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Exploring factors relating to extinction disclosures:
what motivates companies to report on biodiversity and species protection?

Abstract

This paper seeks to contribute to the existing business strategy and the environment literature by investigating the disclosure practices of Biodiversity/Extinction (B/E) and threatened species. We use greenwashing theory to understand global companies' motivation to report on B/E information. Data is collected from 200 Fortune Global companies for 3 years. We develop our comprehensive 53 disclosure index and create and test OLS Regression model to measure the relationships between B/E disclosures and its determinants factors including; environmental performance, industry sector, country, assurance, environmental awards, presence of biodiversity partners and the number of species' related disclosure. Our results reveal that there are positive significant relationships between B/E disclosure and: assurance provided by the Big 4; gaining an environmental award; companies from high biodiversity risk sectors; developing countries; presence of biodiversity partners, and; how many specific biodiversity words are published in companies' reports. On the other hand, there are positive insignificant relationships between B/E disclosure and: assurance; poor performers, and; the number of species disclosed in companies' reports. Our findings have important implications for regulators and policymakers. Our evidence appears to be robust when controlling for possible endogeneities.

Keywords: Content analysis, Biodiversity/Extinction disclosures, Greenwashing, Performance, Industry sector.

1. Introduction

Biodiversity can be described as the infrastructure that supports all life (Jones and Solomon, 2013). The immense pressure plastics are having on the oceans, along with the disappearance of rainforests, and land clearing for agricultural purposes, have all contributed to biodiversity loss and species extinction (Atkins and Maroun, 2018). All these issues have resulted in many years of human overexploitation of our planet and are recognised to be causing the sixth extinction period the planet is currently experiencing(Pievani, 2013; Kolbert, 2014; Russell et al., 2017; Atkins & Maroun, 2018). The World Economic Forum, 2015 considers biodiversity loss as one of the top ten global risks. Adler et al., (2018) reinforces

that promoting biodiversity is critical to business survival as companies have a two-way relationship with biodiversity, including both the impact of companies on biodiversity, and the impact of biodiversity on companies. Therefore, companies must recognise that nature and ecosystems are of fundamental value either directly or indirectly linked to corporate activity (Atkins & Atkins, 2018; Adler et al., 2018; Bebbington & Unerman, 2018). By paying attention to biodiversity and ecosystem health, companies can recognize the risks and opportunities, anticipate new markets, mitigate their impacts, improve stakeholder engagement, and demonstrate leadership (Bebbington & Unerman, 2018). To address this gap in the accounting literature, the objective of our paper is to investigate the disclosure practices on B/E and threatened species of the top 200 Fortune Global companies. We use greenwashing theory to understand global companies' motivation to report on B/E activities. We create and test a regression model of the relationships between B/E disclosures and its determinants factors including; environmental performance, industry sector, country, assurance, environmental awards, presence of biodiversity partnership and species related disclosure.

The study makes several contributions to the extant B/E literature. First, consistent with the study of (Bebbington and Larrinaga, 2014) biodiversity can be considered as a continuation of Corporate Social Responsibility (CSR), our paper contributes to the dearth work on this topic by borrowing some of CSR established factors to measure the relationship between B/E disclosure and its determinants factors. Second, based on the limited prior studies, we have developed our own comprehensive 53-item disclosure and classified into five different themes that have not been introduced before in prior literature and can be used in potential research separately or collectively. We included the source for each item for future use by researchers. Third, our paper is among the first to examine the relationship between B/E disclosure and its' determinants factors. The fourth contribution, we comprehend the pioneer study of Adler et al., (2018) by investigating 3 years instead of one year. The fifth contribution, we did not investigate the current companies' websites because it was not clear when they are updating their websites and we wanted to reflect on what companies actually disclose in the selected years.

2. Literature Review

Research into biodiversity disclosures is nascent (Rimmel & Jonall, 2013). To date, only a limited number of studies have exclusively analyzed the biodiversity reporting practices of companies. We classified these studies into two groups. The first group focused on developing a normative framework for corporate reporting (Atkins & Maroun, 2018; Maroun & Atkins, 2018; Atkins et al., 2018). The framework claims to be emancipatory and transformational by encouraging a corporation to develop a narrative account of its own understanding of species extinction and how it is acting to prevent extinctions. The framework rests on the hope that if corporations can be encouraged to provide accounts of their own impacts on species extinctions then this could lead to changes in organisational behaviour and ensure consistent, transparent reporting on how the company is managing the risk of extinction rather than for legitimising (Atkins and Atkins, 2018), and corporate prosperity (Tadros and Magnan, 2019).

The second group of studies focused on content analysis of biodiversity reporting. They covered listed corporations in Sweden (Rimmel & Jonall 2013), Denmark (van Liempd and Busch 2013), Britain and Germany (Atkins, et al., 2014) and New Zealand local authorities (Samkin et al., 2014) as well as corporations in the Fortune Global 500 (Adler, et al., 2018) and large mining companies (Adler et al. 2017; Boiral 2016). The main finding of both groups is that there is little corporate biodiversity reporting and what little disclosure exists, does not enable stakeholders to meaningfully assess a corporation's biodiversity impacts. Overall, findings suggest that corporate accountability is inconsistent and vague, merely used to legitimise the organisation (van Liempd and Busch, 2013).

The accounting for biodiversity literature is, in keeping with other areas of environmental reporting, considered to be rife with impression management and often apparently lacking in a genuine commitment to biodiversity and species preservation. Indeed, impression management in the area of social and environmental accounting has long been acknowledged and represents a cause for concern (Solomon et al., 2013). Impression management tends to be detected where organisations focus on reporting 'good news' at the expense of 'bad news', placing more weight on the good. Goffman's original framework for impression management, deriving from individual sociological theories, has been the source of a substantial literature on impression management in accounting. Boiral (2014) finds that companies are using four impression management tactics which he names "four non-mutually exclusive techniques of neutralization" (p.765). These factors include mentioning the net positive impact (NPI) on biodiversity to reflect its seriousness, refuting any impact made on biodiversity, and "self-proclaiming corporate excellence, and the claim that the negative impacts on biodiversity are non-existent or have been neutralized" (p. 759). Atkins et al. (2018) find that some corporations are disclosing contributions they have made to rhinoceros conservation projects and conclude that the reporting of these philanthropic gestures represents a shift in the way these corporations are thinking about extinction. These disclosures relating to rhinoceros conservation and protection appear to be far more concerned with a genuine approach to saving rhinoceros embedded in culture, heritage and a desire to preserve biodiversity than other philanthropic disclosures that may be interpreted as impression management (Atkins et al., 2018).

The present study contributes to the two groups of prior studies. It contributes to the first group by creating a comprehensive disclosure index that can be adopted by companies and to the second group by conducting a content analysis of the biodiversity and threatened species disclosures made by the top 200 Fortune Global companies.

3. Theoretical Framework and hypotheses development

3.1 Theoretical Framework

A major stream of accounting research on the theme of biodiversity can be considered as a continuation of corporate social responsibility (CSR) research into corporate disclosure practices (Bebbington & Larrinaga, 2014). Greenwashing as a new perspective of Legitimacy theory was one of the most commonly used to explain the proliferation of non-financial reporting over the last 20 years (Hassan & Guo, 2017). Greenwashing, "involves selective disclosure of positive B/E actions resulting in misleading and biased reporting" (Mahoney et al., 2013, p. 352). Prior studies explain greenwashing by noting that unscrupulous companies may misreport their CSR to capitalise on the face value of CSR reports (Lyon &

Maxwell, 2011; Zijl et al., 2017) to influence stakeholders' perceptions and gain legitimacy. In this vein, Shahab et al., (2018, p.1639) explain "CSR performance acts as a risk-mitigating tool by providing an insurance cover-age and changing the firms adverse scenario into a favourable one". Firms aim to legitimise company activity by implementing environmental strategies, comply with regulative pressures and regulations to help them maintain and gain organisational legitimacy (Haque and Ntim, 2018).

Greenwashing is a practice that is deceptively used to promote the perception that a company's policies or products are environmentally friendly, when arguably they are not (Lewis, 2016). Patten, (2015) for example, finds that a firm faced with a specific environmental crisis increases the extent of non-financial reporting to reassure stakeholders that the organisation is managing the negative event. This again continues a tradition of impression management-oriented literature in environmental accounting. Our study argues that companies provide disclosure to legitimize companies' concerns for B/E issues (Adler et al., 2018; Cho et al., 2015; Lyon and Maxwell, 2011). Whilst this represents a positive approach to accounting for biodiversity and furnishes a motivation for the disclosure it would fall short of genuine and ethical desires to disclose biodiversity information and to instigate biodiversity conservation strategies based on a desire to protect and enhance biodiversity alone. A theoretical framework of greenwashing is embedded naturally within the broader impression management literature, where reporting and other forms of corporate expression may be perceived as exaggerating positive information whilst subordinating negative information about the organisation.

