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Issue Cycles in Corporate Sustainability Reporting: A Longitudinal Study

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Abstract

Issue cycles in media reporting and in the coverage of environmental news in particular have been studied since the 1970s. This study seeks to extend existing theory on issue-attention lifecycles from the news-media domain to the corporate domain by exploring how companies operationalize environmental sustainability over time. Using computer-assisted text analysis, this study investigates 744 corporate environmental reports in a 10-year longitudinal design in order to study how the attention that companies pay to a set of 13 environmental issues shifts over this period. The results indicate discernible issue cycles for almost all of the issues studied. Some issues are in a phase of heightened awareness, others in a punctuated equilibrium following specific events, and even others in a phase of decline. The issue cycles identified suggest that companies pursue their environmental strategies consistently, but shift attention to particular issues as a response to high-profile environmental events.

1. INTRODUCTION

Corporations publish environmental reports to provide an account of their achievements and outline their future goals regarding environmental sustainability. Companies in the US chemicals industry have been required to disclose environmental information for decades and were therefore the first ones to publish environmental reports in order to document some aspects of their environmental impact (Konar & Cohen, 1997). Over the past decades, companies from industries that are not legally required to report on their environmental performance have been subject to growing pressures from governments, supranational bodies, the mass media, environmental advocacy groups, investors, banks, and competitors to address environmental problems and disclose environmental information about their efforts (Hrasky, 2012; Hunter & Bansal, 2007). Environmental reports have therefore become a *de-facto* standard for very large companies. Environmental reporting is practiced in all industries, even in those whose direct impact on the environment is low, such as the financial-services industry. It is relevant even for these companies to report on environmental matters because of the indirect environmental impact that their business activities may have, for example through lending or investments (Kolk et al., 2001).

Even though standard-setting initiatives have emerged to make environmental reporting more uniform and comparable, companies issuing voluntary environmental reports still have a lot of leeway when it comes to communicating their environmental stance. They can freely decide what seems relevant for them to report on, how many pages they want to publish, and what level of detail they want to present for each issue they address. Therefore, corporate environmental and social reports give companies ample opportunities for reality construction (Campbell, 2000), just like the narrative sections in annual financial reports (Morgan, 1988). Bhatia (2012) refers to corporate environmental and social reports as a hybridized genre, because they "combine factual reporting with promotional discourse, but in a manner that is appropriate within the genre of reports" (p. 235). Kolk (2004b) therefore suggests interpreting the presentation of corporate actions and ambitions in corporate environmental and social reports as the "implementation likelihood" of this measure rather than as corporate action, unless reliable, external verification is provided (Kolk, 2004a).

Against this backdrop, this study investigates the lifecycles of environmental issues covered in corporate environmental reports with a view to extending existing theory on issue-attention lifecycles from the news-media domain to the corporate domain. Accordingly, I investigate a longitudinal sample of corporate sustainability reports with computer-assisted text analysis in order to trace environmental issues over time. This study advances our understanding of how companies operationalize environmental sustainability over time, providing insights into both the breadth and depth of their coverage of environmental issues over a 10-year period. Longitudinal studies of issue careers in news coverage have been highlighted as a promising direction of research in environmental communication (Hansen, 2015). This study draws on the body of literature on issue cycles in news coverage (Brossard et al., 2004; Downs, 1972; Henry & Gordon, 2001; Hilgartner & Bosk, 1988) and the longitudinal coverage of environmental issues in news media (Holt & Barkemeyer, 2012; Mazur, 1998; McComas & Shanahan, 1999; Ungar, 1992) in order to add empirical evidence to the theoretical work on issue cycles in the corporate domain (Bigelow et al., 1993; Mahon & Waddock, 1992; Zyglidopoulos, 2003). The amount of attention companies pay to environmental issues cannot be expected to follow the same pattern as in news coverage, because corporate environmental reports are not subject to space restrictions and not driven by newsworthiness as the underlying goal.

