 6.6
Coevolutionary	0.9913**					0.8197*
	[2.10]					[1.81]
Regenerative		0.4526**				0.3171
		[2.39]				[1.63]
Systemic			0.1288			0.2361*
			[0.90]			[1.68]
Business-Centred				−0.1391***		−0.1079**
				[-2.86]		[-2.14]
Compliance					−0.3035***	−0.2417***
					[-3.29]	[-2.66]
SRA_ quality	0.0884***	0.0782***	0.0910***	0.0844***	0.0840***	0.0823***
	[3.57]	[3.13]	[3.59]	[3.44]	[3.45]	[3.42]
BODIND	−0.2313	−0.1845	−0.2348	−0.1822	−0.1893	−0.1878
	[-1.53]	[-1.22]	[-1.53]	[-1.22]	[-1.28]	[-1.30]
BODDIV	0.7150***	0.8200***	0.7107***	0.9472***	0.8428***	0.8833***
	[3.04]	[3.50]	[2.93]	[3.94]	[3.65]	[3.75]
BODSIZE	−0.0042	−0.0073	−0.0029	−0.0097	−0.0014	−0.0099
	[-0.39]	[-0.69]	[-0.27]	[-0.91]	[-0.14]	[-0.95]
LEV	0.0197	0.0097	0.0029	−0.0342	0.0105	0.0695
	[0.17]	[0.08]	[0.02]	[-0.30]	[0.09]	[0.60]
SIZE	0.0634***	0.0613***	0.0609***	0.0623***	0.0734***	0.0688***
	[3.88]	[3.77]	[3.67]	[3.86]	[4.48]	[4.31]
ROA	0.0023	0.0023	0.0021	0.0024	0.0012	0.002
	[1.35]	[1.34]	[1.22]	[1.40]	[0.68]	[1.22]
CROSSLIST	−0.0281	−0.0454	−0.0389	−0.0361	−0.0311	−0.0095
	[-0.71]	[-1.17]	[-0.98]	[-0.94]	[-0.81]	[-0.25]
ESI	0.1409**	0.1712***	0.1453**	0.1433**	0.1935***	0.1370***
	[2.45]	[2.99]	[2.48]	[2.53]	[3.38]	[2.67]
CPI	0.1351**	0.1169**	0.1261**	0.1295**	0.1097**	0.1635***
	[2.53]	[2.21]	[2.34]	[2.47]	[2.11]	[2.86]
IOI	−0.0143	0.0036	0.0079	0.0271	−0.0069	−0.0235
	[-0.29]	[0.08]	[0.16]	[0.57]	[-0.15]	[-0.49]
EOI	0.0506	0.0782*	0.0555	0.0723	0.0553	0.0533
	[1.14]	[1.76]	[1.23]	[1.65]	[1.27]	[1.23]
Year	Included	Included	Included	Included	Included	Included
Intercept	3.3204***	3.3385***	3.3334***	3.4876***	3.2270***	3.3077***
	[15.06]	[15.22]	[14.94]	[15.63]	[14.73]	[15.06]
R-squared	0.3823	0.3871	0.3686	0.3962	0.4055	0.4562
N	280	280	280	280	280	280

***$p < 0.01$; **$p < 0.05$; *$p < 0.1$. Variables are as defined in Appendix 1.

Table 7

Heckman (1979) two-step Approach.