3.2 Hypotheses Development

Consistent with what has been noted above that providing disclosure on B/E can be considered as an extension of CSR, we draw from the established extant CSR to identify appropriate factors to examine the relationship between B/E disclosure and its determinants. These factors include environmental performance, industry sector, country, assurance, environmental awards, presence of biodiversity partners and threatened species' related disclosure

B/E Disclosure and assurance

There is growing stream of literature that empirically examines assurance of a company's CSR report note that stakeholders placed more confidence in CSR reports where the level of assurance provided is reasonably high (Simnett et al., 2009; Kolk & Perego, 2010; Casey & Grenier, 2015; Peters & Romi, 2015; Hassan et al., 2019).[1] In this context, Farooq and De Villiers (2017) noted that the main objective of assurance is to improve sustainability reports' credibility. In addition to the above, prior literature argues that assurance provided by accounting firms is more expensive and of high quality comparing with other assurance providers (Simnett et al., 2009; Braam & Peeters, 2018). Greenwashing predicts that the

[1] These studies tend to use samples of CSR reports issued by US and non-US companies to study differences in stock market responses to CSR reporting with and without assurance and to identify company characteristics associated with assurance of the company's CSR reports. Studies focused on market responses generally find that the response to assured CSR reports is stronger than to those lacking professional assurance. These papers focused on factors associated with CSR report assurance and find that companies that purchase assurance are generally larger, have better CSR or social performance ratings, stronger environmental corporate governance, and are in countries that are more stakeholder-oriented. More specifically, based on a sample of US companies that issued CSR stand-alone reports in 2010, Cho et al. (2014) find that companies with assurance on their CSR reports are more likely to be included in the Dow Jones Sustainability Index and are perceived to be more "green", based on Newsweek's 2011 ranking of "the greenest companies in America"

companies that are more likely to be subject to public pressure and legitimacy threats due to poor sustainability performance may employ third parties to provide assurance to signal good performance (Maroun, 2018; Cho et al., 2014; Boiral, 2013). Thus, independent third-party assurance helps to deflect attention from bad sustainability performance, reduce legitimacy risks, confer greater confidence among stakeholders, and prevent interventions (Perego & Kolk, 2012; Gürtürk & Hahn, 2016). More specifically, these companies proactively employ third parties that provide selective assurance to signal that the B/E information released in sustainability reports is credible and reliable; enhance stakeholders' confidence and improve corporate reputation and perceived legitimacy (Cho et al., 2014; Odriozola & Baraibar-Diez, 2017). However, because they must comply with the reporting standards, these companies prefer the 'low-quality assurance options' with less scrutiny, and thus they have more room to decouple their revealed poor performance from their actual performance. These companies are less likely to employ assurance providers from the auditing profession and are more likely to choose limited assurance on specific sections of the firms' sustainability report (Braam & Peeters, 2018).

Hypothesis 1: There is a relationship between providing disclosure on B/E and buying assurance.

Hypothesis 2: There is no relationship between providing disclosure on B/E and getting assurance from the big 4 accounting firms.

B/E Disclosure *and Environmental Performance*

Previous researchers have empirically found a negative relationship between environmental performance and environmental disclosure (e.g. Mahoney, 2012; Mahoney et al., 2013). That is, companies with poor environmental performance disclose more environmental information to defend legitimacy (Giordano-Spring et al., 2015). These poor performers are likely to disclose extensive B/E information to preserve their corporate image as legitimate companies, avoid the negative consequences caused by legitimacy crises, and address the public concerns (Hassan & Guo, 2017). Greenwashing also suggests that companies with poor social performance records acquire a greater benefit from influencing stakeholders' perceptions of the companies' social performance (Clarkson et al., 2008). We would expect that poor performers provide a high level of disclosure on B/E.

Hypothesis 3: Poor performers are likely to provide disclosure on B/E level of disclosure

B/E Disclosure and getting environmental awards

One way of portraying good CSR practices is by attaining awards for excellent or good practices of CSR (Hafiz et al., 2015). If a firm attains an award for good CSR practices, then the legitimacy gap between the firm and the society would be very small, and therefore, the firm is more willing to be more transparent. Empirical studies examining the impact of award on CSR practices (Boesso & Kumar, 2007; Hassan & Ibrahim, 2012) provided significant results and motivations to disclose CSR information. For instance, (Haniffa & Cooke, 2005; Boesso & Kumar, 2007) find that there is an association between the extent of voluntary disclosure practices and gaining an award. The results of Hassan and Ibrahim, (2012) study reveal that the influencing factors for receipt of an environmental award are the presence of an environmental management system

(EMS); stakeholder engagement. Hafiz et al., 2015 also find that the environmental award has a significant positive relationship with both the extent and quality of CSR disclosure practices of the Malaysian PLCs. Based on the above discussion, according to greenwashing perspective, we would expect poor performers to try to get awards to hide the bad information regarding biodiversity.

Hypothesis 4: There is a relationship between B/E level of disclosure and getting an award

B/E Disclosure and Industry sector

Prior studies found that companies from high-risk industries tend to disclose more environmental information than companies from low-risk industries (Djajadikerta & Trireksani, 2012; Semenova & Hassel, 2016). The underlying assumption is that companies that have higher pollution propensity are required to comply with more rigorous legal requirements. These companies are perceived as being environmentally damaging and thus face greater pressure from stakeholders. As such, they have stronger incentives to disclose more environmental information (e.g., Clarkson et al., 2008; Hassan & Ibrahim, 2012; Hassan, 2015). Legitimacy theorists (e.g., Giordano-Spring et al., 2015) argue that companies facing social and political pressures may use disclosure in an attempt to reduce these exposures. Therefore, we would expect that companies from high biodiversity risk to disclose more information on B/E.

Hypothesis 5: Companies from high biodiversity risk sectors are likely to provide disclosure on B/E comparing with low companies counterparts**.**

B/E Disclosure and Country

There is a stream of research that has been done on CSR in both developed and developing countries. Prior studies found a strong relationship between the industry sector and CSR disclosure in developed countries (Tagesson et al., 2009; Bouten et al., 2011) and in developing countries (Huang & Kung, 2010; Goncalves et al., 2014). Company size also has a significant positive relationship with CSR disclosure in developed countries (Bouten et al., 2011) and in developing countries (Tagesson et al., 2009; Chiu & Wang, 2014). When investigating financial performance, some studies found a significant positive relationship in developed countries (Patten, 1992; Tagesson et al., 2009), while others found an insignificant relationship (Patten, 1991; Chih et al., 2010).

It can be concluded from the above discussion that previous studies in both developing and developed countries selected the country to be the location of their study, but we are not aware of any study that examined the country as one of the determinant factors for B/E disclosure. As a result, our study extends on the above by investigating whether the country (developed vs. developing) can be considered as one of the determinant factors for providing disclosure on B/E activities. Consistent with greenwashing perspective, we would expect that companies from developing countries to provide more disclosure on B/E to preserve their corporate image as legitimate companies to acquire benefits from influencing stakeholders' perceptions of the companies.

Hypothesis H6: Companies from developing countries are likely to provide disclosure on B/E compared with their developed countries counterparts.

4. Research Methodology

4.1 Sample selection

The sample for this study consists of the top 200 companies listed on the Fortune Global 500 for a number of reasons (Hassan, 2015). They are known for reporting on CSR activities. These companies gain more attention from the general public, media, NGOs and the capital markets. The majority of these companies have global operations in a number of countries. We have investigated 200 companies following the study of Adler et al., (2018) with justification that biodiversity reporting is rarely undertaken by the remaining Fortune Global 500 companies. We investigated 3 years, 2012, 2014 and 2016 as we wanted to examine whether the level of disclosure on B/E increased or not and one of our research variables environmental performance as measured by environmental wellbeing score is calculated every two years. We downloaded a total of 600 annual reports and sustainability reports. In contrast with Adler et al., (2018) we did not use any information from the companies' websites as it was not clear when they updated their websites and we wanted to reflect what companies actually disclose in the selected years to indicate whether the level of disclosure increased or not. To ensure the collection of all B/E related information, 28 keywords were searched and counted for evidence of all disclosure[2]. The search of these keywords ensured all relevant information to B/E was captured along with a manual collection. Our sample classified into 19 sectors[3] and covered 22 countries[4].

4.2 Research variables

B/E disclosure index

We developed our own 53-item B/E index. It is a comprehensive biodiversity index that includes a wide range of B/E indicators, which are adapted from previous studies, the GRI, United Nations Development Programs and Biodiversity and Ecosystems Global Framework. The disclosure index is classified into five themes (see appendix 1 for more details on disclosure index items along with the source of each item). The first theme is covering "Company report on current/previous actions (CPA)" and it includes 26 items. The second theme is "Prevent activities happening in the future (PAF)" and covers 8 items. The third theme is "Report on activities contributing to extinction/biodiversity loss (ELOSS)" and entails 13 items. The fourth theme is "Reporting on adopting or following guidelines (FG)" and contains 4 items. The fifth theme is "Report on company fines (FIN) and comprises 2 items.

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[2] The fundamental words are "Extinct," "Extinction," "EN11," "EN12," 'EN13," "EN14," "Wildlife," "Habitat," "Species," "Biodiversity," "Biodiversity offset," "Forest," "Ecosystem," "Flora," "Fauna," "Endangered," "Threatened," "Vulnerable," "Accident" (relating to B/E), "Conservation," "Biological diversity," "Protected," "Floral/Faunal wealth," "Rehabilitation," "Groundwater," "Marine," "Vegetation," "Wetlands".

[3] The 19 sectors are Aerospace (21), apparel (3), Chemicals (6), energy (99), Construction (18), Financial (144), food & beverage and tobacco (15), Food & drug (33), health care (30), House Hold products (6), industrial (18), materials (12), Media (3), Motor Vehicles and parts (48), Retails (21), Technology (42), Telecommunication (33), transportation (15) and Wholesalers (33).

[4] Countries are: including Australia (9), Brazil (12), China (120), France (45), Germany (48), India (3), Italy (12), Japan (57), Luxembourg (3), Malaysia (3), Mexico (6), Netherlands (12), Norway (3), Russia (12), Singapore (3), South Korea (15), Spain (6), Switzerland (15), Taiwan (3), Thailand (3), UK (24), USA (186).

