

Article

From Environmental Reporting to Environmental Performance

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Abstract: This paper identifies factors influencing environmental disclosure and environmental performance of the top 100 Fortune Global companies. The analysis identifies whether they follow the Global Reporting Initiative (GRI) standards to gain and maintain legitimacy with relevant stakeholders. Other factors such as sector and region are taken into account, with empirical testing of a model for the relationship between the extent of environmental disclosure (measured by the developed index based on GRI indicators), sector membership, region, and actual environmental performance. Evidence exists that the main factors related to actual environmental performance were the region and level of environmental disclosure.

Keywords: environmental disclosure; environmental performance

1. Introduction

Air pollution, waste disposal, natural resource depletion, deforestation, water pollution and CO₂ emissions are some of the major environmental issues we face. Environmental crimes have increased despite robust policies implemented in the past two decades [1]. Sustainable research is crucial to minimize the negative environmental impact by seeking solutions for sustainable development. The intention is to pursue sustainable engagement and to increase the ecological awareness of companies and society. This growing interest in environmental issues has led to an increase in academic publications which have adopted theoretical and empirical perspectives focusing on the analysis of environmental/sustainability reports as a dissemination tool [2].

To better understand the need for the sustainability engagement and transparency of companies in this matter, it is worth mentioning the paradigm of the shifting role of corporations in society. Serafeim introduced this alternative view of the corporate role in society and reflects the increasing concentration of economic activity and power in the world's largest corporations [3]. Because of this, there are a handful of large corporations with enormous economic, environmental, and social impact. Many multinational companies either realize and assume that responsibility or find themselves under the pressure of society to do so. As a result, they have launched various environmental and social initiatives as part of their sustainable behavior, together with increasing their transparency and engaging in the well-known practice of “doing well by doing good” [4]. To shed more light on the transparency of top global companies and their performance in environmental matters, we analyzed a sample of 100 Fortune Global companies.

Over the last decade we can also observe how transparency has enhanced environmental corporate compliance, which was traditionally based on regulation. As a result, large companies subjected to greater public scrutiny try to legitimize their activities not only by complying with regulations, but also by voluntary reporting to justify these practices.

Although sustainability reporting used to be voluntary, an increasing number of mainly EU countries are making such a disclosure mandatory. The EU updated a regulation on non-financial disclosure, on the 22nd October 2014, when the EU Council adopted a new directive regarding corporate social responsibility (CSR) disclosure by large companies and groups in the EU. It amends the previous Directive 2013/34/EU on annual financial statements, consolidated financial statements and related reports of certain types of company [5]. The main objective of the new directive is to seek more transparency by establishing minimal requirements regarding how much non-financial information should be available to the public. However, it still ensures an adequate degree of freedom regarding the extent and content of the sustainability report, and companies are free to choose the reporting framework. To comply with the Directive, companies must disclose information regarding their existing policies on environmental, social, employee, human rights, anti-corruption and bribery matters, including a description of the outcomes of their policies, relevant non-financial key performance indicators and main risks related to these matters [6]. The EU Directive is being introduced into national laws by most of the member countries. Governments and stock exchanges play an important role in promoting it.

Various national and international reporting standards were developed over the last decade as a response to the recent trend to regulate this type of disclosure. Marimon et al. claim that there is a wide list of sustainability reporting standards including initiatives such as UN Global Compact Principles, OECD Guidelines for Multinational Enterprises, GRI, ISO 26000, AA1000, ISO 14001 and SA88000, etc. However, there is still a need for an internationally recognized and accepted framework to achieve uniformity in environmental disclosure [7].

According to the most recent KPMG Survey of Corporate Responsibility Reporting [8], the GRI Standards are most often used by large companies worldwide. Thus, these standards, developed in 1997 and now in their sixth version, deserve particular attention. The GRI Standards use the triple bottom line approach which refers to economic, environmental and social indicators. Since 1997, the aim of the organization has been to achieve a global consensus on the most relevant key performance indicators in these three areas. To evaluate the extent of environmental disclosure by global companies, adopting the key performance environmental indicators from these standards seems to be the most appropriate approach due to its wide acceptance and credibility.

