Corporate Social Responsibility and Sustainability Reporting on the Internet

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ABSTRACT
All material related to environmental and social performance on the corporate internet sites of 454 Fortune Global 500 and Fortune 1000 companies in 25 industrial sectors was analyzed using the Pacific Sustainability Index. Maximum scores for individual sectors were 20–75 percent of the total possible, highest in the largest and most environmentally sensitive sectors and ranging generally linearly, as shown by plotting score versus rank, down to nearly zero in every sector. None of the variation in score is explained by corporate revenue in the Asian and European firms in this sample (revenues greater than about $9 billion), but there is a very weak correlation between score and revenue for American firms of this size, and a stronger one when Fortune 1000 companies (all American) with revenues smaller than this are included, suggesting that, as corporate size reaches a certain threshold, sustainability reporting becomes independent of it. Copyright © 2009 John Wiley & Sons, Ltd and ERP Environment.

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Introduction

With the rise in influence of the Global Reporting Initiative (GRI) and its series of sustainability reporting guidelines (GRI, 2000, 2006) derived from earlier CERES reporting guidelines (CERES, 1999a, 1999b), corporate sustainability reports, also frequently referred to as corporate social responsibility (CSR) reports and health safety and environment (HSE) reports, have begun to appear regularly on the websites of many of the world’s largest firms, duplicating or more often supplanting printed copies, to the point that even when a printed copy exists it is also available electronically. These reports characteristically document corporate environmental and social policy, objectives, initiatives and performance, and are increasingly accompanied by third-party assurance statements (Kolk and Perego, 2008). Often they are supplemented with additional material on the corporate website and elsewhere, and the delivery of the formal report via the internet allows this supplemental material to be reached directly from the report by hyperlink. Even when a formal report following GRI or other guidelines is not produced, many corporate websites include a considerable amount of
material suitable for such a report in hyperlinked webpages, and much of the analysis of corporate sustainability material (Albino et al., 2009; Bonsón-Ponte et al., 2006; Bonsón and Escobar, 2002, 2006; Branco and Rodrigues, 2008; Cerin, 2002; Chapple and Moon, 2005; Jenkins and Yakovleva, 2006; Jose and Lee, 2007; Jung et al., 2001; Kolk et al., 2008; Lober et al., 1997; Marston and Polei, 2004; Martin and Hadley, 2008; Moore, 2001; Moore and Robson, 2002; Noci, 2000; O’Dwyer, 2003; Rice, 1993; Roberts Environmental Center, 1999–2009; Rodríguez Bolívar, 2009; Rodríguez Bolívar and Senés García, 2004; Stiller and Daub, 2007; Vormedal and Ruud, 2009) has depended on these internet-based materials, although Cerin (2002) noted that it was not always clear that all appropriate material from a website had been found or that it was up to date. A few authors obtained printed reports as their primary source, but also searched for internet-based information as a matter of course (Branco and Rodrigues, 2008; Kolk et al., 2001; Sinclair and Walton, 2003) or if the printed reports cited material on the internet (Daub, 2005; Stiller and Daub, 2007). However, one recent study formally eschewed internet-based material entirely, preferring the stability and accessibility of paper-based reports (Vormedal and Ruud, 2009), and many studies of corporate social and environmental philosophy, behavior or performance – as opposed to reporting – have based their analyses on survey forms sent to the companies (Banerjee, 2002; Buil-Carrasco et al., 2008; Lober et al., 1997; Marston and Polei, 2004; Martin and Hadley, 2008; Paulraj, 2008; Rao et al., 2009; Revell and Blackburn, 2007; Studer et al., 2006; Welford, 2004, 2005; Xie and Hayase, 2007). It was clear as early as 1983 that the cost of disclosing corporate information via print made it difficult to interpret unambiguously the absence of such information (Verrecchia, 1983). The low cost of internet-based reporting tends to solve this problem as long as there is a will to report (Adams and Frost, 2006), and the many specialized features that can be implemented (Isenmann, 2004; Isenmann et al., 2007; Isenmann and Lenz, 2000, 2001, 2002; Morhardt, 2008) make the internet even more attractive as a means of disseminating corporate information. However, although some authors prefer a formal, edited report in electronic format to a set of hyperlinked webpage material (Morhardt and Adidjaja, 2004), it is clear that, if one’s intent is to examine all relevant data, an internet search should not confine itself solely to the formal sustainability reports (Daub, 2005), and, even before the presence of sustainability reporting in any form, considerable social responsibility information could be found in corporate documents other than formal annual reports (Zéghal and Ahmed, 1990).