This research adopted the weighted scoring method for disclosure indices and assigns a weight to each item to consider the variation in the importance of each type of information (Adler et al., 2018; Hassan et al., 2019). This research provides depth to the findings by use of weighted indexes which deliver a detailed provision of qualitative and quantitative ranges of data. To weight the disclosure index, the researchers followed the prior study of Adler et al., (2018) (see more details in appendix 1). The authors were independently involved in coding the data. The coders then had a meeting to discuss and reconcile any differences. Feedback provided by the coders led to a revision of the disclosure index (Hassan et al., 2019). Data was collected between October 2018 and January 2019.

Industry membership

We followed Adler et al., (2018) and measured the industry membership by the traffic light (red, amber and green) [5] classifications of sectors due to exposure to biodiversity risk recommended by F&C Asset Report, (2004). For the purpose of the analysis, we grouped the amber and red together and we called them "high-risk zone" and there are 219 companies are classified under this category. The other group is "low-risk zone" and there are 381 companies are classified under this category covers the sectors that classified as green (see Table 1 for research variables).

Environmental Performance

We measured environmental performance by environmental well-being scores and data for this variable is taken from the Sustainable Society Foundation's website as suggested by Adler et al., (2018). These scores available per country every two years. We classified this variable into poor performers (sore 0 - 2.9), better performers (score 3-5) and We got 310 companies classified as better performers and 290 classified as poor performers (See Table 1 for more details).

Country

For the purpose of this paper, we classified countries into developing and developed according to UN classification. We get 422 developed and 178 developing countries. For more details about the rest of the research variables, please see Table 1.

Insert table (1) around here

Control Variables

Many researchers (Simnett et al., 2009; Sierra et al., 2013; Liao, et al., 2016) have included financial variables, as control variables in explanatory models in environmental accounting research. In this paper, we consider four financial variables: (1) company size (measured as the logarithm of

[5] **High risk sectors (red zone) are**: Construction & Building Materials, Electricity, Food & Drug Retailers, Food Producers & Processors, Forestry & Paper, Leisure & Hotels, Mining, Oil & Gas and Utilities. **Medium risk sectors (amber zone) are**: Beverages, Chemicals, Financial Services, General Retailers, Household Goods & Textiles, Personal Care & Household Products, Pharmaceuticals & Biotech, Support Services, Tobacco and Transport. **Low risk sectors (green zone) are**: Aerospace & Defence; Automobiles & Parts, Diversified Industrials, Electronic & Electrical Equipment, Engineering & Machinery, Health, Information Technology Hardware, Media & Entertainment, Software & Computer Services, Steel & Other Metals, Telecom Services

total assets); (2) return on assets (ROA and hereafter; measured as the operating income divided by total assets); and (3) leverage (measured as the ratio of total debt divided by total assets).

5. Data analysis and model specification

Data analysis proceeds in six steps. First, descriptive statistics of all study variables are calculated, including mean, median, standard deviation, min, max, and frequencies. Second, the B/E disclosure score index classified by themes and the year is offered. Third, Spearman correlation coefficients are calculated between study variables. Fourth, hypothesis testing is conducted via ordinary least squares (OLS) regression to estimate the influence of explanatory variables on providing disclosure on the B/E disclosure. Generally, OLS regression is well suited for describing and testing our hypotheses and in line with previous studies (Elmagrhi et al., 2019). The regression model is specified as:

$$TOTAL\ Dis = \beta_0 + \beta_1 Ass + \beta_2 Big4 + \beta_3 EW + \beta_4 performance + \beta_5 sector + \beta_6 country + \beta_7\ NOS + \beta_8 HSW + \beta_9 POP + \beta_{10} NOP + \beta_{11} Size + \beta_{12} ROA + \beta_{13}\ LEV + \varepsilon \quad ---------(1)$$

Where *TOTAL* Dis is total B/E disclosure score; *Ass* refers to Assurance; Big4 refers to assured by 4 big accounting firms; EW refers to getting environmental awards; performance refers to performance (poor vs better); sector refers to high-risk vs low-risk zones; country refers to country (developed vs. developing); NOS refers to number of species, HSW refers to how many specific words related to biodiversity disclosed; POP refers to the presence of biodiversity partners; NOP refers to the number of pages allocated for B/E disclosure; control variables of Size refers to the size of the company; and ROA refers to return on assets and LEV refers to Leverage. The statistical programmes of SPSS and Gretl are used in analysing our data.

5.1 Descriptive Analysis

Table 2 presents the summary of descriptive statistics for all dependent, independent and control variables. It also presents the statistics of the five themes of B/E disclosure. Evaluation of the summary's descriptive statistics indicates rather interesting findings. Results positively find an overall increase in the disclosure of biodiversity and extinction accounting. Despite these encouraging and promising results, overall several companies omitted to report on some items which is consistent with analysis of Adler et al., (2018). The total score of B/E ranges from a minimum of 0 to a maximum of 83. Table 2 also shows the scores for the five themes. All themes had a minimum of 0 but having a maximum of (57 in CPA), (14 in PAF), (27 in ELOSS), (4 in FG), and (3 in FIN). Table 2 also presents the minimum and maximum of other research variables.

Insert Table 2 around here

5.2 Analysis of B/E disclosure index

We presented the B/E disclosure score classified by theme and year (See Table 3). Results positively find an overall increase in the disclosure of biodiversity and extinction accounting. The total disclosure score is 61, 83, 78 to in 2012, 2014 and 2016 respectively, with 28% change. This suggests that overall, companies are realising the importance of biodiversity and extinction issues. Nevertheless, although overall scoring increased in the study, scoring is extremely low considering the maximum a company could score is (53 items @3) = 159. Our results support findings from Adler et al., (2018) that there is a huge call for awareness and accountability in biodiversity and extinction. In addition, similar increasing patterns in disclosure score is evident in four themes. We calculated the % of the change in the level of disclosure and we find that collectively disclosure in CPA (16%), PAF (55%), ELOSS (50%) and FIG (100%). The overall increase in years optimistically displays a deep ecological view with companies being self-aware of the fundamental value of the planet. However, the total disclosure in FIN decreased by (67%).

Insert table 3 here

5.3 Correlation Matrix

Table 4 contains the correlation matrix for all variables included in our study, to identify the presence of any multicollinearity problems. Overall, the levels of correlation among all variables are somewhat low, implying that there are no serious multicollinearity problems. Moreover, we calculated VIF and the results suggested that correlation among variables are so low (VIF =0.5). Our results are consistent with the prior study of (Gujarati, 2003) who pointed out that multicollinearity appeared to be problematic if the VIF for any variable of the research was more than 10, or the tolerance of any variable was less than 0.1. In addition, Hair et al. (2013) show that high correlations (generally 0.90 and above) indicate the presence of severe multicollinearity problems.

5.4 Multivariate Results and discussion

Table 5 presents the regression results for the relation between total B/E disclosure and all research variables. Our results show that there is a positive relationship between assurance and total B/E disclosure, however, this relation is not statistically significant ($p = 0.441$). This result offers support for H1. This result is in line with prior studies stream of literature that empirically examines assurance of a company's CSR report, note that stakeholders placed more confidence in CSR reports where the level of assurance provided is reasonably high (Simnett et al., 2009; Hodge et al., 2009; Kolk and Perego, 2010; Pflugrath et al., 2011; Moroney et al., 2012; Casey and Grenier, 2015; Peters & Romi, 2015). Our results also show that there is a significant positive relation between assurance provided by big 4 accounting firms and total B/E disclosure ($p = 0.000$). This result does not offer support for H2 and it is against the greenwashing perspective explanation that is companies with poor performance employ third party and adopt selective assurance to signal that B/E is credible and reliable (Hahn & Lülfs, 2014; Odriozola & Baraibar-Diez, 2017). This result is in contrast with the prior study of (Braam & Peeters, 2018) who found that poor performers companies prefer the 'low- quality assurance options' with less scrutiny, so they have more room to decouple their revealed poor performance from their actual, true performance. However,

this result is in line with other numerous CSR prior studies which find a positive relation between assurance provided by the big 4 and disclosure (Cheng et al., 2015; Simnett et al., 2009) to ensure that stakeholders are aware of the appropriateness of the companies' actions taken on sustainability issues (Clarkson et al., 2008). Model 1 of Table 5 also shows that there is a positive insignificant relation between total B/E disclosure and environmental performance (p = 0.069). We did run the model with the original environmental performance variable before classifying it to "better and poor" and provided similar results. This result offers support for H3 and in line with numerous greenwashing prior studies that companies with poor environmental performance disclose more environmental information to defend legitimacy (Cho et al., 2014; Mahoney, 2012; Mahoney et al., 2013). The results also show that there is a positive significant relation between total B/E disclosure and environmental award (p = 0.000). This result offers support for H4 and in line with previous studies that find a positive relation between disclosure and getting awards (Boesso & Kumar, 2007; Lyon & Maxwell, 2011; Clarkson et al., 2011; Hassan &Ibrahim, 2012). Model 1 of Table 5 also shows that there is a positive significant relation between total B/E disclosure and the industry sector (p = 0.000). This supports H5. That is, companies from red/amber zone provide more biodiversity and threatened species disclosures than green-zone companies is consistent with the F&C Report (2004) and Adler et al., (2018) and is supported by greenwashing theory's expectations that high profile companies (which for the current study are red-zone sector companies) will have the greatest need to report and, by necessity, will be the most likely to report. In fact, Suchman (1995) would argue that these high profile, red-zone firms are in high need of employing a legitimacy-repairing or defensive impression management strategy. This strategy, argues Suchman (1995), requires substantial effort and disclosure making on the part of the reporting entity. The results are also in line with the previous research stream that companies which have a higher pollution propensity have stronger incentives to disclose more environmental information (e.g., Clarkson et al., 2008; Hassan & Ibrahim, 2012; Hassan, 2015; Patten, 2015). Model 1 of Table 5 shows that there is a positive significant relation between total B/E disclosure and the country (p = 0.000). This result supports H6 and this result is consistent with our expectation following greenwashing perspective that companies from developing countries are likely to provide more disclosure on B/E to preserve their corporate image as legitimate companies to acquire benefits from influencing stakeholders' perceptions of the companies. The results also in line with a stream of studies focused on CSR disclosure that found a significant relationship between disclosure and industry sector (Tagesson et al., 2009; Chiu and Wang, 2014). Model 1 of Table 5 displays the regression results for the relation between B/E and species. Our results show that there is a positive relation between the Number of species (NOS) provided and total B/E disclosure, however, this relation is not statistically significant (p = 0.539). The results also show that there is a significant positive relation between how many specific words related to biodiversity/species mentioned in the reports and total B/E disclosure (p = 0.000). This result is in line with the prior study of Adler et al., (2018). Model 1 of Table 5 shows that there is a positive significant relation between total B/E disclosure and the number of pages allocated to B/E in the annual reports (p = 0.004). Our results also show that there is a positive significant relation between total B/E disclosure and the presence of biodiversity partners (p = 0.000). This result is consistent with the prior studies that (Boiral & Heras-Saizarbitoria, 2017; Adler et al., 2018) companies with at least one biodiversity partner made more disclosures than firms without biodiversity partners. These researchers find that the observed increase in biodiversity and threatened species reporting is also consistent with legitimacy theory, whereby stakeholder partnering serves to expand the number of events a company can report on and simultaneously triggers accountability requirements. In terms of control variables,