2. ISSUE-ATTENTION CYCLES

An issue emerges when "one or more human agents attaches significance to a situation or perceived problem" (Crabbe & Vibbert, 1985, p. 5). Accordingly, an issue has been defined as "an unsettled matter which is ready for decision" (Chase, 1984, p. 38), often requiring government intervention or changes in industrial policies (Heath & Palenchar, 2009). Issues vary greatly in the level of importance and attention they receive (Crabbe & Vibbert, 1985). To describe these fluctuations, Downs (1972) introduced the concepts of 'issue-attention cycles' and 'issue careers' in the context of environmental issues in the news media. An issue cycle denotes the appearance and disappearance of issues on the public agenda, as they pass through five stages of attention. These five stages include the pre-problem stage, alarmed discovery and euphoric enthusiasm, realization of the costs of resolving the issue, decline of interest, and the post-problem stage. Henry and Gordon (2001) presented a simplified version of Downs' (1972) stages and reduced them to just three: Equilibrium, developing interest, and decline. Similarly, Bigelow et al. (1993) suggested a model with four stages, consisting of emergence, interpretation, positioning, and resolution, based on models by Post (1978) and Buchholz (1988). What is common to these models is that they describe sequential stages of interest and decline in public attention over time. The different stages vary in length and intensity, depending on the nature of the issue. Issues may only have a very short period of awareness, or they may decline very soon, because they co-occur with other emerging issues that receive more attention (Bigelow et al., 1993).

Broadly, issue attention in the news media rises and falls, because the media select an issue to be covered among a number of competing issues (Hilgartner & Bosk, 1988). Several explanations have been offered for the varying lengths of issue cycles. First, issue competition is a factor that may divert attention away from one issue and on to another. Next, a trigger event may shift attention to a new issue, which is then given more attention than pre-existing issues. Such events include accidents or crises (Bigelow et al., 1993) as well as domestic or international policy debates and regulations, international summits, treaties or disputes (cf. Brossard et al., 2004). In addition, the carrying capacity of the news media determines how many issues can be covered and how much attention they will receive in total (Downs, 1972; Henry & Gordon, 2001). Further, Oh et al. (2012) compared the news coverage of diseases in Korea and the US and found that cultural factors determine how journalists frame an issue, which has a bearing on issue-attention cycles. Similar findings were reported by Brossard et al. (2004) in their study on US and French news coverage of global warming. Their study also revealed that news-media attention is strongly related to events, such as government action or issues linked to international relations and diplomacy, which was also found in a study by Shih et al. (2008) on the news coverage of diseases in the *New York Times*. Finally, an issue has to be newsworthy in order to sell the news content, which implies that journalists have to be able to find new information about an issue in order to keep it alive (Downs, 1972; Henry & Gordon, 2001). Declining interest in an issue can be attributed to its resolution or a lack of attention from powerful groups (Crabbe & Vibbert, 1985). Issues can also reemerge after a decline, when new facts emerge or when stakeholder groups dedicated to a particular issue are powerful enough to move it on top of the public agenda again (Bigelow et al., 1993).

Issue lifecycles have been studied empirically in the context of environmental news. Mazur (1998), for example, found that ozone, CFC, and the rainforest were important environmental issues in US news media in the period from 1987-1990, but to a lesser extent so in 1992-1996, although the issues had not been resolved at that point. He concluded that media attention turns away from environmental

issues that have not been resolved irrespective of the seriousness of the problem in order to avoid repetitive news coverage. Ungar (1992) as well as McComas and Shanahan (1999) found cyclical attention to global warming in the period from 1980-1995. They argue that not the issue of global warming but the narratives constructed by journalists about global warming drove media attention in this period. Djerf-Pierre (2012) examined the interaction between environmental issues in the news in Sweden in the period from 1961 to 2010 and found that news media attention to one environmental issue actually attracts attention to related environmental issues rather than crowding them out. Holt and Barkemeyer (2012) studied environmental issues in 112 worldwide newspapers from 39 countries in seven languages in the period from 1990 and 2008 and tracked the coverage of 'sustainability' and 'climate change'. They found two different patterns: the traditional issue-attention cycle and a punctuated equilibrium. A punctuated equilibrium refers to a sharp increase after a period of stability, followed by a new equilibrium at a higher level than the original equilibrium.