Table 1 is a list of publications analyzing corporate sustainability reporting intended to give an overview of the types of analysis that have been used. It identifies the source of the information, the numbers of topics and categories considered, whether the analysis summed the data into an index of the quality of reporting, whether or not the index was associated with individual companies allowing their ranking and whether or not possible correlations between the index value and characteristics of the firm (e.g. size, profitability, sector etc.) were explored. The main purpose of most of these studies is simply documentation of the types and quantity of sustainability reporting done by various subsets of companies at the time of the study. There are two general approaches: (i) to measure the volume of disclosure in sentences, words, numbers of pages or types of report and (2) to document the presence of predetermined topics. Unerman (2000) provides a more complete documentation of studies of the former type than is included in Table 1. In the context of evaluating the CSR content in Shell’s corporate documents over a 100-year period, he argues forcefully that measuring the numbers of pages of output is more informative than ticking off topics on a checklist. Many of the studies of the latter type represented in Table 1 amount to just ticking off topics and displaying them as a matrix of topics in individual reports (e.g. Holcomb et al., 2007; Hussey et al., 2001) or as percentages of companies addressing each topic (e.g. Jose and Lee, 2007; Rikhardsson et al., 2002), but a more sophisticated multi-level analysis is also common, documenting complexity of disclosure and its quantitative content. The number of levels utilized by each study of this type is also addressed in Table 1. A logical extension of a multi-level analysis by topic is to combine the results from all topics into an index of reporting quality. Those studies in Table 1 that have created such an index, or that include data that could be thus combined, are marked with one asterisk, and if the company-specific index values are reported two asterisks. Of the 15 of the latter, only six (Moore, 2001; Morhardt, 2001; Morhardt et al., 2002; Peck and Sinding, 2003; Roberts Environmental Center, 1999–2009; SustainAbility, 1993–2008) formally rank the companies for quality of reporting. Five of the studies creating indices regress them on size and other firm characteristics (Brammer and Pavelin, 2004; Branco and Rodrigues, 2008; Cormier and Magnan, 2003; Moore, 2001; Roberts Environmental Center, 1999–2009) or on external environmental performance measures (Wiseman, 1982), with the intent of identifying reasons for good reporting.
<table>
<thead>
<tr>
<th>Citation</th>
<th>Companies analyzed</th>
<th>Topics and results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wiseman, 1982**</td>
<td>26 of the largest US steel, oil, and pulp &amp; paper companies</td>
<td>18 environmental topics in 5 categories, 4 levels of reporting, plus No. of sentences on each topic summed into 2 unweighted indices for individual companies, but not by name, regressed on external environmental performance measures.</td>
</tr>
<tr>
<td>Cowen et al., 1987</td>
<td>134 US companies from 10 sectors</td>
<td>7 sustainability topics, No. of of companies and average No. of pages for each topic, regressed on sector and corporate characteristics.</td>
</tr>
<tr>
<td>Zéghal and Ahmed, 1990</td>
<td>6 largest Canadian banks and 9 largest petroleum companies</td>
<td>26 environmental and social topics in 7 categories plus % total words by category, by sector and by type of publication.</td>
</tr>
<tr>
<td>Patten, 1991</td>
<td>156 Fortune Global 500 companies from 8 sectors</td>
<td>7 sustainability topics measured as greater than 0.25 page (high disclosure), less than 0.1 page (low disclosure). Between 0.1 and 0.25 page excluded.</td>
</tr>
<tr>
<td>Roberts, 1991</td>
<td>110 companies from 5 European countries</td>
<td>54 environmental topics in 9 categories, 2 levels, % companies reporting and average No. of items disclosed by category.</td>
</tr>
<tr>
<td>Sustainability, 1993–2008**</td>
<td>10–100 companies in each of 10+ benchmark reports</td>
<td>29–50 sustainability topics, 5 levels, summed into an unweighted index, companies ranked.</td>
</tr>
<tr>
<td>Welford, 1994</td>
<td>BT and IBM UK</td>
<td>Characterization of all environmental topics covered in these 2 reports.</td>
</tr>
<tr>
<td>Azzone and Manzini, 1994**</td>
<td>15 large multinationals</td>
<td>5 categories of environmental performance indicators. Matrix of companies providing data on each type of indicator, an unweighted, unsummed index.</td>
</tr>
<tr>
<td>Gray et al., 1995a, 1995b</td>
<td>100 largest UK companies</td>
<td>20 sustainability topics in 12 categories, plus No. of pages reported for 4 general categories.</td>
</tr>
<tr>
<td>Lober et al., 1997</td>
<td>97 Fortune 500 and Standard and Poors 500 companies (no banks)</td>
<td>58 environmental topics, % reports by sector and average % reports including each topic.</td>
</tr>
<tr>
<td>Davis-Walling and Batterman, 1997**</td>
<td>All 24 Fortune 50 companies publishing environmental reports</td>
<td>29 environmental topics in 6 categories summed into a 2–3-level index of individual companies.</td>
</tr>
<tr>
<td>Adams et al., 1998</td>
<td>25 largest companies in each of 6 European countries</td>
<td>Unspecified environmental, ethical and employee items disclosed, length of narrative disclosures. Narrative length, No. of items of each type and No. of quantitative items disclosed by sector, size and country.</td>
</tr>
<tr>
<td>Roberts Environmental Center, 1999–2009**</td>
<td>15–100 Fortune Global 500 and Fortune 1000 companies in each of 40+ sector reports</td>
<td>60 baseline + up to 20 sector-specific topics, 2–7 levels, summed and normalized into unweighted index, companies ranked and graded, correlations with financial variables.</td>
</tr>
<tr>
<td>Hopkinson et al., 2000</td>
<td>The 27 water companies in England and Wales</td>
<td>27 topics in 8 categories, 3 (non-exclusive) levels of reporting; No. of companies reporting on each category at each level.</td>
</tr>
<tr>
<td>Unerman, 2000</td>
<td>Shell, 1898–1997</td>
<td>No. of pages of CSR reporting, displayed by year and by document type.</td>
</tr>
<tr>
<td>Noci, 2000**</td>
<td>14 Italian firms or multinationals with reports of Italian operations</td>
<td>All indicators found for 6 environmental categories plus economic disclosure, 3 levels, plus various other topics, basically an uncalculated index.</td>
</tr>
<tr>
<td>Kolk et al., 2001</td>
<td>The Fortune Global 250</td>
<td>6 topics, presented as matrices of numbers/percentages of topics by sector.</td>
</tr>
<tr>
<td>Hussey et al., 2001**</td>
<td>3 multinational energy and oil, 4 consumer goods and 3 health care product firms</td>
<td>All 114 topics in GRI 2000 guidelines as a matrix by company and year: basically an unweighted unsummed index.</td>
</tr>
<tr>
<td>Jung et al., 2001**</td>
<td>40 large multinational companies in 7+ sectors</td>
<td>28 environmental topics in 8 categories, 2–6 levels, summed into an index and presented as a matrix of scores for each company in each category.</td>
</tr>
</tbody>
</table>