the only significant negative results are between Biodiversity/ extinction disclosure and Leverage. The company size is not significant. Our results are in contrast with the prior studies (Gallo & Christensen, 2011; Adler et al., 2018).

5.5 Additional Analyses

In this section, we carry out several additional tests to check the robustness of the main results from the previous section. First, we run Hausman as an extra test to tell us whether we will use random-effects vs fixed-effect regression analysis (Alnabsha et al., 2018; Elmagrahi et al., 2019) to investigate whether Global 200 companies features influence B/E disclosure. Hausman test statistic results suggested that the random-effects model is recommended. We present the results of the Random Effect (RE) in the second column of Table 5. Omitted variables are a probable source of endogeneity in our study context. Global companies with certain features could choose to disclose more information about B/E activities. Reverse causality is another potential source of endogeneity. In that occasion, the OLS regression in Model 1 of Table 5 would be biased. To deal with endogeneity, we use a random-effects regression as follows:

$$TOTAL\ Dis = \beta_0 + \beta_1 Ass + \beta_2 Big4 + \beta_3 EW + \beta_4 performance + \beta_5 sector + \beta_6 country + \beta_7\ NOS + \beta_8 HSW + \beta_9 POP + \beta_{10} NOP + \beta_{11} Size + \beta_{12} ROA + \beta_{13}\ LEV + + \delta_{it} + \varepsilon_{it}\ \varepsilon \quad -------(2)$$

Where everything else remains unaffected as stated in equation (2) and Table 5. is the Global companies' specific effects, and ε is the error term. The results are reported in Model 2 of Table 5. These results are highly similar to those represented in Model 1 of Table 5, suggesting that our results seem to be robust to the potential endogeneities that may be affected by omitted variable bias or/and reverse causality. Second, to ascertain the assumption underlying our OLS regression model that all the unobserved heterogeneities may affect the correlation between the research variables and the error term is invariable over time, we calculate a lagged estimator as proposed by Alnabsha et al., (2018). The findings are reported in Model 3 of Table 5. Again, we find the results are also largely similar to those reported in Model 1 of Table 5, and thereby implying that our results are not strongly affected by potential endogeneity problems that may be caused by simultaneity. Thirdly, we run the OLS with Robust (HAC) standard errors as a type of sensitivity analysis and the results are presented in Model 4 and the results also are similar to Model 1. In addition to the above, we have created three interaction variables to examine the influence of these interaction variables on biodiversity/ extinction disclosure. The three interaction variables are (1) country and performance (CoutPer); 2) Country and sector (CoutSect); and 3) Performance and sector (PerSect). The results of Model 5 in Table 5 shows that the only significant interaction variables is PerSect ($p = 0.003$). That is poor performers from high-risk zones are likely to provide disclosure on B/E disclosure. Overall, the findings of these additional analyses make us fairly confident that our results do not appear to be driven by any potential endogenous sample selection problems. In addition, we followed Cahan et al., 2016 and run a change analysis as an additional analysis to provide evidence of a casual relationship and in general, our results are in line with our results in the original model and go in the same directions.

6. Conclusion

The objective of this study is to investigate the disclosure practices of biodiversity/extinction (B/E) and threatened species of the top 200 Fortune Global companies. We use greenwashing theory, and effectively, by implication, impression management theory, to understand global companies' motivation to report on B/E information. We developed our own 53 item disclosure index. We create and test a model of the relationships between B/E disclosures and its determinants, including; performance, industry sector, country, assurance, environmental awards and, species related disclosure. Our results show that disclosure by the top 200 Fortune Global companies is quite limited, with very few companies providing any substantial reporting. Although the overall score increased in the study, scoring is extremely low, with the highest score of 83 out of 159. Even among the highest reporters, there was a lack of consistent reporting across the entire set of index themes. Our results are in line with Cho et al., (2015) that within the currently prevailing social and institutional context the prospects of CSR reports developing into substantial disclosures are severely limited by organized hypocrisy and organizations can use greenwashing theory as a strategic tool to communicate with stakeholders. Our results support findings from (Boiral, 2014; Adler et al., 2018) that there is a huge call for awareness and accountability in biodiversity and extinction. When measuring the relationship between B/E disclosure and its determinants factors, the results revealed that there are positive significant relationships between B/E disclosure and assurance provided by big 4, getting an award, companies from red/amber sector, developing countries, presence of biodiversity partners and how many specific biodiversity words published in companies' reports. These findings are important as they provide some significant evidence on the rationale and motivation underlying biodiversity disclosures. In other words, whereas some may perhaps like to believe that such disclosures are driven by a moral and ethical proclivity towards protecting species and biodiversity and by a desire to preserve our ecological environment, these findings suggest motivations stem from a purely self-interested source. Organisations appear to be disclosing if there is some benefit to them in terms of an award because they are being assured. Such self-seeking approaches to accounting for biodiversity are somewhat disappointing given the current climate change and extinction crisis the world now faces. Further, our results show that there are positive insignificant relationships between B/E disclosure and assurance; poor performers and the number of species disclosed in companies' reports. Our results, in general, are consistent with the literature (e.g., Boiral, 2014) and support the idea that for most companies their reporting is an exercise of indulging in impression management (Boiral & Heras-Saizarbitoria, 2017). In summary, impression management seems to continue to dominate environmental reporting and unfortunately, given the extinction crisis (the world's current 6th mass extinction) reveal that companies seem to be interested in biodiversity protection only when it provides certain advantages to themselves in terms of reputation and enhancing the impression they give to stakeholders and shareholders.

Our study has a number of limitations. The sample represents only a small proportion of a larger population to which it could reasonably apply. Future research might target a bigger sample. We investigated 3 years only and this might affect the analysis, a longer period might affect the results. We focused on a number of determinant factors, future studies can look at other factors that might affect B/E disclosure. We investigated Global 200 companies with different sectors and different countries. Future studies might focus on a single industry/country analysis. Our results have some implications for academics, policymakers and regulators.

References

Adhikariparajuli, M., Hassan, A., Fletcher, M., & Elamer, A.A. (2019). Integrated Reporting in UK Higher Education Institutions. Sustainability Accounting. Management and Policy Journal, Forthcoming

Adler, R., Mansi, M. & Pandey, R. (2018). Biodiversity and threatened species reporting by the top Fortune Global companies. Accounting, Auditing & Accountability Journal, 31(3), 787-825. https://doi.org/10.1108/AAAJ-03-2016-2490

Adler, R., Mansi, M., Pandey, R. & Stringer, C. (2017) United Nations Decade on Biodiversity. Accounting, Auditing & Accountability Journal, 30 (8), 1711-1745. https://doi.org/10.1108/AAAJ-04-2015-2028

Alnabsha, A., Abdou, H. A., Ntim, C. G., & Elamer, A. A. (2018). Corporate boards, ownership structures and corporate disclosures: Evidence from a developing country. Journal of Applied Accounting Research, 19 (1), 20-41. https://doi.org/10.1108/JAAR-01-2016-0001

Alshbili, I., Elamer, A. A., & Beddewela, E. (2019). Ownership types, corporate governance and corporate social responsibility disclosures: Empirical evidence from a developing country. Accounting Research Journal, Forthcoming. doi:10.1108/ARJ-03-2018-0060

Atkins, J., & Atkins, B. (2018). Around the World in 80 Species. Milton: Routledge.

Atkins, J., Maroun, W., Atkins, B., & Barone, E. (2018). From the Big Five to the Big Four? Exploring extinction accounting for the rhinoceros. Accounting, Auditing & Accountability Journal, 31(2), 674-702. https://doi.org/10.1108/AAAJ-12-2015-2320

Atkins, J., & Maroun, W. (2018). Integrated extinction accounting and accountability: Building an ark. Accounting, Auditing & Accountability Journal, 31(3), 750-786. https://doi.org/10.1108/AAAJ-06-2017-2957

Atkins, J., Gräbsch, C. & Jones, M. J. (2014). Biodiversity reporting: exploring its anthropocentric nature chapter, in Jones (Ed.), Accounting for Biodiversity, Routledge, London and New York, NY, pp. 213-215.