In the corporate domain, issues have been defined as emerging social problems or controversies that exist at the intersection of the public sphere and the corporate sphere and therefore require managerial attention (Mahon & Waddock, 1992; Zyglidopoulos, 2003). If ignored, issues can have a serious impact on corporate performance and success (Moore, 1979, p. 43). Issue-attention cycles have been dealt with only theoretically in a corporate context. Issue attention in the corporate domain cannot be expected to follow the same pattern as in news coverage, because corporate reports have no space restrictions, are not concerned with newsworthiness, and are not meant to achieve the same economic goals as news productions. The corporate issue-lifecycle perspective developed by Mahon and Waddock (1992) suggests that issues emerge in the public arena, mature, and peak out, as they are addressed by companies and policy makers. Not all companies choose to respond to every issue. However, when stakeholders are powerful enough to influence a company, the company may actually be forced to address a particular issue (Freeman, 1984). Also, responding to an issue does not mean that a company necessarily changes its strategies to address the issue. Rather, one has to distinguish between symbolic and substantive acceptance of an issue (Mahon & Waddock, 1992). Ultimately, issues cease to be issues, because they are addressed so comprehensively that they become institutionalized in companies' business practices and no longer receive public attention (Mahon & Waddock, 1992). When companies fail to address important issues, a political debate may follow, resulting in legislation or litigation, which also marks the resolution of the issue (Bigelow et al., 1993).

3. REVIEW OF PREVIOUS RESEARCH

Researchers have studied stand-alone corporate environmental reports or environmental disclosures made in annual reports since the 1970s, mainly in content-analytic designs. Early studies focused either on environmental disclosures made in annual financial reports (Abbott & Monsen, 1979) or on whether or not companies issued separate corporate environmental disclosures (Gamble et al., 1996). Later studies focused on the content of environmental and social reports for particular countries in a single year, including for example the *Fortune Global 200* (Jose & Lee, 2007), multiple Asian countries (Chapple & Moon, 2005), the United Kingdom (Stray, 2008), Australia (Naudé et al., 2012), Germany and Switzerland (Lock & Seele, 2015), to name a few. Other content analyses have focused on particular industries (e.g. Rodríguez Bolívar, 2009), carbon-intensive and less carbon-intensive companies (Hrasky, 2012), or very specific content features, such as corporate governance (Kolk, 2008)

and stakeholder salience (Weber & Marley, 2012). Ultimately, corporate reporting content has been compared against external data, such as measurements of social and environmental performance provided by the *KLD Social Ratings* database (Dawkins & Fraas, 2013) and news coverage frequency (Pollach, 2014). On the qualitative side, corporate environmental and social disclosures have been studied with a focus on the language of sustainability (Laine, 2010), rhetorical topics associated with climate change (Ihlen, 2009), rhetorical strategies (Ditlev-Simonsen & Wenstøp, 2011), definitions and operationalizations of sustainability (Ihlen & Roper, 2014), and persuasion (Mason & Mason, 2012). Chen and Bouvain (2008) examined CSR reports from the US, the UK, Australia, and Germany with automated text analysis for the most frequently used CSR themes, including the environmental domain as one theme. They did not find significant differences between the four countries regarding the frequency of environmental themes.