Continued
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<tr>
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<tr>
<td>Moore, 2001**</td>
<td>8 of the 11 main firms in the UK supermarket industry</td>
<td>16 environmental and social topics, 10 levels, summed into an unweighted social performance index and the companies ranked. Scores regressed on several firm characteristics and measures of financial performance.</td>
</tr>
<tr>
<td>Morhardt, 2001**</td>
<td>28 Fortune 50 companies</td>
<td>29, 40 and 50 sustainability topics, depending on system, summed into unweighted indeces and companies ranked.</td>
</tr>
<tr>
<td>Bonsón and Escobar, 2002</td>
<td>20 largest companies in each European Union country</td>
<td>23 topics, only one of which was environmental, and was undefined.</td>
</tr>
<tr>
<td>Cerin, 2002</td>
<td>24 of 317 companies on the OM Stockholm exchange</td>
<td>% of companies with environmental reports by sector, size category, market capitalization, CO₂ emissions/turnover.</td>
</tr>
<tr>
<td>Rikhardsson et al., 2002</td>
<td>481 Fortune Global 500 companies</td>
<td>54 topics based on GRI 2002, plus 9 topics on internet presentation features and 6 topics on means of interaction with the company; % companies disclosing information on each topic.</td>
</tr>
<tr>
<td>Morhardt et al., 2002**</td>
<td>The 10 largest Fortune Global 500 companies in each of 4 sectors</td>
<td>29, 40, 50, 139, and 197 topics, depending on system, summed into unweighted indices, companies ranked within sector.</td>
</tr>
<tr>
<td>Campbell et al., 2003</td>
<td>5 UK companies in 3 FTSE sectors 1975–1997</td>
<td>No. of words of disclosure on employee welfare, community involvement, and environmental issues.</td>
</tr>
<tr>
<td>Kolk, 2003</td>
<td>Fortune Global 250+</td>
<td>All sustainability information plus 10 social topics and 5 social performance indicators. Changes in % companies reporting since Kolk et al. (2001) by sector and country, plus frequency of social topics and performance indicators.</td>
</tr>
<tr>
<td>O’Dwyer, 2003</td>
<td>The 83 publicly listed Irish companies</td>
<td>5 environmental categories. Page length of disclosures and No. of quantified/financial, audited and negative news disclosures.</td>
</tr>
<tr>
<td>Sinclair and Walton, 2003</td>
<td>53 of the 94 largest forest and paper companies</td>
<td>1 topic (fiber procurement) plus company level (corporate, geographic, business unit, site) for which reports are produced.</td>
</tr>
<tr>
<td>Cormier and Magnan, 2003*</td>
<td>50 of 57 non-financial French firms in the Datastream database</td>
<td>39 environmental topics, 6 categories, 4 levels, summed into an index, but companies not shown separately or identified. Index regressed on 12 accounting variables.</td>
</tr>
<tr>
<td>Peck and Sinding, 2003**</td>
<td>30 of the 50 largest mining companies</td>
<td>26 topics in 2 overall categories, 3 levels, summed into 2 indices. The 2 indices plotted on a scattergram are loosely correlated.</td>
</tr>
<tr>
<td>Kolk, 2004</td>
<td>33 Fortune Global 250 companies</td>
<td>10 international standards, 5 organizational aspects, 13 social performance indicators; % companies referencing each.</td>
</tr>
<tr>
<td>Marston and Polei, 2004</td>
<td>The top 25 and last 25 DAX (German) 100 companies</td>
<td>71 characteristics of corporate information on websites, including 5 related to environmental and social reporting, and many on financial, accounting and managerial topics; % companies disclosing information by topic.</td>
</tr>
<tr>
<td>Brammer and Pavelin, 2004*</td>
<td>134 of largest 150 UK companies</td>
<td>11 topics in 3 categories, 3–5 levels, plus inclusion in BIE and BitC indices, summed into an unweighted index by sector, then correlated with characteristics of firms.</td>
</tr>
<tr>
<td>Chan and Welford, 2005</td>
<td>All 219 companies on the Hong Kong stock exchange</td>
<td>19 environmental topics, 3 levels, plus 3 other categories; % companies disclosing each during IPO and in 2002 annual report.</td>
</tr>
<tr>
<td>Haddock, 2005</td>
<td>16 UK retailers and 43 UK food manufacturers</td>
<td>% of companies having environmental policy and reporting, plus evidence of media allegations.</td>
</tr>
<tr>
<td>Chapple and Moon, 2005*</td>
<td>50 largest companies with websites in 7 Asian countries</td>
<td>19 sustainability topics, 3 categories, 3 levels, summed into an index for each company but reported only by country and by category. Comparison of topical reporting by domestic and international companies.</td>
</tr>
<tr>
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</tr>
<tr>
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</tr>
<tr>
<td>Daub, 2005**</td>
<td>76 Swiss companies, the largest 5 in each sector</td>
<td>33 topics in 4 categories, 2–3 levels, summed into an index for each company. Companies ranked but ranking not reported.</td>
</tr>
<tr>
<td>Bonsón and Escobar, 2006</td>
<td>20 largest companies in each of 13 European Union countries</td>
<td>44 topics, one of which was environmental, and another social responsibility, both undefined. % companies reporting each topic.</td>
</tr>
<tr>
<td>Jenkins and Yakovleva, 2006**</td>
<td>The 10 largest mining companies</td>
<td>7 general environmental categories. Matrices of types of reports and general categories reported by year; basically an unweighted unsummed index.</td>
</tr>
<tr>
<td>Jose and Lee, 2007</td>
<td>140 Fortune 200 companies</td>
<td>49 environmental policy, management, control, and leadership topics; % reports touching on each topic.</td>
</tr>
<tr>
<td>Holcomb et al., 2007**</td>
<td>The top 10 hotel companies</td>
<td>16 sustainability topics (unspecified, from a matrix of 41 potential topics), presented as a matrix of topics reported by each hotel company, basically an unweighted unsummed index.</td>
</tr>
<tr>
<td>Brammer and Pavelin, 2008</td>
<td>447 of the 700 FTSE All-Share Index UK companies</td>
<td>5 environmental categories, % disclosing in each by sector, correlated with firm characteristics.</td>
</tr>
<tr>
<td>Kolk, 2008</td>
<td>Fortune Global 250</td>
<td>8 governance/sustainability topics; % companies reporting each in sustainability versus integrated reports.</td>
</tr>
<tr>
<td>Kolk et al., 2008</td>
<td>4 largest domestic and 4 largest international retailers in China</td>
<td>20 sustainability topics in 5 categories, plus type of CSR reporting. Chinese- and English-language websites compared for Chinese companies.</td>
</tr>
<tr>
<td>Branco and Rodrigues, 2008*</td>
<td>49 of the 57 Portuguese companies listed on Euronext–Lisbon</td>
<td>30 sustainability topics; % companies disclosing information on each in reports vs. websites. Correlations with firm characteristics.</td>
</tr>
<tr>
<td>Criado-Jiménez et al., 2008*</td>
<td>78 Spanish firms listed on the Madrid Stock Exchange</td>
<td>9 environmental topics, 2–5 levels, summed into an unweighted index of environmental disclosure by year for all companies.</td>
</tr>
<tr>
<td>Vazquez and Liston-Heyes, 2008*</td>
<td>50 Argentine companies</td>
<td>11 environmental performance and behavior topics, plus 3 discourse categories, each comprising 16 story-lines and metaphors used in discourse analysis; firms classified as having 1 of 3 dominant paradigms.</td>
</tr>
<tr>
<td>Albino et al., 2009</td>
<td>All 255 companies in the Dow Jones Sustainability World Index</td>
<td>4 categories of [unspecified] environmental keywords. % firms using keywords by sector.</td>
</tr>
<tr>
<td>Pollach et al., 2009</td>
<td>989 Fortune 1000 companies, 39 environmental organizations, and 114 news media</td>
<td>311 technical terms in 6 waste management categories searched with automated web content mining. Frequencies of the 6 categories reported by sector, NGO type and media.</td>
</tr>
<tr>
<td>Rodríguez Bolívar, 2009*</td>
<td>4 Spanish utilities and 5 Spanish resource companies</td>
<td>18 environmental topics, 6 financial/environmental topics and 8 website presentation topics, summed into three 2-level unweighted indices. Results presented by sector.</td>
</tr>
<tr>
<td>Vormedal and Ruud, 2009*</td>
<td>98 of 100 largest companies in Norway</td>
<td>4 sustainability categories, 5 levels, summed into an unweighted index. Disclosure in annual reports compared with that in sustainability reports.</td>
</tr>
</tbody>
</table>