Bebbington, J., & Larrinaga, C. (2014). Accounting and sustainable development: An exploration. Accounting, Organizations and Society, 39 (6), 395-413. https://doi.org/10.1016/j.aos.2014.01.003.

Bebbington, J., & Unerman, J. (2018). Achieving the United Nations Sustainable Development Goals. Accounting, Auditing & Accountability Journal, 31(1), 2-24. , https://doi.org/10.1108/AAAJ-05-2017-2929

Boesso, G., & Kumar, K. (2007). Drivers of corporate voluntary disclosure: A framework and empirical evidence from Italy and the United States. Accounting, Auditing & Accountability Journal, 20, (2), 269-296, https://doi.org/10.1108/09513570710741028

Braam, P., & Peeters, R. (2018). Corporate Sustainability Performance and Assurance on Sustainability Reports: Diffusion of Accounting Practices in the Realm of Sustainable Development. Corporate Social Responsibility and Environmental Management, 25, 164-181. https://doi.org/10.1002/csr.1447

Boiral, O. (2014). Accounting for the unaccountable: Biodiversity Reporting and impression management, Journal of Business Ethics, 135 (4), 751-768, available at: http://doi.org/ 10.1007/s10551-014-2497-9.

Boiral, O., & Heras-Saizarbitoria, I. (2017). Managing Biodiversity Through Stakeholder Involvement: Why, Who, and for What Initiatives? Journal of Business Ethics, 140, 403-421. https://doi.org/10.1007/s10551-015-2668-3

Bouten, L., Everaert, P., Van Liedekerke, L., De Moor, L., & Christiaens, J. (2011). Corporate social responsibility reporting: A comprehensive picture? Accounting Forum, 35 (3), 187-204, https://doi.org/ 10.1016/j.accfor.2011.06.007

Cahan, S. F., De Villiers, C., Jeter, D. C., Naiker, V. & Van Staden, C. J. (2016). "Are CSR Disclosures Value Relevant? Cross-Country Evidence". European Accounting Review, 25(3), 579-611.

Casey, R. J., & Grenier, J. H. (2015). Understanding and contributing to the enigma of corporate social responsibility (CSR) assurance in the United States. Auditing: A Journal of Practice & Theory, 34 (1), 97-130.

Clarkson, P.M., Li, Y., Richardson, G.D. & Vasvari, F.P. (2008). Revisiting the relation between environmental performance and environmental disclosure: an empirical analysis, Accounting, Organizations and Society, 33 , 303-327.

Cheng, M. M., Green, W. J. & Ko, J. C. W. (2015). The impact of strategic relevance and assurance of sustainability indicators on investors' decisions. Auditing: A Journal of Practice & Theory, 34 (1), 131–162.

Chih HL, Chih HH & Chen TY. (2010). On the determinants of corporate social responsibility: International evidence on the financial industry. Journal of Business Ethics 93(1), 115–135.

Chiu T, Wang Y. (2014). Determinants of social disclosure quality in Taiwan: An application of stakeholder theory. Journal of Business Ethics 121(1), 1–20.

Cho, C. H., Patten, D. M. & Roberts, R. W. (2014). Environmental disclosures and impression management. In R. P. Hart (Ed.), Communication and language analysis in the corporate world. *(pp.217*-231) Hershey, Pa.: IGI-Global Publishers.

Cho, C. H., Laine, M., Roberts, R. W., & Rodrigue, M. (2015). Organized hypocrisy, organizational facades and sustainability reporting. Accounting, Organizations and Society, 40, 78-94. https://doi.org/10.1016/j.aos.2014.12.003

Djajadikerta, H. G., & Trireksani, T. (2012). Corporate social and environmental disclosure by Indonesian listed companies on their corporate web sites. Journal of Applied Accounting Research, 13 (1), 21-36. https://doi.org/10.1108/09675421211231899

Elmagrhi, M., Ntim, C. G., Elamer, A. A., & Zhang, Q. (2019). A study of environmental policies and regulations, governance structures and environmental performance: The role of female directors. Business Strategy and the Environment, 28 (2), 206–220. https://doi.org/10.1002/bse.2250

F&C Asset Report (2004) [Online] Available at: http://www.businessandbiodiversity.org/pdf/FC%20Biodiversity%20Report%20FINAL.pdf

Farooq, M.B. & De Villiers, C. (2017). The market for sustainability assurance services: A comprehensive review of the literature and future avenues for research. Pacific Accounting Review, 29, 79-106.

Gallo, P. J., & Christensen, L. J. (2011). Firm Size Matters: An Empirical Investigation of Organizational Size and Ownership on Sustainability-Related Behaviours. Business and Society, 50 (2), 315-349. https://doi.org/10.1177/0007650311398784

Giordano-Spring, S., Cho, C.H. & Patten, D.M. (2015). The normativity and legitimacy of CSR disclosure: evidence from France", Journal of Business Ethics, 130 (4), 789-803.

Goncalves R, Medeiros O, Weffort E& Niyama J. (2014). A social disclosure index for assessing social programs in Brazilian listed firms. Accounting in Latin America 14 (1), 75–103.

Gujarati, D.N. (2003). Basic Econometrics. 4th ed. USA: McGraw - Hill Inc

Hafiz, A.A., Majdi Abdul Rashid Hairul, R.M.A & Annuar, A. (2015).The effect of award on CSR disclosures in annual reports of Malaysian PLCs, Social Responsibility Journal, 11 (4), 831 – 852.

Hair, J.F., Black, W.C., Babin, B.J., & Anderson, R.E. (2013). Multivariate Data Analysis, 7th ed. Pearson Education Limited, Harlow, Essex, United Kingdom

Haniffa, R.M. & Cooke, T.E. (2005). The impact of culture and corporate governance on corporate social reporting, Journal of Accounting and Public Policy, 24 (5), 391-430.

Haniffa, R., & Cooke, T. (2005). The impact of culture and governance on corporate social reporting. Journal of Accounting and Public Policy, 24 (5), 391-430. https://doi.org/10.1016/j.jaccpubpol.2005.06.001

Haque, F. and Ntim, C.G. (2018). Environmental Policy, Sustainable Development, Governance Mechanisms and Environmental Performance. Business Strategy and the Environment, 27, 415–435. https://doi.org/10.1002/bse.2007

Hassan, A., Elamer, A., Sobhan, N. & Fletcher, M. (2019) Voluntary assurance of sustainability reporting: Evidence from an emerging economy. Accounting Research Journal, Forthcoming.

Hassan, A. (2015). Environmental performance and voluntary disclosure on specific environmental activities: An empirical study of carbon vs. non-carbon intensive industries-Legitimacy Proactive Approach. International Journal of Sustainable Economy, 7 (4), 243-260.

Hassan, A., & Guo, X. (2017). The relationships between reporting format, environmental disclosure and environmental performance: An empirical study. Journal of Applied Accounting Research, 18 (4), 425-444. https://doi.org/10.1108/JAAR-06-2015-0056

Hassan, A., & Ibrahim E. (2012). Corporate environmental information disclosure: Factors influencing companies' success in attaining environmental awards. Corporate Social Responsibility and Environmental Management, 19 (1), 32-46. https://doi.org/10.1002/csr.278

Huang, C., & Kung, F. (2010). Drivers of Environmental Disclosure and Stakeholder Expectation: Evidence from Taiwan. Journal of Business Ethics, 96 (3), 435-451.

Jones, M. & Solomon, J. (2013). Problematising accounting for biodiversity. Accounting, Auditing & Accountability Journal, 26, 668-687, https://doi.org/10.1108/AAAJ-03-2013-1255

Kolbert, E. (2014) The sixth extinction. London: Bloomsbury.

Kolk, A., & Perego, P. (2010). Determinants of the adoption of sustainability assurance statements: An international investigation. Business Strategy and the Environment, 19 (3), 182-198. https://doi.org/10.1002/bse.643

Lewis, J. K. (2016). Corporate social responsibility/sustainability reporting among the Fortune Global 250: Greenwashing or green supply chain? Entrepreneurship, Business and Economics,1 (5), 347-362.

Liao, L., Lin, T. P., & Zhang, Y. (2016). Corporate board and corporate social responsibility assurance: Evidence from China. Journal of Business Ethics, 150 (1), 211 -225. https://doi.org/10.1007/s10551-016-3176-9

Lyon, T. P., & Maxwell, J. W. (2011). Greenwash: Corporate environmental disclosure under threat of audit. Journal of Economics & Management Strategy, 20 (1), 3-41. https://doi.org/10.1111/j.1530-9134.2010.00282.x

Mahoney, L. S. (2012). Standalone CSR reports: A Canadian analysis. Issues in Social and Environmental Accounting, 6 (1), 4-25.

Mahoney, L. S., Thorne, L., Cecil, L., & LaGore, W. (2013). A research note on standalone corporate social responsibility reports: Signalling or greenwashing? Critical Perspectives on Accounting, 24 (4), 350-359. https://doi.org/10.1016/j.cpa.2012.09.008

Maroun, W. 2018. A Conceptual Model for Understanding Corporate Social Responsibility Assurance Practice. Journal of Business Ethics, 1-23. https://doi.org/10.1007/s1055

Maroun, W., & Atkins, J. (2018). The emancipatory potential of extinction accounting: Exploring current practice in integrated reports. Accounting Forum, 42 (1), 102-118. https://doi.org/10.1016/j.accfor.2017.12.001
Moroney, R., Windsor, C., & Aw, Y. T. (2012). Evidence of assurance enhancing the quality of voluntary environmental disclosures: an empirical analysis. Accounting & Finance, 52(3), 903-939.
https://doi.org/10.1111/j.1467-629X.2011.00413.x

Odriozola, M., & Baraibar-Diez, E. (2017). Is Corporate Reputation Associated with Quality of CSR Reporting? Evidence from Spain. Corporate Social Responsibility and Business Management, 24 (2), 121-132. https://doi.org/10.1002/csr.1399

O'Sullivan, N., & O'Dwyer, B. (2009). Stakeholder perspectives on a financial sector legitimation process: The case of NGOs and the Equator Principles. Accounting, Auditing & Accountability Journal, 22 (4), 553-587, https://doi.org/10.1108/09513570910955443

Patten, D.M. (2015). An insider's reflection on quantitative research in the social and environmental disclosure domain, Critical Perspective on Accounting, 32 (1), 45-50.

