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Additional Information

The Impact of CSR Transparency on the Financial Performance, Brand value and Sustainability level of IT Companies.

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Abstract: The companies are aware of the impact that disseminating their Corporate Social Responsibility (CSR) performance has on how shareholders or investors perceive them. This work analyses if disseminating CSR results affects their economic-financial results, their scores in open-access sustainability ranking, their brand values, and also the credit ratings that agencies S&P and Moody's confer them. For this purpose, the only 13 companies of the IT sector occupying a top 100 brand rankings position were selected. The results reveal that large companies come over as being more transparent in terms sustainability, but this transparency is not related to their financial behaviour. Brand rankings collect socio-economic and environmental information, but only the transparency in social and environmental aspects explains the public-access CRS rankings. Finally, the results also show that this transparency affects credit ratings.

Keywords: brand rankings; credit ratings; CSR reports; finance performance; sustainability; technology sector

1. Introduction

The origin of the *business social responsibility* (BSR) concept dates back a little over one century in the business world (Carrol, 1979). After the work by Bowen (1953), in the 1950s Corporate Social Responsibility (CSR) began to be implemented into US companies (Ghobadian et al, 2015). Later in the 1990s, this concept was reinforced and has constantly evolved thanks to globalisation, economic activity accelerating, awareness of ecology and new technologies developing (Moreno & Cabrera, 2016).

CSR, also known as corporate sustainability, is a concept that takes several meanings. One of the most widely used ones by the literature is that proposed by the EU (Commission of the European Communities, 2001): "a concept whereby companies integrate social and environmental concerns in their business operations and in their interaction with their stakeholders on a voluntary basis". Since the 1970s, the CSR concept has also encompassed the three pillars of sustainability, namely social, economic and environmental (Kutay et al, 2016), also known as the Triple Result (Archel, 2003). In this work, we use this definition of the CSR and we use it in a homogeneous way to define corporate sustainability.

Basically there are four reasons (Charlo et al, 2017) why companies must improve their socially responsible initiatives: their moral obligation (Young & Thyl, 2008), lawfulness (Boesso et al, 2013), reputation as a source of competitive advantage (Jones et al, 2007), and the last reason has to bear in mind the previous three reasons combined, known as the strategic approach (Porter & Kramer, 2006). Studies have also been conducted on the positive relation between CSR and companies' financial performance (Kao et al, 2018; Ding et al, 2016), and on brand value (Torres et al, 2012; Manzano et al, 2013). Therefore, nowadays more and more CSR actions and their better results form a strategic objective of companies.

Notwithstanding, although Directive 2014/95 (OJEU, 2014) expects large companies to disclose non-financial information in their annual accounts, there is no specific regulation or homogeneous standard that determines what the dissemination of companies' socio-environmental information should be. This makes it difficult for those companies displaying sustainable performance to be able to evaluate and disseminate these results.

In parallel, integrating CSR into businesses involves making a comparison between the company and its shareholders (Ballou et al, 2012), where sustainability reports are the form of communication most widely used by companies to report their socio-economic and environmental impact (Fernandez-Feijoo et al, 2014). Indeed the reputation of companies and the way their shareholders perceive them both improve if they communicate their sustainable performance more (Graafland & Smid, 2004), and all this positively influences their future (Cornelissen, 2004). Communicating CSR actions not only affects shareholders, or the company itself, but can also affect their competition, investors, customers, and generally society as a whole. Thanks to companies communicating their CSR, groups of interest will predictably have a different vision of the company and the policies it adopts.

Seeing that sustainability reports are the main tool used to communicate companies' CSR actions, this work aims to study the relations that may stem from companies deciding to disseminate their "sustainable" results with these reports. The specific aim is to solve the matter of whether a company's CSR can be related with the results it obtains.

More explicitly, the objective of the present study is, by employing existing information from CSR reports of IT, companies to model: (i) the company's economic-financial and corporate information; (ii) its score from open-access CSR rankings and brand value rankings; (iii) the company's score obtained from credit ratings. Hence the present work intends to find out how socially responsible companies are perceived, and how their CSR transparency commitment affects markets through different indicators.

To our knowledge the only work that studies the free-access CSR rankings jointly was carried out by Alcaide et al (2019), who analyzed the degree of similarity in the sustainability valuation among these open-access sustainability rankings. On the contrary, the private-access rankings have been included in some works (Wang et al, 2018; Pinillos et al, 2018). Doubtlessly, free-access CSR rankings will be more widely used to evaluate companies' responsible performance given the lack of homogeneity when measuring CSR actions, and also the need for groups of interest to find a trustworthy index that measures companies' non-financial aspects.

The present study examines companies from the IT sector as it is the most incipient sector and the fast-growing one in today's economy, especially since the 1990s, in terms of both turnover and number of companies, promoted by the technological revolution that affected society as a whole (Timoteo, 2015), and is still a very powerful constantly progressing industry in markets. In addition, today this technological revolution has not only affected markets, but also the value of IT companies' brands, and is the sector of economy with a larger number of brands within the Top-10 most prestigious international branding rankings in the last decade. So this study focuses on analysing the most valuable brands in the IT sector during the 2000-2017 study period.

Although some works have analysed the technology sector along with other sectors in economy, we found none that have exclusively studied this sector, and this is another contribution of the present study.

This article is set out as: Section 2 reviews the literature about the study object concepts and it considers the research hypotheses to be analysed to meet the proposed objectives. Section 3 describes the sample and data employed herein. Section 4 explains the methodology to be followed and Section 5 presents the results. Finally, Section 6 ends by discussing the results, and provides details of some final observations made.

2. Background and research hypothesis

This work intends to study the relation between disseminating sustainability reports (CSR) of companies from the technology sector with four different types of indicators for: financial and corporate results, sustainability level, brand value, and companies' solvency. These indicators are described below according to a literature review.

Firm's finance performance

The relation between CSR and companies' performance or value has been the study object of many research works (Guerrero-Villegas et al, 2018; Hu et al, 2018; Marti et al, 2015). Several of these works have used Tobin's Q ratio to analyse the relation between companies' CSR and performance. One such case is that by Kao et al (2018), who compared the possible differences of this relation between state and non-state companies from China. To do so, they used the CSR Southern Weekend database. Then there is the work by Ding et al (2016), which distinguished seven CSR categories by using the KLD database to do so.

The results offered in the literature are not conclusive. Orlitzky et al (2003) suggested a positive relation between CSR and financial performance, whereas, in the same year, Margolis and Walsh (2003) argued that no significant relation existed.

More recently, Cherian et al (2019) suggested that a significant relation exists between the performance of 50 manufacturing Indian companies and their CSR during the period from 2011 to 2017. These authors also used financial indicators, such as Return on Assets (ROA), Return on Equity (ROE), or number of employees, which are also used herein. The same study period (2011-2017) was analysed by Chon (2019), who also verified a positive relation between CSR activities and economic-financial performance (ROA and ROE) of 267 publicly Chinese firms listed in the food and beverage industry. Likewise, Isanzu and Xu (2016) revealed that there is a difference in financial performance (ROE and ROA) which favours the firms that do CSR, and implies that CSR has a positive influence on firms' financial performance. In this case, the sample focused on 101 companies in Tanzania. Therefore, several studies that have used financial indicators like ROE and ROA to measure economic-financial performance found a positive relation between this performance and CSR. However, the results are more divergent when other financial indicators are used; for example, other studies (Sheikh, 2019) have found a negative relation between CSR and firm leverage, but it depends on market competition. Specifically, CSR has a negative effect on firm leverage, but only when competition in product markets is high because when competition is not fierce, CSR has no impact on firm leverage. However, Niron and Aryani (2017) found that size, leverage and ROE have an positive aggregate effect on CSR, so they showed that corporate governance contributes additional value to the firm's value.