* Overall index of reporting quality calculated (or possible to calculate from the data provided).
** Overall index of reporting quality calculated and associated with individual companies.
As described above, the quality of sustainability reporting is often analyzed by documenting the presence of a predetermined set of topics as documented in Table 1. Kolk and Mauser (2002), building on the work of Doty and Glick (1994), examined a large number of publications, six of them appearing in Business Strategy and the Environment (Callens and Wolters, 1998; Ghobadian et al., 1998; Lee and Green, 1994; Roome, 1992; Shrivastava and Hart, 1995; Stikker, 1992), describing approaches to environmental management, and classified them into primarily two types, which are also appropriate for classification of sustainability reporting: continuum and typology. The continuum type results in the linear classification of individual companies (or their reporting) into one of a series of classes, each more comprehensive than the previous one. The classes can be descriptive, such as the designations of ‘beginner’, ‘fire fighter’, ‘concerned citizen’, ‘pragmatist’ and ‘proactivist’ by Hunt and Auster (1990), but when these were applied, for example, to environmental reporting of Norwegian and food processing industries by Hass (1996) they did not seem to accurately characterize the status of the companies. The typology approach often envisions a matrix structure in which a combination of criteria is possible (Kolk and Mauser, 2002), and such a combination can also result in a numerical outcome arrived at by assigning values to each of the criteria and aggregating them, a position that Hass (1996) defaulted to, arraying the aggregate scores onto a linear continuum in the approach used in this paper. The reports marked in Table 1 with two asterisks use at least part of this approach, and are described in more detail below.