Variables	First Step DV Length Dummy	Second Step DV SUS_perf	SUS_perf	SUS_perf	SUS_perf	SUS_perf
Coevolutionary		0.8780** [1.98]				
Regenerative			0.3401* [1.81]			
Systemic				0.1961 [0.70]		
Business-Centred					−0.1244*** [-2.74]	
Compliance						−0.3816** [-2.22]
SUSQUAL	0.3625** [2.09]	0.0625** [2.14]	0.0522** [2.12]	0.0800* [1.70]	0.0766*** [3.38]	0.0578 [1.36]
BODIND	0.4958 [0.49]	−0.1348 [-0.86]	−0.2051 [-1.47]	−0.2555 [-0.88]	−0.2096 [-1.51]	−0.1585 [-0.61]
BODDIV	1.0883 [0.77]	0.7032*** [2.86]	0.8592*** [3.98]	0.8176* [1.82]	1.0321*** [4.71]	1.0151** [2.50]
BODSIZE	0.0214 [0.34]	0.0042 [0.40]	−0.0027 [-0.27]	0.0042 [0.21]	−0.0029 [-0.29]	0.0046 [0.26]
LEV	0.5175 [0.71]	−0.0502 [-0.41]	−0.0455 [-0.43]	−0.0159 [-0.07]	−0.0636 [-0.61]	−0.0032 [-0.02]
SIZE	0.0295 [0.30]	0.0477*** [2.95]	0.0582*** [3.84]	0.0496 [1.54]	0.0590*** [3.96]	0.0659** [2.34]
ROA	0.0171 [1.52]	−0.0018 [-1.02]	0.001 [0.66]	0.0009 [0.28]	0.0012 [0.76]	−0.0003 [-0.09]
CROSSLIST	−0.3562 [-1.48]	−0.0151 [-0.37]	−0.0696* [-1.91]	−0.056 [-0.74]	−0.0617* [-1.72]	−0.0462 [-0.69]
IMR		−0.2127 [-1.08]	−0.0495 [-0.19]	−0.4653 [-0.28]	−0.4113 [-0.51]	−0.4225 [-0.52]
Industry	Included	Included	Included	Included	Included	Included
Year	Included	Included	Included	Included	Included	Included
Intercept	−2.3800* [-1.67]	0.3563*** [2.74]	3.3819*** [10.73]	3.2611*** [5.06]	3.3947*** [11.07]	3.1741*** [5.41]
N	280	280	280	280	280	280

***$p < 0.01$; **$p < 0.05$; *$p < 0.1$. Variables are defined in Appendix 1.

measures. The results and inferences from the additional tests are qualitatively similar to our main results.

6. Conclusion

This study investigates the impact of reporting on various worldviews of corporate sustainability on corporate sustainability performance. This study assesses the narrative of sustainability reports using a computerised textual analysis that positions each company's sustainability reporting with stages of corporate sustainability following Landrum and Ohsowski's (2018) development model and investigates whether reporting on the various worldviews of corporate sustainability can differently affect sustainability performance. Using a sample of UK firms that published sustainability reports during the period 2014–2018, findings show that companies that report on 'very strong' and 'strong' sustainability are more likely to positively affect sustainability performance. On the other hand, companies that follow the business case approach and standardised disclosures will have adverse effects on sustainability performance. Our results hold for a set of sensitivity checks including testing for industry effect and endogeneity issues. The findings of this study have important implications for companies who need to change their approach towards sustainability and sustainability reporting and shift from standardised disclosures and the business-centred approach to advance to the next stage of sustainability reporting which should guide corporate decisions and actions. Companies that engage in more mature stages of corporate sustainability and communicate the message that they understand sustainability to mean prevention of environmental damage and coexisting with all earth beings in a mutually beneficial relationship are more likely to improve sustainability performance. When companies embrace and truly engage in ecological sustainability, there will be recognisable improvements in sustainability performance.

This study has few limitations which offer opportunities for future research. First, the study focuses on firms that publish sustainability reports in the UK context. Further research could examine different contexts where the governance of sustainability reporting is different. Second, future research can shed light on a specific industry sector and examine how certain policies might influence firms' reporting along the five stages of sustainability. Third, firms may publish sustainability information that is not in the CSR report, e.g., websites/media which can be more specific/up to date. Future research can investigate whether/how the content of other reporting channels affects sustainability performance. Fourth, future research can focus on integrated reports (IR) and examines how IR can be assessed and how sustainability worldviews could impact differently on the content of IR. Finally, further theoretical improvement can be made to help understand how reporting on sustainability and the various worldviews can affect sustainability performance.