The relation of these business characteristics has also been studied with some given CSR aspects, like disseminating carbon-related information, in which case it is significantly related with size (assets) and profitability (ROE) (Liesen et al, 2015; Broadstock et al, 2017).

Other studies have also analysed the relation of CSR performance with either the cost of companies' financing (Attig et al, 2011), with how bonds perform (Sharfman & Fernando, 2008), with either the credit default swap (Drago et al, 2018) or the stock market (Miralles et al, 2017). This last study revealed that, in general, European Stock Market investors value the CSR information published by listed companies for decision making, but this study found differences between markets. Only investors in the German and UK markets value CSR reports positively and significantly, while investors in other markets do not appear to find that CSR disclosure provides their valuations of the firms with higher values, except for the Swedish market where these authors observed a negative influence on the share value of the firms that disclose CSR reports.

Sustainability rankings

Several research works have used private-access sustainability indices like KLD (Ding et al, 2016; Chatterji & Levine, 2006), Southern Weekend (Kao et al, 2018), FTSE4Good (Chatterji & Levine, 2006; Duran & Bajo, 2014) or the Dow Jones Sustainability Index (DJSI) (Searcy & Elkhawas, 2012; Kutay et al, 2016). In recent times however, some agencies have begun to devise

free-access sustainability rankings, like Newsweek, Corporate Knight, Reputation Institute, and the Yahoo Finance Server. These four institutions score from 1% to 100% (from worse to better) the CSR level of the world's biggest companies on an annual basis, whose scores are included in these rankings: "Green ranking", "RepTrack", "Global 100 most sustainable corporations", and "Finance Yahoo Sustainability", respectively.

Brand value and brand rankings

The relation between CSR and brand value has been studied from various angles. Nonetheless, the majority of studies have focused on analysing the relation between CSR and brand fidelity or how customers perceive a brand (Hoeffler & Keeler, 2002; Keller, 2003; Lichtenstein et al, 2004; Du et al, 2007). All this research suggests that customer fidelity for a company's brand is related with the CSR actions that it performs, which is very relevant for those international brands subject to constant changes in social expectations, wealth and globalisation (Werther & Chandler, 2005). A similar perspective has analysed the relation linking a company's CSR and the various stakeholders interested in it (customers, shareholders, employees, suppliers and society) (Torres et al, 2012). Other studies have analysed the relation between CSR and brand value qualitatively (Martínez et al, 2018), empirically (Manzano et al, 2013) and with structural equations models (Fatma et al, 2017; Engizek & Yaçın, 2018; Lapuente et al, 2013; Signh & Verma, 2017). These authors have also studied this relation in connection with the effects that CSR has on customer satisfaction, fidelity and perception.

Brands have an important quantitative value and are possibly the most valuable intangible asset of companies (Keller & Lechmann, 2006), whose valuation is increasingly important. The difficulty to value brands given their intangible nature and the fact that an active market for selling brands not being available have led to the development of international brand rankings. These rankings are very useful for agents that join financial markets because they provide these agents with an idea of which brands are the most valuable in economic terms, as well as an intangible value, in international and national markets. They also act as a benchmark to value other less recognised brands worldwide.

Currently, there are three main international agencies (Interbrand, Brand Finance and Millward Brown) that quantify and publish the most internationally esteemed brands yearly. Although *a priori* it is feasible to believe that the most valued brands are the most sustainable ones, not much literature has analysed the relation between CSR and brand value using these brand rankings. The Interbrand ranking has been employed in several research works to relate its effect on CSR (Torres et al, 2012). Other studies have used the value of these rankings, but have related it with Stock Exchange values (Dutordoir et al, 2015; Bagna et al, 2017), but not with companies' sustainability.

Credit ratings

According to the US Securities and Exchange Commissions (SEC), the three main credit rating agencies are: Standard & Poor's (S&P), Moody's and Fitch.

Studies into the relation between the CSR performance and credit ratings of companies was analysed by Attig et al (2013), who found a positive impact between CSR and S&P's ratings. These authors stressed the importance of the non-financial information that CSR transmits, and indicated that ranking agencies should use it to evaluate companies' solvency. Conversely, Fernández and Elfner (2015) found a poor, but positive, correlation between CSR ratings and those of Moody's, and they concluded that integrating CSR with a credit analysis created value for companies' shareholders, and could also lead to credit stability and investment for their customers. However, the relation between CSR and the Fitch agency credit ratings have not yet been studied.

As previously mentioned, there is no specific regulation to determine how the dissemination of companies' socio-environmental information should be. Hence transparency in companies'

sustainability reports is understood as the quantity and variety of information they report about their CSR results and actions.

Thus, the greater amount of information reported by companies at their sustainability reports, the higher their transparency is. Following this premise, the research hypotheses that this work pursues are set out:

Hypothesis 1 (H1). *Companies' economic-financial and corporate information, such as their size, increases in their assets and revenues, their leverage and performance, is explained or modelled by such information existing in their CSR reports.*

These economic-financial and corporate variables have been used as control variables in research works conducted to analyse the performance of sustainability reports (Córdova et al, 2018; Sierra-García et al, 2014; Zorio-Grima et al, 2015).

It is important to verify if disseminating CSR performance and transparency is related with the characteristics of companies, and also with the results they produce. In fact the literature contains non-conclusive results, as previously commented.

Hypothesis 2 (H2). *Those companies that obtain a higher ranking in open-access CSR and brand rankings are indeed those that report more information in their CSR reports.*

Those companies whose brands are better valued and obtain better scores in CSR rankings could be expected to be more interested in disseminating their CSR results. Thus, CSR reports would be taken as transparency indicators and, therefore, would act as a useful tool for investors to measure companies' non-financial aspects and would, thus, be employed as an index of investors' trust.

Hypothesis 3 (H3). *The transparency of companies reflected in their sustainability reports relates their solvency ratings provided by credit rating agencies.*

To date, credit rating agencies have evaluated countries and companies by using economic-financial information, and do not explicitly reveal the use of CSR performance information. However, these agencies include a large set of CSR-related activities to measure companies' market/financial risk.

This third hypothesis might be more consistent in the long term than the two previous ones. In fact, some authors indicate that CSR actions have no immediate effect on companies' short-term profitability, or only have a weak effect. However, analysing their relation with companies' credit ratings proves a better measure of the profits made from CSR (Attig et al, 2013). These arguments are consistent with other research works (Menz's, 2010) which have concluded that pressure from CSR on credit markets is greater than on the Stock Exchange.