Wiseman (1982), analyzing annual reports, examined 18 environmental topics at four levels of reporting in five categories, and summed them into an unweighted index, plus number of sentences on each topic (line count index). Both indices were reported by company, but, although the scores were not associated with company names, the overall environmental disclosure index and its five categories were regressed on external environmental performance measures, defined by the Council on Economic Priorities (CEP). There was no correlation between the indices and the CEP rankings. SustainAbility (1993–2008) published an influential series of benchmarking studies based on corporate environmental reports, later supplemented with information on corporate websites, ranking the companies for quality of reporting. Azzone and Manzini (1994) examined company reports of 15 large multinationals, documenting whether they had any disclosure of five different categories of environmental performance indicators (prevention costs and investments, operating environmental costs, contingent environmental liabilities, physical indicators and compliance) and reported them by company in a matrix that could be summed to create a reporting index, allowing the ranking of the firms. Davis-Walling and Batterman (1997) examined the 24 environmental reports produced by Fortune 50 companies at the time for one or two levels of information on 29 environmental reporting topics and presented the raw data in a table that allows ranking the companies. Subsequently, the Roberts Environmental Center at Claremont McKenna College (1999–2009) began an ongoing characterization of corporate sustainability reporting on company websites based on the Pacific Sustainability Index (PSI) (Morhardt, 2002; Roberts Environmental Center, 2008), effectively amalgamating the ideas in the ISO 14031 and GRI guidelines into a comprehensive sustainability reporting scorecard customized for each industrial sector and reported as a single score (with several subsets available) for each company. Morhardt (2001) applied the Davis-Walling and Batterman, Deloitte Touche Tohmatsu (1999) and SustainAbility scoring systems to data available in 1998 on the websites of the companies scored in two previous reports (Davis-Walling and Batterman, 1997; SustainAbility–UNEP, 1996) and found that the scores of all three were similar in magnitude and strongly correlated. Morhardt et al. (2002) carried this analysis farther for the 10 largest companies in four sectors (motor vehicles and parts, petroleum refining, utilities and electronics) using these three scoring systems plus two additional ones of their own design based on the ISO 14031 (ISO, 1999) and GRI 2000 (GRI, 2000) guidelines. The latter two included many topics not considered in the published scoring systems, and the scores from them were much lower, suggesting plenty of room for more complete reporting and more detailed analysis. Jung et al. (2001), like Morhardt et al. (2002), considered that GRI and ISO 14031 were good candidate lists of environmental indicators, and selected a subset of 29 them to create the ‘GScore’ index, which they then used to score 39 EHS reports from firms in the petroleum and refining industry that had put their reports on the internet. Hussey et al. (2001) also saw the merit of using the GRI reporting guidelines as an index of reporting and used all 114 of the topics to score the 1995–2000 sustainability reports of 10 large firms, presenting the adherence to each of the topics by company in a matrix, creating an incipient index. Moore (2001) created an independent index of social performance...
by aggregating the unweighted scores of 16 social performance criteria, then used it to rank eight firms in the UK supermarket industry. In an unusual approach, Peck and Sinding (2003) created two indices for individual large mining companies, one related to expressed environmental intent and the other to presentation of quantitative data, then plotted the two indices against each other, resulting in an unquantified regression suggesting a strong link between the two. Daub (2005) developed an index assigning a numerical rating to each of 33 topics, then used it to rank the sustainability reports of 73 Swiss companies, and Jenkins and Yakovleva (2006) studied the reporting of the largest mining companies and presented the data as a matrix of general environmental categories reported on by company, effectively creating an index that they could have compared to those of Peck and Sinding (2003). Finally, Holcomb et al. (2007) looked at the reporting of the top 10 hotel companies in the world, associating the presence of 16 (unidentified) sustainability topics with the individual company reports, but did not formally rank the companies. A principal research question of all of these studies was descriptive: to describe the current state of reporting.

This paper reflects a much larger effort along these same lines, using the PSI. The results presented here comprise an overview of sector-by-sector sustainability reporting of many of the world’s largest companies characterized by the overall PSI score.

Although there are now many studies evaluating the environmental reporting, and less often the social reporting, of corporations by sector, this is the first that systematically looks at all Fortune Global 500 and Fortune 1000 companies in each sector analyzed, calculates a single performance index and ranks them. The result is a systematic analysis spanning a corporate size (revenue) range of over two orders of magnitude (from $1.4 billion to $380 billion), much larger than covered in most other studies, so the effect of company size – or lack of it – on sustainability reporting should be clearly discernable. The size of company considered here is well above what is usually considered small or medium sized (European Commission, 2005), however, so reporting considerations specifically related to such firms (cf. Borga et al., 2009) are not addressed here. Plotting the scores of each company within each sector by rank from highest to lowest reveals not only the overall differences in score among sectors, but also sector-wide patterns of reporting, making it possible to determine whether in some sectors most – or, alternatively, very few – companies do a good job of reporting or whether there is a gradual falling off of scores from the best to the poorest reporters.

This paper contributes to the literature by demonstrating striking differences in sustainability reporting across industrial sectors and across companies in each sector. It uses the technique of encapsulating such reporting in a single score for each company and plotting the scores by rank, a technique not previously used in analyzing sustainability reporting, providing an unusually graphic overview of differences across sectors, and of how scores in each sector relate to one another. In particular, it shows that in only a few sectors are the leading reporters far above their peers; in most sectors there is a fairly linear decline in PSI score from the best reporters in a sector to the worst, which in all sectors report hardly anything. Furthermore, the best reporters in the best reporting sectors have more than three times the overall PSI score than the best reporters in the poorest sectors. This paper also demonstrates that, although corporate size is clearly important in sustainability reporting if a large enough size range is considered, it appears to be unimportant when all sectors are considered together in companies large enough to be included in the Fortune Global 500.