Credit author statement

Habiba Al-Shaer: Conceptualization- Methodology- Software Formal analysis- Writing – original draft- Writing – review & editing.; Khaled Hussainey: Writing – original draft- Writing – review & editing

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Appendix 1

Variable	Definition
ENV_ *performance*	Denotes business actions in terms of environmental responsibilities. The environmental scores received from Thomson Reuters Asset 4 database.
SOC_ *performance*	Denotes business actions in terms of social responsibilities and reflects a firm's commitment to the community. The social scores received from Thomson Reuters Asset 4 database.
SUS_ *performance*	Denotes business actions in terms of social and environmental responsibilities. Total social and environmental scores received from Thomson Reuters Asset 4 database.
Coevolutionary	The word frequencies from the Very Strong sustainability wordlist based on Landrum (2018) and Landrum and Ohsowski (2018).
Regenerative	The word frequencies from the Strong sustainability wordlist based on Landrum (2018) and Landrum and Ohsowski (2018).
Systemic	The word frequencies from the Intermediate sustainability wordlist based on Landrum (2018) and Landrum and Ohsowski (2018).
Business-Centred	The word frequencies from the Weak sustainability wordlist based on Landrum (2018) and Landrum and Ohsowski (2018).
Compliance	The word frequencies from the Very Weak sustainability wordlist based on Landrum (2018) and Landrum and Ohsowski (2018).
CPI	Consumer-proximity industries
ESI	Environmentally sensitive industries
IOI	Investor-oriented industries
EOI	Employee-oriented industries
SRA_ *quality*	Represents sustainability report assurance quality (the voluntary adoption of SRA and the choice of assurer). We assign a score of 0 in the case of no assurance of sustainability reports, 1 if sustainability reports are externally assured by a non-accounting firm, 2 if the report is externally assured by a non-Big Four accounting firm, and 3 if the external assurer is a Big-Four firm
BODIND	Proportion of independent directors on the board
BODDIV	the percentage of female directors on the board
BODSIZE	Number of directors on the board
Length	Length of the document
Leverage	ratio of debt to total assets
Size	The natural log of total assets
ROA	Return on asset ratio
CROSSLIST	Total number of countries in which the from securities are cross listed

Appendix 2. Keywords of Stages of Corporate Sustainability

Compliance	Business-Centred	Systemic	Regenerative	Coevolutionary
Very weak Sustainability	Weak Sustainability	Intermediate Sustainability	Strong Sustainability	Very Strong Sustainability
compliance	biotechnology	collaborate	carrying capacity	circular
compliant	biotechnologies	collaborates	consumption	circular material
legal	business as usual	collaborated	degrowth	coevolve
legalized	business model	collaborating	holistic	coevolving
legally	competitive advantage	collaborative	interdependent	coevolution
legality	competitiveness	collaboratively	interdependence	ecocentric
regulate	cost	cooperate	interdependencies	ecocentrics
regulated	costs	cooperated	natural system	ecocentrism
regulates	costly	cooperating	natural systems	ecoethic
regulation	costing	cooperation	planetary boundary	ecoethics
regulatory	costed	cooperative	planetary boundaries	ecological
risk	cost-benefit	cooperatives	preservation	ecology
risks	cost-benefits	ecoefficiency	redistribution	ecosystem
enforce	customer	ecoefficiencies	repair	ecosystems
enforced	customers	game changer	repairs	flourish
	demand	game changing	repairing	flourished
	demands	global citizen	repaired	flourishes
	demanding	global citizens	restore	flourishing
	efficiency	global citizenship	restored	no growth
	efficiencies	humanity	restores	regenerate
	expense	industry	restoring	regenerated
	expenses	integrate	restoration	regenerating
	growth	integrates	restorative	regeneration
	market	integrating	science	regenerative
	markets	integration	sciences	resilience
	marketing	integrative	scientific	resilient
	market share	partnership	steady state	steady state
	market shares	partnerships	steady states	limited state
	market value	system	zero growth	eco-ethics
	market values	systems	conserve	energy flows
	money	systemic	conservation	transformation
	profit	transform		innovation
	profits	transforms		dynamic
	profited	transformed		

(*continued*)

Compliance	Business-Centred	Systemic	Regenerative	Coevolutionary
	profiting	transforming		
	profitable	transformation		
	profitability	transformations		
	retention	transformative		
	return on investment	managerial		
	ROI	managerialist position		
	sales	business solutions		
	strategy			
	strategies			
	strategic			
	strategical			
	strategically			
	technology			
	technologies			
	value chain			
	value chains			
	self-benefit			
	image			
	reputation			
	public relations			
	employee retention			
	employee recruitment			

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