Previous studies on environmental reporting and actual environmental performance are contradictory. Some authors argue that environmental disclosure is just a greenwashing strategy, a new perspective of legitimacy theory, to pose as good corporate citizens even when they are not [9]. Others found a positive correlation between the level of environmental reporting and actual impact [10], nevertheless they call for new studies to shed more light on this phenomenon [9–11]. To contribute to the ongoing and controversial academic debate on the importance of environmental disclosure and transparency, a sample of 100 of the largest global companies was analyzed and new measurement techniques applied to determine this relationship between disclosure and real environmental impact.

The aim of our study is twofold. First, we aim to identify factors influencing the level of environmental transparency measured by the GRI environmental reporting score. Second, we aim to identify factors directly related to the level of environmental scoring which represents the positive/negative environmental impact of a company. Our study is a new avenue for research as we explore the relationship between the level of environmental disclosure and the real environmental impact/performance of the top 100 global companies representing four different regions (USA, Europe, Asia, Latin America) and ten sectors. To assess the level of environmental disclosure we created an index based on the GRI framework, which over the last decade gained certain international recognition [8] and used the index developed by Newsweek to evaluate the environmental impact of the company [12]. Our study provides insights into the extent to which global companies engage with environmental disclosure, and whether it is a genuine effort for transparency or a greenwashing strategy.

According to the results emerging from our study, the companies operating in critical sectors tend to disclose more environmental information, whereas region and environmental disclosure were

the factors affecting real environmental performance. We found that companies headquartered in the European region and companies more engaged in environmental transparency also tend to achieve higher environmental performance.

2. Literature Review

Academics have applied numerous theories to give meaning to the existence of sustainable initiatives and company transparency. Some scholars stated that the propensity of companies to engage in CSR initiatives and reporting on them can be explained by the legitimacy theory [13–15]. Based on the legitimacy theory, companies strive to be perceived as “good citizens” to legitimize their activities and prove that their practices are in compliance with the norms, values, and expectations of society [16,17]. Thus, through this legitimization process a company seeks approval (or perhaps the avoidance of sanctions) from different stakeholder groups. According to Deegan, legitimacy is possible by being transparent about environmental and social issues related to the company [14]. Van Staden and Hooks postulated that a company might have either a proactive or reactive approach towards legitimacy. With a proactive approach, a company tries to prevent legitimacy concerns from arising, while a reactive approach refers to the enhanced transparency of the company as a reaction to negative events [18].

Several proxies have been used to test the legitimacy theory, but the most common ones are industrial sector and country [2]. Previous studies [15,19–23] showed that companies operating in more environmentally sensitive sectors tend to engage more with sustainability transparency than those operating in less sensitive sectors. Hoffman added a country effect on environmental transparency and argued that companies operating within the same sector and country share some kind of institutional context in which they benchmark each other to legitimize their practices and gain societal acceptance [24]. Gray et al. claim that this phenomenon shows consistency with the legitimacy theory [15].

Mata et al. present a literature review of environmental account reporting based on papers published between 2006 and 2015 where they focused on results obtained, methodologies adopted, data sources, industrial sectors, and countries involved. They conclude that most of the studies present a longitudinal approach and use content analysis as their methodology. They also claim that the most extensively used theories are the legitimacy and stakeholder theories [2].

Hassan and Guo analyzed 100 large European companies and studied the relationship between reporting format and environmental disclosure. Their findings support greenwashing as a new perspective of legitimacy theory: companies in carbon-intensive industries used environmental reports to pose as good corporate citizens even when they were not [9]. Nazari et al. however, analyzed the relationship between the complexity of CSR disclosure and actual CSR performance, finding a positive association between actual CSR performance and readability and the size of CSR disclosure documents. Their sample comprises large US companies across different sectors. They also point out that using less-readable language in sustainability reports leads to obfuscation. Thus, a well-structured and readable sustainability report format is important and can determine the credibility of CSR disclosure [10]. Bernardi and Stark analyzed the role of environmental disclosure in determining the effectiveness of an integrated report. They found that environmental reporting plays a key role and stakeholders tend to give it more priority than social and governance disclosure [11]. Pineiro-Chousa et al. focused on the importance of environmental reporting in the downsizing of reputational risk. They compare the context of voluntary and mandatory environmental reporting and factors affecting reputational risk in these two contexts [25].