Other Approaches to Characterizing Sustainability Reporting

In addition to the analysis schemes that, like the one used in this paper, set out to score and rank individual companies, many studies have analyzed various aspects of the environmental and social content of corporate reporting across a range of companies, most reporting the data in aggregate. Some have confined their analysis to companies that produced free-standing environmental or related reports (see Table 1 for this and the other characteristics mentioned here.) Sometimes they also include material in annual reports, but most have analyzed material whether in a formal report or not, with increasing dependence on materials provided on the internet. Some have examined companies in a single industry, from a single country or a few countries, or both, but some, like this study, have had as their target group the largest companies, irrespective of country or industrial affiliation.

Daub (2007) took issue with national and international studies on the quality of corporate sustainability reporting that select individual reports that appear to be extremely good and analyze only them. He particularly notes
this practice in the benchmark studies of the consultancy SustainAbility, begun in 1994, the most recent of which (SustainAbility, 2006) continues this approach. It was this exclusion of lesser reporters that prompted me to begin analyzing all companies above a certain size within an externally determined industrial sector. Doing so has the obvious advantage of allowing an unbiased comparison of reporting across sectors. Daub also objected to exclusion of information not contained in a formally designated sustainability report, an obvious issue when attempting to compare all companies of a certain size within a sector, because many, even those publishing much relevant information, package it in other ways: hence my strategy of including all relevant material available on corporate websites at the time of analysis. Daub himself, however, in setting out to analyze the top 100 companies in Switzerland, could not resist including two smaller companies because of the quality of their reporting (Daub, 2007), and selected enough companies ranked between 100 and 200 to obtain at least five companies from each sector, much as I have done here, augmenting Fortune Global 500 companies with smaller Fortune 1000 companies to obtain 30 companies per sector when possible.

Methods and Results

The subject of this paper is the material related to environmental and social issues posted on the websites of corporations on the Fortune Global 500 and Fortune 1000 lists. The lists group the companies into industrial sectors, and this paper analyzes the reporting of companies in 25 of these sectors (identified in Figures 1 and 2) using the

Figure 1. Ranking of PSI overall scores for companies in 25 industrial sectors.
most recent data available in May 2008 from the Roberts Environmental Center sustainability reporting database (Roberts Environmental Center, 1999–2009). For sectors with more than 30 companies, only the largest 30 were analyzed. For the remainder, all companies in the sector were included. The companies on the Fortune 1000 list (an extension of the Fortune 500 list) are all based in the US, so all companies smaller in size than those on the Fortune 500 list (revenues of about $9 billion depending on year) are American.

All relevant materials from the websites of each company were downloaded and scored using the PSI, which consists of a base scoring sheet used for all sectors and a sector-specific scoring sheet with more specialized topics. The detailed scoring sheets are available at the Roberts Environmental Center (2008) website. In addition to the PSI overall score, which is calculated as the percentage of the total possible score on the PSI scoring sheets, scores for six subsets of the overall score were calculated, each also expressed as a percentage of its total possible score. These scores are based on mutually exclusive subsets of all of the PSI topics, grouped into the categories of environmental and social intent (expressions of intending to act in a sustainable manner), environmental and social reporting (the extent to which numerical data, good or bad, are reported) and environmental and social performance (numerical data showing improvement and better than sector average values).

The PSI overall scores for each sector plotted by rank (Figure 1) show that the highest scores for each sector vary widely, between 20 and over 70 percent of the highest possible score, with a large gap between those scoring above 40 percent and the four sectors near 20 percent. These latter sectors – oil equipment, scientific and photo equipment, wholesalers and homebuilders – have relatively few (between 10 and 15) members, most of them not in the Fortune Global 500, and are not obviously associated with environmental or social issues, thus it is not

![Figure 2. Ranking of revenue for companies in 25 industrial sectors.](image-url)
surprising that they are not yet reporting much sustainability information. Nevertheless, the highest scorers in each are Fortune Global 500 companies. Four other sectors – mail, food services, forest and paper products and medical products – are equally small but have at least some companies with much better reporting and hence higher scores. Most of the sectors with the highest scores also have many more companies on the Fortune lists, and about half of them score higher than the highest scores of the smallest sectors. Thus, having more companies in the pool appears to increase the chances of having some that are actively engaged in sustainability reporting. Some sectors strongly associated with environmental or social issues, such as utilities and petroleum refining, retain high scores over much of their range, as do, for less obvious reasons, but probably having to do with strong retail–customer interactions, motor vehicles and parts, and banks. Most sectors also have members with very low scores, so it is clear that even in this sample of fairly large companies the decision to engage in sustainability reporting is by no means universal.