3. Sources of information

The criterion followed to select companies from the technology sector so they form part of the study sample as those that have been in the top 100 in at least two of the rankings published by three international consultants that value the most prestigious brands, namely Interbrand, Brand Finance and Millward Brown, during the period from 2000 and 2018 (both inclusive).

Only thirteen global companies met this criterion: Accenture, Apple, Cisco, Facebook, Google, HP, IBM, Intel, Microsoft, Oracle, Samsung, SAP and Sony.

Figure 1 shows the revenues (in millions of \$) in 2018 of the 13 companies in our sample. Thus follows the importance of the selected sample in relation to the IT sector as a whole as the 13 companies in the sample (28.26%) reached 41.89% of the revenues for the IT sector (46 of the world's largest technologies companies for revenues). Figure 1 represents the IT sector with the world's largest technology companies for revenues according to the 2018 Global 500 list (Fortune

Global 500, 2018), which includes the world's 500 largest companies for revenues. This list shows the companies ranked by their annual revenue from their fiscal years that ended on or before March 31, 2018. Of these 500 companies, 46 come from the IT sector and are, therefore, considered the world's largest technology companies for revenues.

[Figure 1]

The employed information was grouped into five kinds:

1st) Economic-financial and corporate variables: the economic-financial and corporate information was acquired from the companies' annual accounts for the years 2000-2017. This information allowed the following variables to be built: total assets logarithm, increase in total assets, increase in revenues or sales, leverage (Total liabilities/Total assets *100), financial profitability or ROE (Net income/Equity *100), and economic profitability or ROA (BAII/Average total assets *100). In addition, from the notes of financial statements, the number of employees in each tax year was added.

2nd) Open-access CSR rankings: Green Ranking, RepTrack, Finance Yahoo Sustainability and Global 100 most sustainable corporations. They were obtained from their respective websites. Table 1 characterises these four rankings. These rankings impose a series of demanding requirements to value the companies that make them all practically listed companies.

[Table 1]

The 13 companies forming the sample were not equally present in the four open-access CSR rankings, and the years when each ranking was available also differed.

3rd) Brand values (in millions of \$) rankings for the years 2010-2018 were provided by the rankings of Interbrand, Brand Finance, and Millward Brown.

4th) Credit ratings: they were taken from the websites of both S&P and Moody's, and also from the information company Thomson Reuters, for the 2000-2017 period. These ratings were transformed to an ordinal scale from 1 to 10 according to the values included in Table 2 for each agency (Attig et al, 2013).

[Table 2]

5th) Socio-environmental variables. They compose two of the three CSR dimensions according to the definition of the "Triple Result". These socio-environmental performance variables were taken from the CSR reports, progress reports or corporate citizenship reports published by companies, and also from their websites, for the 2000-2018 period. Unlike the economic variables, which comprise the third CSR dimension, and whose dissemination is standard and compulsory, publishing socio-environmental variables is completely voluntary for which there is no standard practice.

Sixteen variables were selected in the environmental dimension: greenhouse gas emissions (metric tons CO₂), gas emissions: scope 1 (metric tons CO₂), gas emissions: scope 2 (metric tons CO₂), gas emissions: scope 3 (metric tons CO₂), energy used: electricity (GWh), energy used: natural gas (GWh), energy used: diesel fuel use (KWh), total energy used (GWh), electricity from renewable sourcing (GWh), renewable energy (GWh), renewable energy supply (GWh), use of water (m³), waste generation (metric tons), waste generation (%), waste recycled (metric tons), and waste recycled (%).

Thirteen variables were taken from the social dimension: onsite supplier audits, employees' volunteering hours contributed, employees' donations, hours of voluntary work done, women (%), women's leadership (%), number of African, Hispanic, Asian, White staff members of races

or from other ethnic groups, rate of lost work days (per 100 full-time employees), and total incident rate (per 100 full-time employees).

Table 3 shows the descriptive statistics of the quantitative variables, except for the credit ratings (transformed into an ordinal scale) and the socio-environmental variables (coded as dichotomical variables), as explained in the next section.

[Table 3]

4. Methodology

The methodology followed to verify the three posed hypotheses was multivariate linear regression by Ordinary Least Squared (OLS). The equation of the model is:

$$Y_j = \alpha + \sum_1^n \beta_i X_{ij} + \dots + \varepsilon_j \quad (1)$$

Where:

Y_j : Dependent variable of the observation j .

α : Constant term.

β_i : Coefficient of the independent variable i ($i = 1 \dots n$).

X_{ij} : Independent variable i in the observation j .

ε_j : Random disturbance term.

Seven regression models were obtained with H1. The dependent variables were economic-financial and corporate: size, measured as the total asset's logarithm, and also the number of employees in each tax year; increase in total assets; increase in revenues; leverage; and the company's performance measured with the ROE and ROA ratios.

To analyse H2, seven regression models were built. In the first four models, the considered dependent variables were the score of the four CSR rankings. In Models 5, 6 and 7, the dependent variables were the scores obtained by the companies in the three brand rankings.

The third hypothesis was verified by two regression models. The dependent variables were the long-term credit ratings given by S&P and Moody's, transformed into an ordinal scale in accordance with Table 2.

The independent variables considered in all the analyses were the 29 selected performance variables: 16 environmental and 13 socials. They were all dichotomic: a value of 1 if the company provided information about the variable in its sustainability report, and 0 otherwise.

In H2 and H3, the seven economic-financial and corporate variables used in H1 were added as control variables (total asset's logarithm, number of employees, increase in total assets, increase in revenues, leverage, ROE and ROA).

CSR rankings are published at the beginning of each year t , but their values refer to the previous year ($t-1$). In contrast, CSR reports are usually published at the end of the year (t) and contain the results of that same year (t). Thus in H2, the independent variables were referenced to year $t-1$, and the dependent variables to year t .

The models' goodness of fit was measured with the adjusted R^2 and the Student's t . The error considered levels were 0.5%, 1% and 5%. Multicollinearity was measured with the condition index (CI) and the variance inflation factor (VIF).

5. Results

5.1. H1: Companies' economic-financial and corporate information, such as their size, increases in their assets and revenues, their leverage and performance, is explained or modelled by this information existing in their CSR reports.

Table 4 provides the linear regression results from 2000 to 2017.

[Table 4]

Just a few variables (1, in Model 7, to 4, in Model 6) included in the CSR reports are related to the companies' economic-financial results, such as increased assets, increased revenues, leverage or their performance (ROE and ROA) (Models 3 to 7). In addition, their explanatory power is very low (between 2.00% and 13.80%). However, the number of variables included in the CSR reports impacting in their size, measured by the total asset's logarithm (model 1) and number of employees (model 2) is greater (8 and 17 variables, respectively), and its explanatory power (48.90% and 75.40% respectively). This corroborated that the largest companies publish more CSR information and appear more transparent. The total assets logarithm was explained by five environmental variables and three social ones, whereas number of employees was explained by 12 environmental variables and five social ones. Company size (Models 1 and 2) was always explained positively by disseminating gas emissions, renewable energy, waste generation and number of women leaders, and negatively by the energy used.

5.2. H2: Those companies that obtain a higher ranking in open-access CSR and brand rankings are indeed those that report a larger amount of information in their CSR reports.