Despite a long list of previous studies on environmental disclosure a gap remains due to the contradictory findings on whether environmental disclosure is a trustworthy indicator of actual environmental performance. More evidence is needed to contribute to this ongoing debate with the inclusion of more diverse global cases. In addition, previous studies have used different methodologies to determine the level or quality of environmental reporting. Therefore, a credible internationally recognized and accepted format should be chosen.

As a response to that, our study analyzed 100 of the largest global companies from four different regions. The GRI standards were chosen as a basis to develop the environmental reporting index. This format has wide international acceptance with a high level of credibility [8]. To measure real economic performance, the data was obtained from the Newsweek Green Rankings 2017 [12] which represents an assessment of the sustainability performance of the 500 largest publicly-traded companies.

Hypotheses

Given that the aim of our study is twofold, the hypotheses are divided into two groups. The first group refers to the factors influencing the level of environmental transparency measured by the GRI environmental reporting score and the second group refers to the factors related to the level of actual environmental performance.

Several previous studies have analyzed the sector factor for sustainability reporting.

Companies within the same industry might show similarities regarding information disclosure practices [26–28]. Young and Marais distinguished the industry type in terms of high/low risk [29] and Reverte also divided the industries based on their environmental sensitiveness [30]. Similarly, Snider et al. stressed that companies operating in an industry with higher environmental impact face stronger stakeholder demands for greater transparency. Facing this scrutiny, these companies are under greater pressure to legitimize their actions than companies operating in low risk sectors [31]. As communication plays an important role in the legitimacy process, environmental disclosure might be a very effective tool to manage the perception and reputation of a company. Thus, based on previous research and the legitimacy theory, in the present study two groups of industry sectors were created based on their environmental risks sensitivity. Our first hypothesis was established:

Hypothesis 1 (H1). *There is a relationship between the sector-environmental sensitivity and the level of environmental disclosure.*

The country where the company has its headquarters might create an institutional context which can influence the attitudes of the company towards its external stakeholders. Even if it is a multinational company operating globally, previous studies show a home country influence on company actions reflected in the level of transparency or reporting [32]. A large number of previous studies on sustainability reporting have shown that there is a strong regional effect influencing the level of voluntary disclosure [28,29,33,34] well-grounded in the legitimacy theory. In compliance with this theory, the country represents an institutional context in which the company has to legitimize its activities.

Hypothesis 2 (H2). *There is a relationship between the level of the environmental disclosure and the region where the company is headquartered.*

Hassan and Guo point out that companies from carbon-intensive industries have used environmental reporting to hide the real negative environmental impact [9]. Companies operating in a critical sector face higher reputational risks and are expected to have low environmental performance and are therefore under greater scrutiny by society [32]. Nevertheless, a company operating in a critical industry is not necessarily irresponsible. To shed more light on this issue we analyzed the following hypothesis where the environmental ranking, hence the actual environmental performance, is a complex indicator.

Hypothesis 3 (H3). *There is a relationship between environmental performance and sector.*

As the country represents an institutional context in which the company has to legitimize its activities, companies from a certain region might face stricter environmental policies and are more scrutinized in this matter than companies in other regions where environmental legislation is not so strict. Several authors [35–37] claim that the legal system is one of the most important institutional

factors. Hence, due to the different governance systems, regulation [38], and environmental protection laws [39] among others [32] it might be expected that there is a strong regional effect on the level of actual environmental performance. The answer to this question would help us to understand the role of regulation in combating negative environmental impact.