The companies within each sector, although large, are not comparable in size, in some sectors varying in annual revenue by more than two orders of magnitude. Figure 2 displays the revenue by rank of all companies by sector and superficially resembles the plots in Figure 1; however, the revenue axis is exponential rather than linear, so, even though appearing similar to Figure 1, the revenue falls off with rank much faster than the PSI overall scores fall off with rank. It might be expected that companies with more revenue would do better sustainability reporting than those with low revenue, and indeed this is true when all companies in the sample are considered. Figure 3 is a regression of the PSI overall scores on the revenue of all companies in the sample (omitting banks, which report assets rather than revenue). Log-transformation of revenue increased linearity and resulted in a highly significant regression ($P < 0.000$), with log revenue explaining a third of the variability in PSI overall scores (adjusted $r^2 = 0.33$). Regressions of PSI overall score (and all other subsets of PSI scores) on income of Fortune Global 500 European, and Asian firms are all insignificant, however, indicating that the overall regression is entirely driven by the American firms in the sample, which by themselves result in an adjusted $r^2$ of 0.34. The strength of the overall regression, while still highly significant, falls considerably when only firms in the Fortune Global 500 are included (adjusted $r^2 = 0.07$ for all data, adjusted $r^2 = 0.15$ for American firms only), thus the inclusion of Fortune 1000 (American) firms with revenues less than around $9$ billion is a strong contributor to the overall regression.

![Figure 3. Regression of PSI overall score on log₁₀ revenue.](image-url)
regression. Also clearly visible in Figure 3 is a shift in the distribution of scores at about the threshold size of the Fortune Global 500. Companies with revenues between $1 billion and $9 billion have almost no scores over 40; immediately above this revenue level the highest scores are commonly above 50, with some above 60. No Asian or European firms smaller than those in the Fortune Global 500 were included in the dataset, so the effect they might have had on the distribution of scores or the strength of the overall regression is unknown.

The subsets of the PSI scores are all highly significantly correlated with one another (Table 2), indicating that, in general, if companies begin reporting at all they tend not to confine themselves to just environmental or just social reporting, and if they express intent to report they tend to provide numbers as well. Those firms expressing the strongest intent to report also report the most and have the best performance. That said, however, there is a considerable amount of scatter in these correlations. An example (Figure 4), plotted and labeled in a manner

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*Table 2.* Pairwise correlation matrix of all PSI sub-categories for all websites (n = 445). P < 0.0001 for all values

**Figure 4.** Regression of environmental reporting and social reporting scores on environmental intent and social intent scores.
analogous to the analysis by Peck and Sinding (2003) of the reporting of the mining sector, shows just how noisy the data are. Many companies (those in the Starters quadrat) achieve high intent scores but do not follow this up with much numerical data. Others (the few in the Hoarders quadrat) provide the data without saying much about it. The slopes of the regression lines fitted to both environmental and social data (not shown) are considerably less than 1.0, reflecting the fact that meeting the intent requirements of the PSI is considerably easier than providing the data expected by it under the reporting requirements.

Discussion

The main empirical result of this study is that, for most sectors, there is a smooth gradation in sustainability reporting from the best reporters to the worst, and in all sectors the worst reporters are very bad indeed. In particular, it is the lower end of reporting that is seldom examined. There are only a few studies (Holcomb et al., 2007; Jenkins and Yakovleva, 2006; Jung et al., 2001) other than those of the Roberts Environmental Center (on whose data this paper is based) that systematically evaluate the reporting of all the largest companies in each sector, irrespective of status of sustainability reporting, and score them in a way that can be ranked, although there are many studies that include all reporters and non-reporters without ranking them (see Table 1). Other examples of ranking score only the best reporters across sectors (SustainAbility, 1993–2008), only the largest companies across sectors (Davis-Walling and Batterman, 1997; Morhardt, 2001), only the largest companies within sectors that had environmental reports on their websites (Morhardt et al., 2002; Peck and Sinding, 2003), or only companies that submitted reports for scoring (Daub, 2005). Only by scoring all the information on the websites of all the largest companies in each sector does it become clear that such a large range of reporting exists, and that there are few substantial discontinuities when the scores are arranged in ranks. The most striking discontinuities occur in the sectors with the fewest companies, particularly medical products (in which one firm had twice the score of its nearest rival, which in turn had three times the score of the next in line) and entertainment (in which the scores of the two leaders were both more than twice as high as that of the third in line.) In the medical products sector all the companies are relatively small – less than $10 billion, but the highest scorer is twice as large as the second highest scorer so this may be a size effect. In the entertainment sector the two scoring leaders are much larger than the next four highest-scoring firms, and more than half again as large as any of the other firms in the sector, so this discontinuity of scoring also appears to be a size effect with the largest companies in the sector in the Fortune Global 500 size range, and the others well below it.

There is considerable evidence that corporate social responsibility is at least partially influenced by size. It is easy to imagine that small companies do not see any competitive advantage in making environmental improvements (Revell and Blackburn, 2007; Simpson et al., 2004; Studer et al., 2006; Vazquez and Liston-Heyes, 2008), and that small firms with low perceived impact on the environment are likely to ignore it and take a completely passive stance (Buil-Carrasco et al., 2008), potentially to their detriment as they are cut out of larger companies’ supply chains, even though adoption of CSR practices could confer many tangible benefits on them (Welford and Frost, 2006). In medium and large size firms, however, there are likely to be a variety of internal and external pressures to demonstrate social responsibility, making it easier for managers who want to act accordingly to do so (Buil-Carrasco et al., 2008), particularly if these executives are responsible for environmental matters (Aragón-Correa et al., 2004). Larger companies often are found to do a better job (cf. Adams et al., 1998; Brammer and Pavelin, 2004; Branco and Rodrigues, 2008; Cormier and Magnan, 2003; Patten, 1991) if a large enough size range is considered, and I suspect that if the size range in this study were extended downward the relationship between size and PSI score would increase.