The results of the seven models can be found in Table 5.

[Table 5]

It is seen from the set of the 36 independent variables under study that only 15 explained some of the four CSR rankings (Table 5). The Finance Yahoo Sustainability was explained by more environmental variables (7), followed by Green Ranking (4), Rep Trak (3), and finally by Global 100 (1). Conversely, Global 100 was not explained by any social variable, while the other three CSR rankings were explained by three social variables each. Apart from the diversity of the variables that explained each ranking, it is worth mentioning that the coefficients of each variable completely differed.

Conversely, more variables (18) explained brand values in the brand rankings. In short, eleven environmental data, five social d, and two control variables (Num. employees and ROE) explained the scores obtained in the brand rankings. Interbrand and Millward Brown were explained by eleven variables (6 environmental, 3 social and 2 economic-financial), but Brand Finance was explained by ten variables (7 environmental and 3 social). The coefficients of the variables also considerably differed. The three rankings only coincided in valuing positively the variables: renewable energy use and renewable energy supply. Regarding the social variables, two of the three rankings negatively valued information about the total incident rate, white staff and black staff in companies, and positively valued information on Hispanic staff and other ethnicity employees in companies.

Paradoxically, the socio-environmental variables showed that the brand rankings models had more homogeneous explanatory power (62.60%-82.40%) than the CSR models (16.50%-83.80%). In addition, the explanatory power in CSR rankings was heterogenous; Finance Yahoo Sustainability, which is the only CSR ranking to consider economic-financial variables, obtained a high power, 83.80%, followed by Rep Track and Green Ranking, with 69.10% and 54.60% respectively, while Global 100 had the least explanatory power (16.50%).

5.3. H3: The transparency of companies reflected in their sustainability reports relates their solvency ratings provided by credit rating agencies.

The linear regression results showing the relation between CSR transparency and credit ratings are presented in Table 6.

[Table 6]

The explanatory power of Moody's model (51.90%) was better than the S&P one (35.60%). Moody's was also explained by more variables (12): five environmental ones (Gas emissions: scope 2, Renewable energy, Renewable electricity, Water use and Waste generation), three social ones (Employee volunteerism rate, Women and Total incident rates), and four economic-financial ones (Inc. assets, leverage, ROE and ROA). The S&P's model was explained by three environmental information variables (Gas emissions: scope 3, Renewable energy and Renewable electricity), two social ones (Employee volunteerism rate, and Lost work day) and two economic-financial variables (Inc. assets and ROA).

The coefficients of the environmental variables were completely logical: all those related with gas emissions took a positive sign, so these rankings positively valued the fact that companies informed about such emissions. The same occurred with renewable energy. This influence was stronger in Moody's rating than in S&P's rating. Conversely, water use took a negative coefficient.

The social variables indicated that these ratings defended further information being made available about employee volunteerism rate, and punished the incidence rate and lost work days.

Initially, we performed the H2 and H3 without considering the financial variables, but to check the robustness of the models, we performed the analyzes again including those variables, as control variables. The results obtained, which are the ones shown in this section, confirm the previous analysis and therefore give them consistency.

6. Discussion

This paper analyses the relation between the information provided by companies in the technology sector about their socio-environmental actions, their economic results, their size, the value of their brands, their score in the rankings of CSR and its credit ratings. This relation does not imply any causal relation between CSR information and other indicators, or *vice versa* (Kendall & Stuart, 1977).

Firstly, the study reveals that a company's sustainability transparency is well-related to its size (number of employees and its assets logarithm), which coincides with other studies (Niron & Aryani, 2017; Liesen et al, 2015; Broadstock et al, 2017; Kao et al, 2018; Cherian et al, 2019). Some social variables are positively related to size, such as the percentage of women managers and ethnic variety, while the number of white people does so negatively. This may be because large companies have offices all over the world and, therefore, have personnel of many races, and are more receptive to incorporate female managers into their staff. Regarding information about environmental variables, they were in some cases positively related to size, such as information on greenhouse gas emissions, use of diesel fuel, waste generation and renewable energy, while they dido so negatively in other cases, such as information on energy use, water use, recycling waste, and the emissions of scope 3. This is logical because large companies are usually more environmentally aware and are more concerned about current environmental variables, such as using renewable energies, greenhouse gas emissions, controlling waste or using less polluting energies, such as diesel.

Conversely, a company's sustainability transparency is scarcely related to its financial behavior, as suggested by Margolis and Walsh (2003), but not by Orlitzky et al (2003), who suggested a positive relation between CSR and financial performance. The closest relation was with the ROE (albeit only 13.80%), where the information of only four CSR variables was related to that ratio. Although some CSR variables positively affected financial behaviour, which agrees with several studies (Cherian et al, 2019; Chon, 2019; Isanzu & Xu, 2016) that found a positive relation with ROE, other CSR variables negatively affected it, which coincides with other studies (Sheikh, 2019) that negatively related CSR and firm leverage. To find such evidence, it may be necessary to increase the sample size.

Secondly, this indicates that companies disseminating their CSR results to improve their brand value in international rankings is generally more beneficial for those than doing this to improve their CSR ranking scores. This indicates that if technology sector companies achieve more transparency and certain standards to prepare sustainability reports, all this will act as an incentive to increase the value of their brands, which is a very beneficial achievement for the companies in this sector, particularly where the value of their intangible assets will become increasingly more relevant compared to other sectors. This finding coincides with other studies which report that disseminating CSR actions positively impacts brand value (Torres et al, 2012; Manzano et al, 2013). Nonetheless, this is not logical because brand rankings theoretically only take into account economic aspects (which have been included in the models through ROE and number of employees, except in Brand Finance), rather than socio-environmental ones. Likewise, the model obtained by Finance Yahoo Sustainability is the only CSR ranking in which economic aspects (increased income) intervene with sustainability aspects to reach a high ranking percentage (83.8%). In the other CSR ranking models (Green ranking, RepTrak and Global 100) economic variables do not intervene, but only sustainability ones, which is expected. Although these CSR rankings are open-access, our results coincide with other works obtained for private-access CSR (Wang et al, 2018), which confirms a positive and significant relation between CSR performance and transparency reports. We conclude that economic and CSR variables impact brand rankings (except Brand Finance), while only CSR variables impact CSR rankings (except Finance Yahoo Sustainability).

Thirdly, publishing complete sustainability reports comes over as being important for companies because these results affect the credit rating given by main agencies S&P and Moody's, especially Moody's, as they are recognised and valued worldwide by investors and creditors so they can learn about companies' solvency and decision-making power with less uncertainty. These results agree with what other research works suggest (Menz's, 2010; Attig et al, 2013), which confirm the positive impact of CSR on companies' credit ratings. However, it contradicts the work of Fernandez and Elfner (2015), who precisely found a poor relation with Moody's.

In parallel, the present research also indicates that transparent environmental information has a stronger impact than the social area on both the economic-financial results of companies and the different studied measurement rankings and ratings. Therefore, it is a bigger priority for companies to improve the transparency of communication on their environmental actions than that of their social actions. Evidently, however, clear and complete communication about all their CSR actions would be ideal. This information disagrees with what some other authors report about an association found between transparency in CSR reports being stronger with social performance than with environmental performance (Wang et al, 2018).