Hypothesis 4 (H4). *There is a relationship between the actual environmental performance and region.*

According to Di Maggio and Powell [40], once a set of organizations emerge as a field, they tend to adopt similar practices in certain actions. Nowadays, voluntary disclosure might be one of these practices. Nevertheless, strategies that are rational for individual organizations/cases may not be rational if adopted by large numbers. Hence, in the case of environmental disclosure, it may not serve its main purpose but might simply represent a current trend. This phenomenon is well-grounded in institutional theory [41]. Perhaps the most important research question would be whether higher environmental disclosure leads to a more positive environmental impact. Opinions among academics in this matter are rather contradictory. Some authors [9,42] claim that companies use voluntary environmental reporting as a tool for justifying, or even the obfuscating negative environmental impact. This is sometimes referred to as a greenwashing technique [9]. Other studies have found a positive relationship between the actual CSR performance and the extent of CSR disclosure [10]. To contribute to this controversial academic debate by analyzing different samples and applying new measurement techniques, we formulated the following hypothesis:

Hypothesis 5 (H5). *There is a positive relationship between the level of environmental disclosure and the environmental performance/impact.*

3. Methodology

3.1. Sample and Data

Our initial sample consisted of 100 top global fortune companies. Only the companies with a GRI sustainability report, and for which the environmental score was available, were used for further analysis. Hence, our final sample consists of sixty companies from fourteen different countries and ten sectors.

3.2. Variables and Measurement

3.2.1. Dependent Variables

In the first group of hypotheses, the GRI Reporting Score (DV1) is a dependent variable. In the second group of hypotheses, where a model is proposed, actual environmental performance (DV2) is a dependent variable and the GRI Reporting Score becomes an independent variable. The GRI Reporting Index has been calculated as follows. The GRI Sustainability report was downloaded from the official website of each company. Two possible versions might be found, G4 and GRI Standards. Then, one point was assigned to the index for each environmental KPI disclosed in the report.

The GRI Reporting Index is measured using all key environmental performance indicators (KPI) listed in G4 and GRI Standards versions. Later, the index was transformed to the percentage value of disclosed indicators for both versions. The G4 version lists 34 environmental KPIs and the latest GRI Standards version lists 30 environmental KPIs. The actual environmental performance score was retrieved from the Newsweek Green Rankings 2017, where more detailed information on methodology is provided [12]. It consists of an assessment of sustainability performance by revenue of the 500 largest publicly-traded companies in the world. KPIs taken into account were: combined energy productivity score (weight: 15%); combined GHG productivity score (weight: 15%); combined water productivity score (weight: 15%); combined waste productivity score (weight: 15%); green revenue percent range (weight: 20%); sustainability pay link (weight: 10%); sustainability board committee (weight: 5%); audited environmental metric (weight: 5%); monetary fines paid or payable (maximum deduction of

5%); products/services category (maximum deduction of 5%). Data are taken from the Bloomberg, FactSet, Thomson Reuters and the Carbon Disclosure Project databases. Furthermore, all companies are contacted for data verification once all available items of data have been obtained. Based on this complex analysis of environmental performance, a company receives a score from 0 to 100.

3.2.2. Independent Variables

The independent variables are sector and region. In the second group of hypotheses, where a model is proposed, the GRI Reporting Score is also an independent variable.

The companies in our final sample come from ten different sectors (based on GICS). For the purposes of our study, we followed a similar approach to Snider et al. [31], Tagesson et al. [43], and Bonsón and Bednárová [32] and divide the companies into two groups (critical/non-critical sector, Table 1).

Table 1. Sector categories.

Sector (GICS)	Number of Companies	Category: Critical/Non-Critical (Dummy Variable)
Consumer Discretionary	11	Critical
Consumer Staples	4	Critical
Energy	8	Critical
Financials	14	Non-critical
Health Care	4	Non-critical
Industrials	2	Critical
Information Technology	7	Non-critical
Materials	1	Critical
Telecommunication	6	Non-critical
Utilities	3	Critical
Total	60	Critical: 29 Non-critical: 31

The four categories of USA, Europe, Asia and Latin America include companies from 14 countries grouped according to the region (Table 2).

Table 2. Regions.

Country	Number of Companies	Region (Categorical Variable)
Brazil	1	Latin America
China	8	Asia
France	1	Europe
Germany	7	Europe
Italy	3	Europe
Japan	8	Asia
Netherlands	1	Europe
Russia	2	Asia
South Korea	2	Asia
Spain	1	Europe
Switzerland	2	Europe
Taiwan	1	Asia
UK	2	Europe
USA	21	USA
Total	60	USA: 21 Europe: 17 Asia: 21 Latin America: 1

3.3. Methods of Analysis

For H1, H2, H3 and H4 nonparametric statistics for tests of differences such as Mann-Whitney test for dummy independent variables (sector) and Kruskal-Wallis test (region) for several independent samples were applied.