Patten, D.M. (1991). Exposure, legitimacy and social disclosure, Journal of Accounting and Public Policy, 10 (4), 297-308.

Patten, D.M. (1992). Intra-industry environmental disclosures in response to the Alaskan oil spill: a note on legitimacy theory, Accounting, Organizations and Society, 17 (5), 471-475.

Perego, P., & Kolk, A. (2012). Multinationals' accountability on sustainability: The evolution of third-party assurance of sustainability reports. Journal of Business Ethics, 110 (2), 173-190.

Peters, G., & Romi, A. (2015). The Association between Sustainability Governance Characteristics and the Assurance of Corporate Sustainability Reports. Auditing: A Journal of Practice & Theory, 34 (1), 163-198. https://doi.org/10.2308/ajpt-50849

Pievani, T. (2013) The sixth mass extinction: Anthropocene and the human impact on biodiversity. Rendiconti Lincei, 25 (1), 86-93. https://doi.org/10.1007/s12210-013-0258-9

Pflugrath, G., Roebuck, P., & Simnett, R. (2011). Impact of Assurance and Assurer's Professional Affiliation on Financial Analysts' Assessment of Credibility of Corporate Social Responsibility Information. Auditing: A Journal of Practice & Theory, 30, (3), 239-254.https://doi.org/10.2308/ajpt-10047

Reverte, C. (2009). Determinants of Corporate Social Responsibility Disclosure Ratings by Spanish Listed Firms. Journal of Business Ethics, 88 (2), 351-366. https://doi.org/10.1007/s10551-008-9968-9

Rimmel, G.,& Jonäll, K. (2013). Biodiversity reporting in Sweden: corporate disclosure and preparers' views. Accounting, Auditing & Accountability Journal, 26 (5), 746-778. https://doi.org/10.1108/AAAJ-02-2013-1228

Russell, S., Milne, M., & Dey, C. (2017) Accounts of nature and the nature of accounts: Critical reflections on environmental accounting and propositions for ecologically informed accounting. Accounting, Auditing and Accountability Journal, 30 (7), 1426-458. https://doi.org/10.1108/AAAJ-07-2017-3010

Samkin, G., Schneider, A., & Tappin, D. (2014). Developing a reporting and evaluation framework for biodiversity. Accounting, Auditing and Accountability Journal, 27 (3), 527-562. https://doi.org/10.1108/AAAJ-10-2013-1496

Semenova, N., & Hassel, L. G. (2016). The moderating effects of environmental risk of the industry on the relationship between corporate environmental and financial performance. Journal of Applied Accounting Research, 17 (1), 97 114. https://doi.org/10.1108/JAAR-09-2013-0071

Shahab, Y. Ntim, C.G., Chengang, Y., Ullah, F., and Fosu, S. (2018). Environmental Policy, Environmental Performance and Financial Distress in China: Do Top Management Team Characteristics Matter? Business Strategy and the Environment, 27, 1635-1652. https://doi.org/10.1002/bse.2229

Shahab, Y., Ntim, C.G., Yugan, C., Ullah, F., Li, H., and Ye, Z. (2019). CEO Attributes, Sustainable Performance, Environmental Performance and Environmental Reporting: New Insights from Upper Echelons Perspective. Business Strategy and the Environment. https://doi.org/10.1002/bse.2345

Sierra, L., Zorio, A., & García-Benau, M. A. (2013). Sustainable development and assurance of corporate social responsibility reports published by Ibex-35 companies. Corporate Social Responsibility and Environmental Management, 20 (6), 359-370. https://doi.org/10.1002/csr.1303

Simnett, R., Vanstraelen, A., & Chua, W. F. (2009). Assurance on sustainability reports: An international comparison. The Accounting Review, 84 (3), 937-967.

Suchman, M. (1995). Managing Legitimacy: Strategic and Institutional Approaches. Academy of Management Review. Vol 20 (3). https://doi.org/10.5465/amr.1995.9508080331

Solomon, J. F, Solomon, A., Joseph, N.L., & Norton, S.D. (2013). Impression management, fabrication and myth creation in private social and environmental reporting: insights from Erving Goffman. Accounting, Organizations and Society, 38 (3), 195-213.

Tadros, H. and Magnan, M. (2019). How does environmental performance map into environmental disclosure? Sustainability Accounting, Management and Policy Journal, (10), 62-96. https://doi.org/10.1108/SAMPJ-05-2018-0125

Tagesson, T., Blank, V., Broberg, P., & Collin, S. (2009). What explains the extent and content of social and environmental disclosures on corporate websites: a study of social and environmental reporting in Swedish listed corporations. Corporate Social Responsibility and Environmental Management, 16 (6), 352-364. https://doi.org/10.1002/csr.194

Van Liempd, D., & Busch, J. (2013). Biodiversity reporting in Denmark. Accounting, Auditing and Accountability Journal, 26 (5), 833-872. https://doi.org/10.1108/AAAJ:02-2013-1232

Zijl,V. W., Wostmann, C., & Maroun, W. (2017). Strategy disclosures by listed financial services companies : signalling theory, legitimacy theory and South African integrated reporting practices, 48 (3), 73-85.

Table 1: Summary of variables and measurement

Variables	Acronym	Definitions and coding.

Dependent Variable: Total Biodiversity/Extinction Disclosure Score	TOTAL Dis	Total Biodiversity/ Extinction Disclosure Score. containing 53 items based on 5 main themes (see appendix 1 for more details), including: (1) Company report on current/pervious actions (CPA) including 26 items; (2) Prevent activities happening in the future (PAF) containing 8 items; (3) Report on activities contributing to extinction/biodiversity loss (ELOSS) covering 13 items; (4) Reporting on adopting or following guidelines (FG) entailing 4 items; (5) Report on company fines (FIN) and comprises 2 items. All 53 items have a score threshold of 0 to 3, resulting in a total potential score of (53X3) 159. A score of "0" was awarded for no disclosure at all. A score of "1" was awarded when the disclosure relating to a particular item was minimal, vague and/or completely general. A score of "2" was awarded when disclosures contained objective, verifiable and current data. A score of "3" was awarded when disclosure included all the ingredients of code "2," as well as providing specific information identifying the site/operating facility, affected species, and or number of affected flora/fauna; a description of specific measures taken and/or amount of money spent; a discussion of trend information; and/or a linking of the data presented to a company strategy, aim performance measure, target, incident or accident".
Independent Variables	POP	Presence of biodiversity partners, value of "1" if more than 1 biodiversity partner present, "0" if none. Data collected from CSR annual reports.
	EW	Environmental Award, value of "1" if award given, "0" otherwise. Data collected from CSR annual reports.
	Ass	Assurance has a value of "1"if company has assurance, "0" otherwise. Data collected from CSR annual reports.
	Big4	Has a value of "1" when a company got assured by Big 4 and "0" otherwise. Data collected from CSR annual reports.
	Country	Has value of "1" if the country is classified as developing, value of "0" if it is classified as developed. Data collected from United Nations Website.
	NOS	Number of Species mentioned in the reports. Data collected from CSR annual reports.
	HSW	How many specific words are mentioned in the report relating to biodiversity/extinction. Data collected from CSR annual reports.
	Performance	The company has a value of "1" if it is poor performer and a value of "0" if it is better performer. Data collected from Sustainable Society Foundation (SFF) because it develops and publish the Sustainable Society Index (SSI) every two years and has been adopted by the prior study of Adler et al., 2018.

	NOP	Number of pages in report allocated to biodiversity. Data collected from CSR annual reports.
	Industry sector	The company has a value of "1" if it is classified under Red/Amber high risk zone and a value of "0" if it classifies as green low risk zone. We followed the biodiversity sector classification recommended by F&C Asset Report (2004) and adopted by prior study of Adler et al., 2018.
Control variables	Size	Company size measured by Total Assets
	ROA	Return on Assets: Operating income/total assets
	LVG	Leverage: Total debt/total assets

Table 2: Descriptive statistics of study variables for all years.