Given the substantial scatter in the relationship between company size and score in this study (Figure 3) and within each sector (not shown), and the lack of any clear effect of size once it exceeds annual revenues of about $9 billion, it is clear that there are many considerations other than size contributing to development of good CSR practices and sustainability reporting in every sector. Some of these possibilities include risk reduction (Bebbington et al., 2007; Spence, 2009; Unerman, 2008; Welford and Frost, 2006), information cost (Cormier and Magnan, 2003), fear of losing competitive advantage by unnecessary disclosure (Daub, 2005), employee retention (Welford and Frost, 2006), high visibility to regulators, pressure groups and the media (Brammer and Pavelin,
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2004) and a host of others, but there does not appear to be any single overwhelming driving factor. Even though size has been shown to be important, there has been a tendency in the literature to look broadly at the sustainability reporting of only the largest firms (see Table 1). Although the lack of CSR activities in the smallest firms is well documented (Revell and Blackburn, 2007; Simpson et al., 2004; Studer et al., 2006; Vazquez and Liston-Heyes, 2008; Welford and Frost, 2006) – and from this we can infer a lack of reporting, reporting in mid-sized firms has largely been ignored.

That there are sector differences in CSR orientation and reporting is also well documented (Banerjee, 2002; Brammer and Pavelin, 2004; Branco and Rodrigues, 2008; Jose and Lee, 2007; Patten, 1991) and a variety of possible drivers are suspected including established environmental sensitivity and substantial direct environmental impacts in sectors such as manufacturing, resources, utilities, chemicals pharmaceuticals, motor vehicles and parts (Brammer and Pavelin, 2004; Kolk et al., 2001), and close relationships with consumers in sectors such as banking, food/drink/tobacco, media and retailing (Brammer and Pavelin, 2008). The same general arguments apply in this study, with aerospace, motor vehicles and parts, pharmaceuticals, petroleum refining, chemicals and banks doing the most reporting.

Choice of Variables and the PSI

The different studies of sustainability reporting based on predetermined topics use a wide range of them (Table 1) from just one (Sinclair and Walton, 2003) to over 100 keywords (Pollach et al., 2009). The PSI is in the middle, with 60 baseline topics and as many as 20 additional sector-specific topics of up to seven levels contributing to the score (but with all final scores normalized to the maximum possible points for the sector). The sector-specific topics are determined by what the top reporters in each sector are reporting, rather than on a construct of what should be reported. The intent behind the PSI is to capture as many topics as the leading companies in each sector are actually reporting, and the 60 baseline topics and up to 20 sector-specific topics are required to do so. It would certainly be possible to create an even more complex scoring system based on specific reporting guidelines, as has previously been done using the GRI 2000 guidelines (Hussey et al., 2001; Morhardt et al., 2002; Rikhardsson et al., 2002; Stiller and Daub, 2007). Indeed, if attempts succeed to persuade companies to use XBRL to tag the sustainability data they put on the internet (GRI, 2007; Isenmann et al., 2007), it will become trivial to implement an automated scoring system based on the GRI G3 guidelines. It can be argued, as it has been by Hubbard (2009), that large sets of topics such as these are impossibly complex and that a much more manageable subset would be preferable. He would limit environmental reporting to key material use, energy use, water use and sector-specific waste emissions, all normalized to units produced or as percent of total resources used. His choice of social issues would include employee satisfaction, social performance of suppliers, community relationships, philanthropic investments and some form of industry-specific factor such as ‘community open days’. The problem with his approach is that when attempting to characterize what companies are actually reporting, especially when comparing a group of companies with highly disparate reporting practices, as is usually the case, there would be very little comparable information available if only Hubbard’s criteria were used. The question then is whether or not there is an optimal number of topics that capture overall quality of reporting and performance. On one hand, the fact that all of the subsets of the PSI in this dataset are strongly correlated suggests that any of them might be adequate if the desired end result were characterizing, in a general sense, the quality of individual corporate reporting. Such a correlation is not uncommon, with positive correlations found between environmental management initiatives and both environmental performance and improvements of environmental performance (Rao et al., 2009), and between different subsets of indicators of environmental management quality (Xie and Hayase, 2007). On the other hand, the best reporters continually add topics to their sustainability reporting, and it seems to me that that information should be captured and should form the basis of future reporting standards for the sector.

Conclusions and Suggestions for Future Research

This research is unique in creating indices of sustainability reporting for all companies within selected sectors of the Fortune Global 500 and Fortune 1000, irrespective of the amount of reporting they do, then ranking them. It
reveals, in a graphic way, the extreme range of reporting in every sector examined – 25 in this sample – of the largest global and American companies, and the generally uniform distribution of reporting within almost all sectors from very good to very poor. When data from all sectors are combined and only Fortune Global 500 firms are considered, there is a very wide range of reporting quality but little evidence of size influencing it; almost all of the best reporters, as well as many of the worst, are in this group. Below this size, all American companies in this sample, the scores are notably lower and, in addition, there is a definite but small increase in the quality of reporting with size. In both these and in the entire sample of 454 firms, however, the scatter in Figure 3 shows that there are clearly other, unknown factors at work, which are not well explained in the literature. A significant gap in this study is the lack of European and Asian firms in the $1–10 billion range. It would be extremely interesting to see whether their scores reflect the lesser reporting seen in the smaller American firms. It would also be useful to examine reporting down at least another order of magnitude in company size to $100 million, well above the usual definition of medium-size business, but a size range not much examined for sustainability reporting. If Fortune Global 500 companies continue to increase the quality of their reporting to the point that there are few differences among them, smaller firms are likely to feel increased pressure to emulate them in reporting, and studies such as this one will, of necessity, move to smaller companies.

References

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