For bivariate analysis (H5), Spearman rank correlation has been calculated to measure the association between environmental disclosure and actual environmental performance as both variables are ordinal and there was not a normal distribution of the dependent variable.

Further, the generalized linear model (GLM), which is a flexible generalization of ordinary linear regression was applied to test which factors are related to actual environmental performance.

4. Results

4.1. Descriptive Statistics

The initial sample consisted of 100 companies. Sixty-six of those companies (66%) prepare a standalone GRI based sustainability report. Data from the Newsweek Green Rankings 2017 [12] were available for 88 analyzed companies (88%). The final sample was reduced to 60 companies with both an available Newsweek Green Rankings and GRI Report. Table 3 provides descriptive statistics related to environmental performance and environmental disclosure.

Table 3. Descriptive statistics.

	Min.	Max.	Mean
Environmental performance (Green Rankings)	0	85.3	41.02
Environmental disclosure (GRI Standards)	13	100	52

4.2. Hypotheses Testing

Hypothesis 1 (H1). *There is a relationship between the sector-environmental sensitivity and the level of environmental disclosure.*

To test H1 a Mann-Whitney test has been applied. It shows, that there are statistically significant differences between the two groups of sectors (sig. 0.04) and that companies from more environmentally sensitive sectors tend to have a higher disclosure index (Table 4).

Table 4. Sector and environmental disclosure.

Test		Significance				
Mann-Whitney		0.04				
Sector	N	Min	Max	Mean	Std. Dev.	
(1) Critical	29	20	87	56.75	19.64	
(2) Non-critical	31	13	100	47.81	24.91	

Sig. Level 0.05.

Hypothesis 2 (H2). *There is a relationship between the level of the environmental disclosure and the region where the company is headquartered.*

Nevertheless, when it comes to the differences between regions and the extent of environmental disclosure, applying the Kruskal-Wallis test (Table 5) we found no significant differences (sig. 0.388).

Table 5. Region and environmental disclosure.

Test	Significance
Kruskal-Wallis	0.388

Sig. Level 0.05.

Hypothesis 3 (H3). *There is a relationship between environmental performance and sector.*

Similarly, applying the Mann-Whitney test we found that there are no significant differences (sig. 0.307) in actual environmental performance measured by the green ranking between the companies operating in critical and non-critical sectors. The coherence of the Green Ranking is given by its methodology which is as follows. Companies are compared to their industry group peers based on performance indicators for which the underlying data are reasonably well disclosed by their industry group globally. Hence, the Environmental Score in the index takes into account the environmental impact in each sector separately so the result is not biased (Table 6).

Table 6. Sector and environmental performance.

Test	Significance
Mann-Whitney	0.307

Sig. Level 0.05.

Hypothesis 4 (H4). *There is a relationship between the actual environmental performance and region.*

Applying the Kruskal-Wallis test, significant differences (Sig. 0.009) were found among the regions and their environmental performance (Table 7). The best environmental ranking was detected in European companies (mean = 54.72).

Table 7. Region and environmental performance.

Test	Significance			
Kruskal-Wallis	0.009			
Region	Mean	N	Std. Dev.	
(1) USA	38.62	21	19.67	
(2) Europe	54.72	17	15.12	
(3) Asia	33.24	21	20.22	
(4) Latin America	21.5	1	-	
Total	41.02	60	20.39	

Sig. Level 0.05.

Hypothesis 5 (H5). *There is a positive relationship between the level of environmental disclosure and the environmental performance/impact.*

As seen in Table 8, there is a positive relationship between environmental disclosure and actual environmental performance (Spearman: 0.428 **).

Table 8. Environmental reporting and actual environmental performance.

Type of Correlation Coefficient	Variables	Environmental Score	GRI Reporting Index
Spearman's correlation coefficient	Environmental Score	Corr. coefficient	1
		Sig. bilateral	0.428 **
	GRI Reporting Index	N	60
		Corr. coefficient	0.428 **
		Sig. bilateral	0.01
		N	60

Sig. level 0.01.