Variable	Min	Max	Mean	Std. Dev
Panel A: Continuous variables				
Dependent variable				

Total biodiversity/Extinction Score	0	83	10.68	17.361
For each Theme				
Theme (1) CPA	0	57	7.73	12.181
Theme (2) PAF	0	14	.63	1.770
Theme (3) ELOSS	0	27	2.11	4.400
Theme (4) FG	0	4	.18	.563
Theme (5) FIN	0	3	.05	.283
Independent variables-				
Environmental Performance	2	5	3.38	.771
Number of Species mentioned in the report (NoS)	0	585 (1703)	2.84	27.117 (9477)
How many specific words are mentioned in the report related to biodiversity (HSW)	0	594	15.98	40.383
How many pages allocated to biodiversity (NOP)	0	25	1.13	2.195
Presence of biodiversity Partners (POP)	0	7	.39	.832
Control variables				
Size	0	2592042941	18222054.48	169982897.400
Leverage	.000	578.680	5.22475	43.527600
ROI	-15.359	52.076	.48426	3.480426

Table 3. – Total disclosure for the total sample for 2012, 2014 and 2016

Variables	**Total sample**			**% Change**
	2012	**2014**	**2016**	
Total biodiversity Score				**% of change**
Min	0	0	0	
Max	61	83	78	28%
Mean	8.70	11.09	12.24	
STD	15.014	17.853	18.883	
Theme (1) CPA				

Min	0	0	0	
Max	49	57	57	16%
Mean	6.35	7.99	8.84	
STD	10.860	12.405	13.099	
Theme (2) PAF				
Min	0	0	0	
Max	9	12	14	55%
Mean	.046	.64	.79	
STD	1.473	1.771	2.016	
Theme (3) ELOSS				
Min	0	0	0	
Max	18	23	27	50%
Mean	1.74	2.25	2.36	
STD	3.577	4.603	4.907	
Theme (4) FIG				
Min	0	0	0	
Max	2	3	4	100%
Mean	.06	.16	.33	
STD	.269	.574	.717	
Theme (5) FIN				
Min	0	0	0	
Max	3	3	1	-67%
Mean	.07	.04	.03	
STD	.376	.262	12.24	

% of change is calculated as follows (the difference between the score in 2012 and the score in 2016/the score in 2012)

Table 4 (Correlation matrix)

	TOTAL Dis	NOP	EW	ASS	Big4	NOS	HSW	POP	Country	Performance	industry	size	ROA	LEV
														LEV
TOTAL Dis	1													
NOP	.593**	1												
EW	.302**	.263**	1											
ASS	.159**	.141**	.171**	1										
Big4	.152**	.014	.108**	.549**	1									

NOS	.184**	.228**	-.010	.031	-.003	1								
HSW	.649**	.520**	.063	.034	.099*	.211**	1							
POP	.639**	.544**	.161**	.130**	.031	.141**	.367**	1						
country	.006	.019	.006	.023	.012	-.002	-.035	-.052	1					
Performance	.004	-.059	.038	.049	.061	.023	-.014	-.029	-.387**	1				
Industry sector	.010	-.007	.048	.007	.004	.007	.013	-.019	.061	-.034	1			
Size	-0.18	-.015	-0.41	-.060	-.045	-.008	-.007	-105*	-.114**	-.084*	-.067	1		
ROA	-0.41	-.033	-.156**	.108**	.017	-.008	-.029	-.034	-.079	-.060	-.072	-.021	1	
LEV	-.050	-.033	.179**	.076	.050	-.011	-.030	-.040	-.159**	.092*	-.052	-.011	.620**	1

Note. The above table contains Pearson`s Parametric correlation coefficients, Significance levels: $p<.05$*. $p<.01$**. Variables are defined as follows: Where *TOTAL* Dis is total biodiversity/extinction disclosure score; *NOP* refers to number of pages allocated for biodiversity/extinction disclosure; EW refers to getting environmental awards; *Ass* refers to Assurance; Big4 refers to assured by 4 big accounting firms; NOS refers to number of species, HSW refers to how many specific words related to biodiversity disclosed; POP refers to the presence of biodiversity partners; Country (developed vs. developing) refers to the country,; Sector refers to industry sector (green vs red/amber); control variables Size refers to the size of the company; ROA refers to return on assets and LEV refers to Leverage. We also run Spearman correlation coefficients and gave us similar results.

Table (5) the relationship between B/E disclosure and its determinant factors

Variables	**(1) OLS**	**(2) RE**	**(3) Lagged**	**(4) Sensitivity Analysis**	**(5) With interactions**	**(6) Change Model**
Panel A: Independent variables						
NOP	0.734*** (0.004)	0.359 (0.159)	0.750 (0.742)	0.073 (0.283)	0.782*** (.003)	0.926 (0.726)
EW	8.060*** (0.000)	7.896*** (0.000)	6.342*** (0.000)	8.060*** (0.000)	8.056*** (.000)	6.506*** (0.000)
ASS	0.831 (0.441)	1.0212 (0.459)	0.842 (0.428)	0.831 (0.528)	0.557 (0.616)	4.426 (0.027)
Big4	2.797*** (0.000)	1.454 (0.271)	0.567 (0.577)	2.797 (0.0732)	2.372 (0.024)	2.545 (0.176)
NOS	0.009 (0.539)	0.006 (0.578)	0.009 (0.441)	0.009 (0.495)	.010 (0.515)	0.007 (0.407)
HSW	0.1835*** (0.000)	0.142*** (0.000)	0.108*** (0.000)	0.183*** (0.000)	0.189*** (.000)	0.1020*** (0.000)
POP	8.043*** (0.000)	6.888*** (0.000)	3.89*** (0.000)	8.043*** (0.000)	8.034*** (0.000)	4.402*** (0.000
Country	0.3.583*** (0.006)	3.106** (0.0382)	1.670** (0.097)	3.538** (0.010)	0.212 (0.879)	0131*** (0.885)
Performance	0.439 (0.069)	0.276 (0.830)	0.158 (0.858)	0.439 (0.719)	-1.151 (0.347)	0.415 (0.877)
Industry Sector	2.650*** (0.000)	3.63*** (0.006)	0.384* (0.059)	2.650 (0..051)	-4.120*** (.008)	.3167 (0.707
TA	0.000 (0.709)	-2.072 (0.146)	6.212 (0.898)	0.000 (0.984)	.000 (0.711)	0.000 (0.120)
ROA	-0.0425 (0.780)	-0.037 (0.794)	-0.029 (0.850)	-0.042 (0.560)	-0.57 (0.712)	-0.000 (0.211)
LEV	-0.249** (0.043)	-0.023 (0.143)	0.014*** (0.239)	-0.024*** (0.001)	-0.18 (0.138)	-0.001** (0.0232)
CoutPer					0.695 (0.755)	
CoutSect					2.665 (0.194)	

PerSect					5.696*** (0.003)	
_cons	--0.128 (0.930)	1.125 (0.503)	2.533 (0.264)	-0.128 (0.931)	1.329 (0.906)	
Year	included					
F-value	81.98***		110.11***	24.67***	82.34**	0.000
R2	0.67		0.82	0.678	0.670	0.349
Adjusted R2	0.667		0.813	0.669	0.66	0.325

Notes: The above table represents regression coefficients and t statistics in parentheses. Significance levels are * p<0.10, ** p<0.05, *** p<0.01. The Variables are defined as follows. Total biodiversity/Extinction disclosure (*TOTAL Dis*).Where *TOTAL* Dis is total biodiversity/extinction disclosure score; *NOP* refers to number of pages allocated for biodiversity/extinction disclosure; EW refers to getting environmental awards; *Ass* refers to Assurance; Big4 refers to assured by 4 big accounting firms; NOS refers to number of species, HSW refers to how many specific words related to biodiversity disclosed; POP refers to the presence of biodiversity partners; Country (developed vs. developing) refers to the country,; Sector refers to industry sector (green vs red/amber); control variables of Size refers to the size of the company; ROA refers to return on assets and LEV refers to Leverage. CoutPer refers to interaction variable between country and Performance. CoutSect refers to interaction variable between country and sector; PerSect refers to interaction variable between performance and sector. We also run Spearman correlation coefficients and gave us similar results. We run the model with and without the control variables and the results are similar for both.

Appendix: Biodiversity/extinction disclosure score index

	DISCLOSURE ITEM	**0**	**1**	**2**	**3**	**TOTAL**	***SOURCE***
	COMPANY REPORT ON CURRENT/PREVIOUS ACTIONS						
CPA1	Company reports on corporate expressions of moral, ethical and/or emotional motivations for preserving species and preventing extinction with a consideration of ecosystem level effects, including normative reflective self-accounts of the company's impact on threatened and endangered species.	**473**	**32**	**47**	**48**	**600**	Atkins and Maroun (2018), King and Atkins (2016)
CPA2	Company report on partnership engagement between wildlife/nature/conservation organization's and the company which aim to address corporate impacts on endangered species.	**497**	**26**	**46**	**31**	**600**	Atkins and Maroun (2018), King and Atkins (2016)
CPA3	Company report on assessment and reflection on outcome/impact of engagement/partnerships and decisions taken about necessary changes to policy/initiatives going forward.	**524**	**27**	**29**	**20**	**600**	Atkins and Maroun (2018), King and Atkins (2016)
CPA4	Company provide pictorial representation of success in conservation	**532**	**23**	**18**	**27**	**600**	Atkins and Maroun (2018)
CPA5	Company report on provision of education/training delivered on extinction accounting to all employees.	**592**	**3**	**4**	**1**	**600**	King and Atkins (2016)
CPA6	Company report on support given at Managerial level, ensure understanding of extinction accounting by decision makers	**584**	**10**	**5**	**1**	**600**	Weir (2018)