Based on these results, and as other authors suggest (Chaterji & Levine, 2006; Delmas & Blass, 2010; Windolph, 2011; Alcaide et al, 2019), the present study reveals the need to define a regulation or standards to measure and disseminate companies' CSR actions that also promote greater sustainability transparency. This is important for financial agencies and society, and is particularly relevant for investors, shareholders and creditors who need clearer and more trustworthy indices to be able to measure companies' non-financial aspects.

Our results also have relevant implications for companies, especially those interested in obtaining higher values for their brands in brand rankings, or higher credit ratings because, as our analyses reveal, disseminating complete information in sustainability reports leads to a lower percentage in not only brand rankings, but also in the credit ratings by S&P and Moody's. CSR reporting can also be viewed as a strategy for building and maintaining good relationships with stakeholders (Sun et al, 2018).

For all these reasons, this work could be interesting for shareholders to support the investments that companies make in CSR so that companies could be as sustainable as possible, and to also help them provide all this information in their CSR reports. Moreover, CSR engagement can act as a tool to improve a firm's creditworthiness. This result can serve as an

incentive to pay more attention to CSR in management, regulatory and investment decisions (Drago et al, 2017).

Despite the importance of analysing the most prestigious brands in the IT sector, it is also necessary to consider other study limitations. One of them is the chosen selection criterion, which limited the sample size to 13 companies. Another study limitation is the period that the open-access CSR ranking scores covered, between 3 and 8 years, in accordance with rankings. This is because it is still an incipient issue worldwide, which ratifies the interest of the present study.

References

- Alcaide, M.A, De La Poza, E., & Guadalajara, N. (2019). Assessing the sustainability of high-value brands in the IT sector. *Sustainability*, 11 (6), 1598.
- Archel, P. (2003). Las memorias de sostenibilidad de la Global Reporting Initiative. *Economía y desarrollo sostenible*. V Congreso de Economía de Navarra, Pamplona, Spain.
- Attig, N., El Ghouli, S., Guedhami, O., & Suh, J. (2013). Corporate social responsibility and credit ratings. *Journal of Business Ethics*, 10 (6), 15-28.
- Bagna, E., Dicuonzo, G., Perrone, A., & Dell'Atti, V. (2017). The value relevance of brand valuation. *Applied Economics*, 49 (58), 5865-5876.
- Ballou, B., Casey, R.J., Grenier, J.H., & Heitger, D.L. (2012). Exploring the strategic integration of sustainability initiatives: Opportunities for accounting research. *Accounting Horizons*, 26 (2), 265-288.
- Boesso, G., Kumar, K., & Michelon, G. (2013). Descriptive, instrumental, and strategic approaches to corporate social responsibility: Do they drive the financial performance of companies differently? *Accounting, Auditing and Accountability Journal*, 26 (3), 399-422.
- Bowen, H. (1953). *Social responsibilities of the businessman*. New York, Estados Unidos: Harper & Row.
- Broadstock, D.C.; Collins, A.; Hunt, L.C.; Vergos, K. (2017). Voluntary disclosure, greenhouse gas emissions and business performance: Assessing the first decade of reporting. *The British Accounting Review*, 50, 48-59.
- Carroll, A. (1979). A three-dimensional conceptual model of corporate performance. *Academy of Management Review*, 4 (4), 497-505.
- Charlo, M. J., Moya, I., & Muñoz, A. M. (2017). Sustainable development in Spanish listed companies: A strategic approach. *Corporate Social Responsibility and Environmental Management*, 24, 222-234.
- Chatterji, A., & Levine, D. (2006). Breaking down the wall of codes: evaluating non-financial performance measurement. *California Management Review*, 48, 29-52.
- Cherian, J., Umar, M., Thu, P.A., Nguyen-Trang, T., Sial, M.S., & Khuong, N.V. (2019). Does corporate social responsibility affect the financial performance of the manufacturing sector? Evidence from an emerging economy. *Sustainability*, 11(4), 1182, <https://doi.org/10.3390/su11041182>
- Chon, M.L. (2019). An empirical study of the relationship between corporate social responsibility and profitability in Chinese food and beverage companies. *Korean Journal of Hospitality and Tourism (KJHT)*, 28 (2), 131-145.
- Commission of the European Communities. (2001). Green Book: *Promote a European framework for corporate social responsibility*. Retrieved from <https://eur-lex.europa.eu/legal-content/ES/TXT/PDF/?uri=CELEX:52001DC0366&from=ES>
- Córdova, C., Zorio-Grima, A., & Merello, P. (2018). Carbon emissions by South American companies: Driving factors for reporting decisions and emissions reduction. *Sustainability*, 10 (7), 1-16.
- Cornelissen, J. (2004). *Corporate communications, Theory and Practice*. London, UK: Sage.
- Corporate Knights. Available online: <https://www.corporateknights.com/reports/global-100/> (accessed on 24 August 2018).
- Delmas, M., & Blass, V.D. (2010). Measuring corporate environmental performance: the trade-offs of sustainability ratings. *Business Strategy and the Environment*, 19, 245-260.
- Ding, D.K., Ferreira, C., & Wongchoti, U. (2016) Does it pay to be different? Relative CSR and its impact on firm value. *International Review of Financial Analysis*, 47, 86-98.