4.3. Generalized Linear Model (GLM)

Finally, a generalized linear model has been used to identify the factors influencing actual environmental performance. As depicted in Table 9, region and the extent of environmental disclosures are positively associated with environmental performance.

Table 9. GLM—Factors influencing the actual environmental performance.

Origin	Type III			
	Chi-Square	Wald	GI	Sig.
(Intercept.)	3.67		1	0.055
Region	25.35		3	0
Sector	0.02		1	0.878
GRI rep. score	21.7		1	0

Dependent variable: Environmental scoring
Model: (Intercept.), Region, Sector, GRI rep. score

5. Discussion and Conclusions

Companies are increasingly being asked to explain their performance on a range of environmental issues such as pollution, waste control and natural resource management challenges with reference to quantitative metrics. This is on one hand driven by new regulations put in place, and on the other hand greater stakeholder scrutiny which requires more accountability and transparency. However, there are different policies, reporting standards and environmental regulations applied on the global level. A more data-driven and empirical approach to environmental disclosure and performance is necessary to make it easier to spot problems, track trends, highlight policy successes and failures, and identify best practices.

Our study aimed to contribute to the ongoing debate on the factors influencing both environmental disclosure and actual environmental performance. The results of this study show that 66% of the largest global companies follow the GRI standards to report on their environmental performance. It is currently the most widely used sustainability reporting standard worldwide [8].

With respect to the first hypothesis, we examined the relationship between the industry sector and the extent of GRI environmental disclosure. We found significant differences between critical and non-critical sectors and their level of reporting. Companies operating in environmentally sensitive sectors are under most scrutiny. Thus, by being more transparent they try to legitimize their practices, as in compliance with regulations and norms of the society. That is why they generally have a higher environmental reporting index. This finding supports the legitimacy theory and previous studies [15,19,20].

Nevertheless, no relationship has been found between the region and extent of environmental reporting.

In terms of the factors associated with actual environmental performance, no relationship has been found between the sector and the actual environmental score either. Newsweek Green Rankings 2017 [12] compares companies to their industry group peers. Thus, companies from critical sectors are compared with companies operating in environmentally sensitive sectors. This approach ensures that the result is not biased and that a company operating in such a sector would not automatically have a worse environmental performance score than a company operating in the non-critical sector.

We believe that regulation plays an important role in creating an institutional context in the region. Companies from the European region also tend to have a higher environmental score. The fact that European companies ranked higher in their environmental score might be due to stricter legislation in terms of environmental responsibility and impact of companies, in particular the pressure on large listed corporations. These companies face stricter policies than those legally and environmentally accountable in other regions. We believe that the strong legal system in the EU in this matter contributed to the regional effect which would support previous studies [35–37] and the legitimacy theory [24].

Last but not least, our study shows that the higher environmental reporting index is correlated with higher actual environmental score. According to our findings, environmental reporting is not used as a greenwashing tool to hide poor environmental performance as suggested in some studies [9,42].

Finally, the tested model shows that the main factors influencing actual environmental performance are the region and environmental disclosure. The region might represent a certain institutional context where companies try to legitimize their activities, aware of the fact they may be benchmarked with their peers. However, it might also be a sign of a general improvement in minimizing the adverse environmental impact in countries where a well-developed environmental legislation is put in place. The positive effect of environmental disclosure on actual performance adds to evidence that disclosure and transparency also matter.

Limitations and Future Research

This study contributes to the reflection of research in environmental accounting. Nevertheless, certain limitations have to be acknowledged. To improve the generalizability of the results and to fill the gap, we analyzed 100 global companies from different sectors. Future studies might follow our approach and extend the sample. Similarly, a longitudinal study might map the evolution of environmental reporting and performance over time. In addition, it would be interesting to see if the findings change using different measurement techniques.

Regarding the statistical analysis, the limitations of our study stem from the non-normal distribution of our data. Hence, nonparametric alternatives such as Spearman, Mann-Whitney, Kruskal-Wallis, and the GLM were adopted, which are inherently less accurate than their parametric alternatives. In addition, only the correlations were tested, not causality.

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