CPA7	Company report on its involvement in afforestation activities (such as seedling transplantation, forest plantation, sustainable forestry practices or other reforestation activities).	**362**	**87**	**99**	**52**	**600**	Adler, Mansi and Pandey (2018), Adler et al. (2017)
CPA8	Company reports its involvement in protection/conservation of "Ecological corridors" in and around the manufacturing plants, mines, transport infrastructure and/or other locations.	**476**	**47**	**60**	**17**	**600**	Adler, Mansi and Pandey (2018), Adler et al. (2017)
CPA9	Company report on "biodiversity assessment" of its activities in and around the manufacturing plants, mines, transport infrastructure and/or other locations.	**449**	**56**	**55**	**40**	**600**	Adler, Mansi and Pandey (2018), Adler et al. (2017)
CPA10	Company report on implementation of "biodiversity offset" for reducing their biodiversity impacts.	**516**	**40**	**35**	**9**	**600**	Adler, Mansi and Pandey (2018), Adler et al. (2017)
CPA11	Company report on biodiversity partners (both local and international organizations) helping company in biodiversity conservation.	**444**	**61**	**62**	**33**	**600**	Adler, Mansi and Pandey (2018), Adler et al. (2017)
CPA12	Company report on biodiversity projects undertaken to enhance the biodiversity in and around the manufacturing plants, mines, transport infrastructure and/or other locations.	**446**	**41**	**62**	**51**	**600**	Adler, Mansi and Pandey (2018), Adler et al. (2017)
CPA13	Company report on its involvement in land management/land rehabilitation activities	**461**	**47**	**63**	**29**	**600**	Adler, Mansi and Pandey (2018), Adler et al. (2017)
CPA14	Company reports on floral wealth in or around its operating area (production/functional/ transportation).	**484**	**78**	**29**	**9**	**600**	Adler, Mansi and Pandey (2018), Adler et al. (2017)
CPA15	Company discloses the faunal wealth in or around its operating area (production/functional/ transportation).	**515**	**57**	**22**	**6**	**600**	Adler, Mansi and Pandey (2018), Adler et al. (2017)
CPA16	Company reports on donation provided (or conducted philanthropic activities) which contributed to the conservation, protection, enhancement, promotion, preservation of biodiversity.	**465**	**51**	**47**	**37**	**600**	Adler, Mansi and Pandey (2018), Adler et al. (2017)
CPA17	Company reports steps taken for creating biodiversity awareness among its employees or in the community.	**448**	**63**	**52**	**37**	**600**	Adler, Mansi and Pandey (2018), Adler et al. (2017)
CPA18	Company report on participation in biodiversity associations (external agencies, NGOs) to improve biodiversity practices in the community.	**463**	**58**	**52**	**27**	**600**	Adler, Mansi and Pandey (2018), Adler et al. (2017)
CPA19	Company reports on amount spent (R&D, technologies, innovations) for biodiversity conservation/restoration.	**520**	**34**	**35**	**11**	**600**	Adler, Mansi and Pandey (2018), Adler et al. (2017)
CPA20	Company reports on environment policy strategy (or statement) values (or concerns) biodiversity	**436**	**81**	**70**	**13**	**600**	Adler, Mansi and Pandey (2018), Adler et al. (2017)

CPA21	Company reports biodiversity award or recognition received for biodiversity conservation/ restoration	**549**	**22**	**19**	**10**	**600**	Adler, Mansi and Pandey (2018), Adler et al. (2017)
CPA22	Company reports biodiversity in top-level management plan.	**531**	**41**	**24**	**4**	**600**	Adler, Mansi and Pandey (2018)
CPA23	Company reports international conventions for biodiversity conservation and restoration.	**535**	**29**	**18**	**18**	**600**	Adler, Mansi and Pandey (2018)
CPA24	Company reports regular assessments (audit) of species populations in areas affected by corporate operations.	**586**	**12**	**1**	**1**	**600**	Atkins and Maroun (2018),King and Atkins (2016)
CPA25	Explain how these have been integrated into the company's internal control system, business model, business strategy and operational plans.	**579**	**15**	**6**	**0**	**600**	Atkins and Maroun (2018),King and Atkins (2016)
CPA26	Company reports biodiversity action plans or biodiversity goals/targets for coming years.	**522**	**41**	**32**	**5**	**600**	Adler, Mansi and Pandey (2018), Adler et al. (2017)
	PREVENT ACTIVITIES HAPPENING IN THE FUTURE						
PAF27	Report on potential risks/impacts on these specific species arising from the company's operations.	**516**	**29**	**27**	**28**	**600**	Atkins and Maroun (2018), King and Atkins (2016)
PAF28	Report assessment of whether or not corporate initiatives/actions are assisting in prevention of future species extinction	**554**	**22**	**14**	**10**	**600**	Atkins and Maroun (2018), King and Atkins (2016)
PAF29	Report strategy for the future development and improvement of actions/initiatives	**574**	**18**	**7**	**1**	**600**	Atkins and Maroun (2018), King and Atkins (2016), Adler, Mansi and Pandey (2018), Adler et al. (2017)
PAF30	Include a discussion of ways in which the company is working to prevent future liabilities related to harming endangered species	**571**	**21**	**6**	**2**	**600**	Atkins and Maroun (2018)
PAF31	Offering where possible future graduate schemes on extinction accounting	**599**	**0**	**1**	**0**	**600**	King and Atkins (2016)
PAF32	In the future collaborate with key advisors across professions to conceptualize accounts and progress with ecologists, scientists, humanities scholars, other experts	**585**	**3**	**6**	**6**	**600**	Russell, Milne and Dey (2017), Weir (2018), Jones and Solomon (2013)

							Roberts (2018)
PAF33	Update shareholders/stakeholders quarterly with progress and future actions	**592**	**4**	**4**	**0**	**600**	
PAF34	Provide education on extinction initiatives to schools in future	**592**	**4**	**4**	**0**	**600**	Atkins et al. (2018)
	REPORT ON ACTIVITIES CONTRIBUTING TO EXTINCTION/BIODIVERSITY LOSS						
ELOSS35	Record a list of plant and animal species, identified as endangered by the IUCN Red List, whose habitats are affected by the company's activities	**537**	**29**	**27**	**7**	**600**	GRI (EN14), Atkins and Maroun (2018),King and Atkins (2016), IUCN (2018), Boiral (2016), Boiral and Heras-Saizarbitoria (2017), Adler et al. (2017), Adler, Mansi and Pandey (2018)
ELOSS36	Report where, geographically, the company's activities pose a threat to endangered plant and animal species, as identified by the IUCN Red List	**543**	**30**	**23**	**4**	**600**	GRI (EN11), Atkins and Maroun (2018),King and Atkins (2016), IUCN (2018), Boiral (2016), Boiral and Heras-Saizarbitoria (2017), Adler et al. (2017), Adler, Mansi and Pandey (2018)
ELOSS37	Report and assess habitat status area protected, restored, affected and conserved	**478**	**43**	**43**	**36**	**600**	GRI (EN13), Atkins and Maroun (2018),King and Atkins (2016), IUCN (2018), Boiral (2016), Boiral and Heras-Saizarbitoria (2017), Adler et al. (2017)
ELOSS38	Report on potential risks/impacts on these specific species arising from the company's operations.	**569**	**21**	**9**	**1**	**600**	GRI (EN12), Atkins and Maroun (2018),King and Atkins (2016), IUCN (2018), Boiral (2016), Boiral and Heras-Saizarbitoria (2017), Adler et al. (2017)
ELOSS39	Company reports operations (countries) with activities in IUCN category I-IV protected areas	**575**	**13**	**8**	**4**	**600**	Adler, Mansi and Pandey (2018)
ELOSS40	Company reports the native/indigenous/endemic species affected/conserved/protected/restored	**548**	**27**	**20**	**5**	**600**	Adler, Mansi and Pandey (2018)
ELOSS41	Company reports ecosystems affected/conserved/protected/restored	**476**	**60**	**45**	**19**	**600**	Adler, Mansi and Pandey (2018)
ELOSS42	Company reports wetlands affected/conserved/protected/restored	**514**	**44**	**29**	**13**	**600**	Adler, Mansi and Pandey (2018)
ELOSS43	Company reports marine biodiversity affected/conserved/protected/restored	**522**	**30**	**24**	**24**	**600**	Adler, Mansi and Pandey (2018)
ELOSS44	Company reports rivers, creeks, lakes, reservoirs or waterways affected/conserved/protected/restored	**526**	**39**	**29**	**6**	**600**	Adler, Mansi and Pandey (2018)
ELOSS45	Company report by incorporate images (photos or drawings, for example) of threatened species which are affected by the company's operations and which the company need to protect	**582**	**13**	**2**	**3**	**600**	Atkins and Maroun (2018),King and Atkins (2016)

ELOSS46	Provide pictorial representation of failure i.e species loss	**585**	**15**	**0**	**0**	**600**	Atkins and Maroun (2018)
ELOSS47	Report on companies biodiversity/species loss due to its operations	**587**	**7**	**2**	**4**	**600**	Adler, Mansi and Pandey (2018)
	REPORT ON GUIDELINES OR ADOPT THE FOLLOWING						
FG48	Ensure that the whole process of 'extinction accounting' is integrated into corporate strategy and is incorporated into the company's 'integrated report', not resigned to separate sustainability reports or websites, including species specific information	**590**	**10**	**0**	**0**	**600**	Atkins and Maroun (2018), King and Atkins (2016), IIRC (2013)
FG49	Report on compliance of United Nations Sustainability Development Goal(No15) Life on Land 15.5 Take urgent and significant action to reduce the degradation of natural habitats, halt the loss of biodiversity and, by 2020, protect and prevent the extinction of threatened species	**567**	**30**	**3**	**0**	**600**	United Nations (2015) , King and Atkins (2016)
FG50	Report on compliance of Aichi Target 12 - By 2020 the extinction of known threatened species has been prevented and their conservation status, particularly of those most in decline, has been improved and sustained	**594**	**3**	**2**	**1**	**600**	Aichi (2010) , King and Atkins (2016)
FG51	Report using International Integrated Reporting Council (IIRC) framework	**565**	**22**	**6**	**7**	**600**	IIRC (2013)
	REPORT ON COMPANY FINES						
FIN52	Report potential liabilities relating to future possible legal fines/claims relating to endangered species impacts	**585**	**12**	**1**	**2**	**600**	Atkins and Maroun (2018)
FIN53	Report full details (narrative as well as financial figures) relating to any fines or ongoing claims relating to endangered species legislation including the names of species and a summary of losses suffered with causes identified	**596**	**2**	**1**	**1**	**600**	Atkins and Maroun (2018), King and Atkins (2016)