- Drago, D., Carnevale, C., & Gallo, R. (2018). Do corporate social responsibility ratings affect credit default swap spreads?. *Corporate Social Responsibility and Environmental Management*, 26 (3), 644-652. DOI: 10.1002/csr.1709
- Du, S., Bhattacharya, C. B., & Sen, S. (2007). Reaping relational rewards from corporate social responsibility: The role of competitive positioning. *International Journal of Research in Marketing*, 24, 224-241.
- Duran, J.J., & Bajo, N. (2014). Institutions as determinant factors of corporate responsibility strategies of multinational firms. *Corporate Social Responsibility and Environmental Management*, 21 (6), 301-317.
- Dutordoir, M., Verbeeten, F.H.M., & De Beijer, D. (2015). Stock price reactions to brand value announcements: magnitude. *International Journal of Research in Marketing*, 32, 34-47.
- Engizek, N., & Yaşın, B. (2018). Influence of consumer attributions and service quality on support of corporate social responsibility. *Organizations and Markets in Emerging Economies*, 9 (1), 86-105.
- Fatma, M., Khan, I., & Rahman, Z. (2018). CSR and consumer behavioral responses: the role of customer-company identification. *Asia Pacific Journal of Marketing and Logistics*, 30 (2), 460-477.
- Fernandez, R., & Elfner, N. (2015). ESG integration in corporate fixed income. *Journal of Applied Corporate Finance*, 27 (2), 64-72.
- Fernández-Feijoo, B., Romero, S., & Ruiz, S. (2014). Commitment to corporate responsibility measured through global reporting initiative reporting: factors affecting the behavior of companies. *Journal of Cleaner Production*, 81, 244-254.
- Fortune Media IP. Fortune Global 500, 2018. Available online: <http://fortune.com/global500/list/filtered?sector=Technology> (accessed on 15 May 2019).
- Ghobadian, A., Money, K., & Hillenbrand, C. (2015). Corporate responsibility research: Past-Present-Future. *Group & Organization Management*, 40 (2), 271-294.
- Graafland, J.J., & Smid, H. (2004). Reputation, corporate social responsibility and market regulation. *Tijdschrift voor Economie en Management*. XLIX, 2, 271-308. Retrieved from <https://www.researchgate.net/publication/41459436>
- Guerrero-Villegas, J. Sierra-García, L., & Palacios-Florencio, B. (2018). The role of sustainable development and innovation on firm performance. *Corporate Social Responsibility and Environmental Management*, 25 (6), 1350-1362.
- Hoeffler, S., & Keller, K. L. (2002). Building brand equity through corporate societal marketing. *Journal of Public Policy and Marketing*, 21 (1), 78-89.
- Hu, J., Wang, S., & Xie, F. (2018). Environmental responsibility, market valuation, and firm characteristics: Evidence from China. *Corporate Social Responsibility and Environmental Management*, 25, 1376-1387.
- Interbrand. Available online: <https://www.interbrand.com/best-brands/> (accessed on 15 December 2018).
- Isanzu, J., & Xu, F.J. (2016). Impact of corporate social responsibility on firm's financial performance: The Tanzanian perspective. *Risus-Journal on Innovation and Sustainability*, 7 (1), 18-27.
- Jones, T.M., Felps, W., & Bigley, G.A. (2007). Ethical theory and stakeholders-related decisions: the role of stakeholder culture. *Academy of Management Review*, 32 (1), 137-155.
- Kantar Millward Brown. Available online: <http://www.millwardbrown.com/brandz/rankings-and-reports> (accessed on 15 December 2018).
- Kao, E.H., Yeh, C.C., Wang, L.H., & Fung, H.G. (2018) The relationship between CSR and performance: Evidence in China. *Pacific Basin Finance Journal*, 51, 155-170.
- Keller, K.L. (2003). Brand synthesis: The multidimensionality of brand knowledge. *Journal of Consumer Research*, 29, 595-600.
- Keller, K.L., & Lehmann, D.R. (2006). Brands and branding: Research findings and future priorities. *Marketing Science*, 25 (6), 740-759.
- Kendall, M.G., & Stuart, A. (1977). The advanced theory of statistics. Nueva York: Macmillan Publishing Co. Inc. Vol 1, 4 th ed.
- Kutay, N., & Tektüfekçi, F. (2016). A new era for sustainable development: A comparison for sustainability indices. *Journal of Accounting Finance and Auditing Studies*, 22, 70-95.
- Lapuente, I., Cunha, F.R., & Matte, F. (2014). O papel da confiança na relação entre responsabilidade social corporativa e o valor de marca. *Revista de Ciências da Administração*, 16 (39), 101-118.
- Lichtenstein, D.R., Drumwright, M.E., & Braig, B.M. (2004). The effect of corporate social responsibility on customer donations to corporate-supported nonprofits. *Journal of Marketing*, 68 (4), 16-32.

- Liesen, A.; Hoepner, A.G.; Patten, D.M.; Figge, F. (2015). Does stakeholder pressure influence corporate GHG emissions reporting? Empirical evidence from Europe. *Accounting, Auditing & Accountability Journal*, 28 (7), 1047–1074.
- Manzano, J.A., Simó, L.A., Pérez, R.C. (2013). La responsabilidad social como creadora de valor de marca: El efecto moderador de la atribución de objetivos. *Revista europea de dirección y economía de la empresa*, 22, 21–28.
- Margolis, J.D., & Walsh, J.P. (2003). Misery loves companies: Rethinking social initiatives by business. *Administrative Science Quarterly*, 48, 268–305.
- Marti, CP., Rovira-Val, MR., & Drescher, LGJ. (2015). Are firms that contribute to sustainable development better financially?. *Corporate Social Responsibility and Environmental Management*, 22 (5), 305–319.
- Martínez, P., Pérez, A., & Rodríguez, I. (2012). Análisis de la práctica corporativa de la responsabilidad social en el sector turístico: Un estudio de casos. *Cuadernos de Turismo*, 30, 145–164.
- Menz, K. M. (2010). Corporate social responsibility: Is it rewarded by the corporate bond market? A critical note. *Journal of Business Ethics*, 96, 117–134.
- Miralles-Quiros, M.M., Miralles-Quiros, J.L., & Guia, I. (2017). Are Firms that Contribute to Sustainable Development Valued by Investors?. *Corporate Social Responsibility and Environmental Management*, 24 (1), 74–84. DOI: 10.1002/csr.1392
- Moreno, B., & Cabrera, J.C. (2016). *Ética en la profesión y valores para la vida. (Desarrollo humano profesional)*. México: Editorial Parmenia bajo el sello De La Salle ediciones.
- Newsweek. Available online: <https://www.newsweek.com/newsweek-green-rankings-2017-methodology-739761> (accessed on 1 September 2018).
- Niron, BE., & Aryani, DN. (November, 2017). *Good corporate governance on corporate social responsibility with profitability, size and leverage as moderating variables (case study at regional development banks in Indonesia)*. 1st international conference on intellectuals' global responsibility (ICIGR), University Muhammadiyah Sidoarjo, Indonesia.
- Official Journal of the European Union. Directive 2014/95/EU of the European Parliament and the Council of 22 October 2014 amending Directive 2013/34/EU as regards the disclosure of non-financial information and information on diversity by certain large companies and certain groups. L 330/1. Available online <https://eur-lex.europa.eu/legal-content/ES/TXT/?uri=CELEX%3A32014L0095> (accessed on 10 May 2019).
- Orlitzky, M., Schmidt, F., & Rynes, S.L. (2003). Corporate social and financial performance: A meta-analysis. *Organization Studies*, 24 (3), 403–441.
- Pinillos, AA., Fernandez-Fernandez, JL. & Mateo, JF. (2018). A critical review of the corporate governance dimension in the sustainability indexes questionnaires. *Revista de Comunicación Perú*, 17 (2), 9–40.
- Porter, M.E., & Kramer, M.R. (2006). Strategy and society: The link between competitive advantage and corporate social responsibility. *Harvard Business Review*, 84 (12), 78–92.
- Reputation Institute. Available online: <https://www.reputationinstitute.com/csr-reprtrak> (accessed on 4 September 2018).
- Searcy, C., & Elkhawas, D. (2012). Corporate sustainability ratings: An investigation into how corporations use the Dow Jones Sustainability Index. *Journal of Cleaner Production*, 35, 79–92.
- Sharfman, M.P., & Fernando, C.S. (2008). Environmental risk management and the cost of capital. *Strategic Management Journal*, 29, 569–592.
- Sheikh, S. (2019). Corporate social responsibility and firm leverage: The impact of market competition. *Research in International Business and Finance*, 48, 496–510. DOI: 10.1016/j.ribaf.2018.11.002
- Sierra-García, L., García-Benau, M., & Zorio, A. (2014). Credibilidad en latinoamérica del informe de responsabilidad corporativa. *Revista de Administración de Empresas*, 54, 28–38.
- Singh, A., & Verma, P. (2018). Driving brand value through CSR initiatives: An empirical study in Indian perspective. *Global Business Review*, 19 (1), 85–98.
- Standard and Poor's. (2008). Corporate ratings criteria. Available at: <http://www.scribd.com/doc/29391142/Corporate-Ratings-Criteria-2008>.
- Sun, W., Zhao, C., & Cho, C. (2018) Institutional transitions and the role of financial performance in CSR reporting. *Corporate Social Responsibility and Environmental Management*, 26 (2), 367–376. DOI: 10.1002/csr.1688.

- Sustainalytics. Yahoo Finance Expands Offerings as Only Free Provider of Sustainability Scores, across Desktop and Mobile Web. Available online: <https://www.sustainalytics.com/press-release/yahoo-finance-adds-sustainability-scores/> (accessed on 10 October 2018).
- The Brand Finance Group. Available online: <http://brandfinance.com/knowledge-centre/reports/brand-finance-global-500-2018/> (accessed on 15 December 2018).
- Timoteo, J., Matías, G., Buxaderas, E., & Ferruz, S. (2015). *Intangibles in the value of companies. The business of Faust*. Spain: Díaz de Santos Editions.
- Torres, A., Bijmolt, T.H.A., Tribó, J.A., & Verhoef, P. (2012). Generating global brand equity through corporate social responsibility to key stakeholders. *International Journal of Research in Marketing*, 29, 13–24.
- Wang, ZH., Hsieh, TS., & Sharkis, J. (2018). CSR performance and the readability of CSR reports: Too good to be true?. *Corporate Social Responsibility and Environmental Management*, 25 (1), 66-79.
- Werther, W. B., & Chandler, D. (2005). Strategic corporate social responsibility as global brand insurance. *Business Horizons*, 48 (4), 317–324.
- Windolph, S. E. (2011). Assessing corporate sustainability through ratings: Challenges and their causes. *Journal of Environmental Sustainability*, 1, 1–22.
- Young S., & Thyil, V. (2008). A holistic model of corporate governance: a new research framework. *Corporate Governance International Journal Business in Society*, 8 (1), 94–108.
- Zorio-Grima, A., García-Benau, M.A., & Sierra-García, L. (2015). Sustainability report assurance in Spain and Latin America. *Innovar*, 25, 85–101.

Tables

Table 1. Characterisation of open-access CSR rankings.

Ranking	No. companies	Year the ranking began	Methodology
Green Ranking	Publish the Top 500 ranking.	2010 (except 2013)	It uses eight environmental indicators: energy intensity, greenhouse intensity, water intensity, waste intensity, green revenue score, green pay link, sustainability board committee, and audited environmental metrics.
CSR RepTrak	Publish the Top 100 ranking.	2012	Collect information through surveys carried out by a panel of experts. It is based on questions that measure the quality of: the workplace, governance and citizenship.
Finance Yahoo Sustainability	More than 2,000 companies	2014	It numerically scores the company for all three environmental, social and governance ESG categories, and an overall score.
Global 100 most sustainable corporations	Publish the Top 100 ranking.	2015†	It uses 15 indicators: 5 are environmental (energy intensity or productivity, carbon intensity, water intensity, waste intensity, and clean air intensity) and 10 corporate ones (innovation capacity, percentage of tax paid, CEO to average worker pay, suppliers score, pension fund status, safety performance, employee turnover, leadership diversity, sustainability pay link, and clean capitalism pay link).

Source: Own performance from Alcaide et al (2019).

†This ranking has been published since 2005 and ranks from 1 to 100 companies in it, but it was not until 2015 when it incorporated scores from 1% to 100%.

Table 2. The equivalence of credit ratings to an ordinal value.

Ordinal scale	S&P	Moody's
10	AAA	Aaa
9	AA	Aa1
8	A	Aa2
7	BBB	Aa3
6	BB	A1
5	B	A2
4	CCC	A3
3	CC	Baa1
2	C	Baa2
1	D	Baa3

Source: Own performance from Attig et al (2013).

Table 3. Descriptive statistics of the quantitative variables.

	N	Min	Max	Mean	Std. Dev.
Green Ranking	79	5	100	60.33	18.91
RepTrak	63	64	75	69.65	2.78

Global 100	16	52	72	57.81	4.96
Finance Yahoo Sustainability	52	41	86	71.19	9.38
Interbrand	216	5,182	214,480	33,684.92	33,569.07
Brand Finance	119	8,021	145,918	33,142.46	26,806.65
Millward Brown	151	5,524	246,992	49,066.33	54,076.91
Total Assets	219	47,000	375,319,000	76,633,190.35	62,619,489.19
Revenues	227	19,108	233,715,000	55,219,998.78	47,273,208.03
Num. Employees	226	7	434,246	123,941.47	112,277.15
ROE	219	-74.12	374.82	24.73	32.22
ROA	219	-31.28	305.95	16.93	26.76
Leverage	219	-111.35	45,540	1.25	9.02

CSR ranking scores take values from 1% to 100%, brand rankings data and financial data are expressed in millions USD, ratios in percentage (%), number of employees in units.

Table 4. Results of the linear regression for the economic-financial and corporate information from 2000 to 2017.

	1	2	3	4	5	6	7
	Log. Total Assets	Num. employees	Inc. Asset	Inc. Revenues	Leverage	ROE	ROA
Constant	7.11*** (0.000)	40862.00*** (0.000)	31.90*** (0.002)	27.22*** (0.002)	49.22*** (0.000)	34.46*** (0.000)	15.55*** (0.000)
Greenhouse gas emissions	0.36*** (0.001)	53094.22*** (0.003)					
Gas emissions: Scope 1				164.56*** (0.000)			
Gas emissions: Scope 2		60787.22*** (0.000)		-183.33*** (0.000)			
Gas emissions: Scope 3		-38836.08*** (0.002)	35.83* (0.021)				
Energy use: Electricity		-43039.24*** (0.004)			-21.88* (0.038)	-25.27*** (0.000)	
Energy use: Natural gas					34.82*** (0.002)		
Energy use	-0.19* (0.025)	-54604.62** (0.001)					
Diesel fuel use		123947.12*** (0.000)				28.10*** (0.000)	
Renewable electricity	0.29** (0.006)						
Renewable energy	0.43*** (0.000)	43324.19*** (0.004)					
Renewable electricity		-49710.32* (0.016)					
Water use		-100393.51*** (0.000)					
Waste generation (mt)	0.32*** (0.000)	17497.53*** (0.000)					
Waste generation (%)						15.84* (0.033)	14.31* (0.019)
Waste recycled (mt)		-79090.29*** (0.000)					
Waste recycled (%)		-54325.38*** (0.000)					

Volunteering hour contributed			-42.21*** (0.005)				
Women's leadership	0.29*** (0.000)	88440.67*** (0.000)					
White		-112240.66*** (0.000)					
Hispanic	-0.26*** (0.001)						
Other ethnicity		44129.19*** (0.005)					
Employee volunteerism rate	0.21** (0.006)						
Lost work day		-112242.39*** (0.000)				-24.26*** (0.000)	
Total incident rate		57551.35*** (0.000)					
Adjusted R²	48.90%	75.40%	4.00%	9.30%	3.70%	13.80%	2.00%
N	219	226	206	214	219	218	219
CI	8.56	16.58	2.54	9.71	4.42	3.42	1.37
FIV	1.187	3.835	1.088	9.423	2.973	1.794	1.000

The dependent variables in Models 1-7 are size, measured as the total asset's logarithm, and also with the number of employees in each tax year; increased assets/revenues; leverage (total liabilities/total assets *100); and company's performance, measured by the ROE and ROA ratios, respectively. The independent variables in this study are the 29 dichotomic socio-environmental variables, which take a value of 1 if the company provides information about the variable in its sustainability report, and 0 otherwise. ***, **, and * are 0.5%, 1% and 5% error levels, respectively. CI and FIV presents a low level in the obtained models. This means that no multicollinearity exists among the variables.

Table 5. Linear regression models for the brand and sustainability rankings, from 2010 to 2018.

	1	2	3	4	5	6	7
	Green Ranking	RepTrak	Global 100	Finance Yahoo Sustainability	Interbrand	Brand Finance	Millward Brown
Constant	63.25*** (0.000)	68.04*** (0.000)	63.33*** (0.000)	65.29*** (0.000)	44965.44*** (0.000)	56340.37*** (0.000)	101880.89*** (0.000)
Greenhouse gas emissions						-14720.97* (0.035)	-77942.45*** (0.000)
Gas emissions: Scope 1						-29111.98*** (0.001)	-32953.95*** (0.001)
Gas emissions: Scope 2						24349.19* (0.011)	
Gas emissions: Scope 3				-8.53*** (0.000)			
Energy use: Electricity	-18.67*** (0.001)	3.44*** (0.000)		12.56*** (0.000)	-52457.48*** (0.000)	-41776.26*** (0.000)	
Energy use: Natural gas	27.72*** (0.000)	-3.42*** (0.000)		-11.74*** (0.000)	36013.57*** (0.002)		
Energy use	14.03*** (0.004)			9.95*** (0.000)			
Diesel fuel use	18.68*** (0.001)	-3.70*** (0.000)					-75608.52*** (0.000)
Renewable energy			-6.95* (0.043)		41374.97*** (0.000)	32958.07*** (0.000)	53501.16*** (0.000)
Renewable energy supply				-15.92*** (0.000)	56791.66*** (0.000)	25613.55*** (0.000)	45746.64*** (0.000)
Waste generation (mt)					32343.13*** (0.004)		28645.42* (0.014)

Waste generation (%)				6.29*** (0.000)		25550.23*** (0.000)	
Water use				7.04*** (0.000)	-21686.48** (0.008)		
Employee volunteerism rate	25.21*** (0.000)	3.50*** (0.000)					
Volunteering hour contributed	-18.93*** (0.000)						
Hispanic	-22.62*** (0.000)				34135.25*** (0.000)		36982.85*** (0.002)
White					-35157.16*** (0.001)		-54860.30*** (0.000)
Black		-1.46* (0.020)				-22765.08*** (0.000)	
Other ethnicity		3.71*** (0.000)				41328.41*** (0.000)	71157.78*** (0.000)
Total incident rate					-16916.39* (0.019)	-20464.42*** (0.000)	
Inc. Revenues				-1854.35*** (0.000)			
Num. employees					-807.60* (0.012)		-1328.52*** (0.002)
ROE					333.12* (0.041)		1432.59*** (0.000)
Adjusted R²	54.60%	69.10%	16.50%	83.80%	62.60%	82.40%	77.20%
N	79	63	20	65	111	99	113
CI	9.78	7.11	2.10	11.53	15.96	24.45	17.12
FIV	2.202	2.650	1.000	2.255	2.579	2.080	2.674

The contemplated dependent variables are, in Models 1-4, the scores obtained in the four CSR rankings, respectively; in Models 5-7, they are the scores obtained in the three brand rankings. The independent variables are the 29 dichotomic environmental and social variables selected from the companies' CSR reports. Also, 7 economic-financial control variables were added. ***, **, and * are 0.5%, 1% and 5% error levels, respectively. CI and FIV presents a low level in the obtained models. This means that no multicollinearity exists among the variables.

Table 6. Results of the linear regression for credit rating from 2000 to 2017.

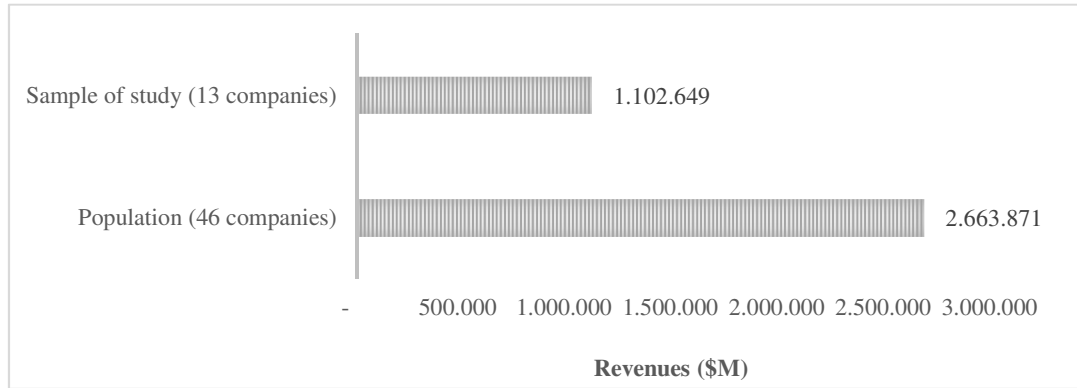
	1		2	
	S&P		Moody's	
Constant	7.49*** (0.000)		5.43*** (0.000)	
Gas emissions: Scope 2			1.27*** (0.000)	
Gas emissions: Scope 3	0.56*** (0.000)			
Energy use: Electricity				
Renewable energy	0.79*** (0.000)		1.34*** (0.000)	
Renewable electricity	0.42* (0.032)		1.33*** (0.000)	
Water use			-1.51*** (0.000)	
Waste generation			1.62*** (0.000)	
Employee volunteerism rate	0.69*** (0.000)		1.61*** (0.000)	
Women			-0.66* (0.014)	

	-0.56***	
Lost work day	(0.000)	
		-1.01***
Total incident rate		(0.000)
	12.07*	26.12***
Inc. Assets	(0.022)	(0.005)
		-316.68***
Leverage		(0.000)
		84.73**
ROE		(0.006)
	58.30***	621.90***
ROA	(0.004)	(0.000)
Adjusted R²	35.60%	51.90%
N	200	200
CI	3.17	12.36
FIV	1.051	1.161

The dependent variables are the long-term issuer credit ratings, transformed into an ordinal scale in accordance with the equivalence in Table 2, provided by S&P (Model 1) and by Moody's (Model 2). The independent variables in the study are the the 29 dichotomic socio-environmental variables, which take a value of 1 if the company provides information about the variable in its sustainability report, and 0 otherwise. Also, 7 economic-financial control variables were added. ***, **, and * are 0.5%, 1% and 5% error levels, respectively. CI and FIV presents a low level in the two obtained models This means that no multicollinearity exists among the variables.

Figures

Figure 1. Population and sample of Technology sector, in 2018.



Source: Own performance from Fortune Global 500.