To a very small extent only have previous studies been conducted longitudinally, which would be required for the examination of issue lifecycles. Qualitative designs have been used longitudinally to examine the inclusion of climate-change discourse in annual letters to shareholders over time (Domenec, 2012). On the quantitative side, Niskala and Pretes (1995) analyzed annual reports of large companies in Finland in the period from 1987 to 1992 to study the disclosure of environmental content over time. Further, Azzone et al. (1996) examined the form, structure, and content of environmental reports from 14 companies in the period from 1991 to 1994 and found increases in the level of detail. Kolk (2003) conducted a content analysis of environmental reports from the *Fortune Global 250* in 1998 and 2001 in a comparative design of industries and countries. Using classic content analysis, all of these studies only give insights into whether certain content categories were present, but do not enlighten us to what extent they were covered in each year and how they changed over time. More recently, Albertini (2014) conducted a quantitative analysis of environmental reports by 55 industrial companies in France, covering the period from 2006 to 2010. Using computer-assisted text analysis, she extracted the most frequently used keywords in each year from the reports and found that there is a connection between these keywords and the economic situation of the firms. This inductive approach is certainly worthwhile, but does not result in variables that are examined systematically over the period studied, which is required for the study of issue cycles. Thus, no study on corporate environmental reports has used a methodological approach that is able to make assessments as to how extensively an issue was covered over a certain period of time and how much this attention has shifted.

4. METHOD

This study will use a longitudinal design based on computer-assisted text analysis that is able to study issue cycles in corporate environmental reporting. This section will explain how the data were collected and analyzed with the help of computer-assisted text analysis.

4.1 Data collection

Since environmental reporting has been found to be positively associated with company size (e.g. Brammer & Pavelin, 2008; e.g. Jenkins & Yakovleva, 2006; Niskala & Pretes, 1995), the sample was chosen from the largest companies in the world. The *Forbes Global 2000* ranking was used to identify these companies. Only companies from North America and Western Europe were included in the

sample, as there were generally only very few companies from Asia Pacific, South America, and Eastern Europe among the *Forbes Global 2000*. To account for variations in the companies' impact on the environment, low-impact, medium-impact, and high-impact companies were selected for this study. Previous studies on corporate environmental reporting have identified banking, financial services, and insurance (Jose & Lee, 2007; Kolk et al., 2001; Stray & Ballantine, 2000) as low-impact industries, which were therefore included in this study. Further, services, consumer products and foods have been identified as medium-impact industries (Banerjee et al., 2003). Of these, consumer products, and foods were included. Lastly, high-impact companies were added to the sample, including the transportation and the oil-and-gas industries. The chemical industry was not included, since it is subject to stringent disclosure requirements, which means that chemical companies do not necessarily report voluntarily on their environmental activities and plans. Overall, 223 companies from Western Europe and North America were found for the above industries in the *Forbes* ranking. Each company's website was accessed and all environmental/CSR reports that were made available in English were downloaded.

Only stand-alone reports were chosen, since they are considered to be the primary CSR communication vehicles by CSR directors (Pollach, 2015). Sixteen companies did not make any reports available, had gone bankrupt or had been acquired by another company since the publication of the *Forbes* ranking in 2010. The study was therefore conducted with reports from 207 companies. Not enough reports were found from the early and mid-1990s to include them in the study. Accordingly, the study covers the 10-year period from 2001 to 2010, which has resulted in a sample of 744 reports. Table 1 displays the total number of reports found for each year and industry group.

Table 1: Overview of Environmental Reports

Year	Financial services	Consumer goods	Industrial goods	SUM
2001	9	10	1	20
2002	13	15	2	30
2003	19	22	2	43
2004	21	25	3	49
2005	23	28	5	56
2006	22	30	8	60
2007	38	39	24	101
2008	30	62	25	117
2009	33	53	36	122
2010	39	44	48	131
SUM	253	337	154	744

4.2 Data Analysis

A hitherto under-exploited method in studies on corporate environmental reporting is computer-aided text analysis (CATA), which is able to analyze large-scale text corpora with the help of computer software. CATA can examine the frequencies with which particular words are used in these texts (e.g. Kabanoff, 1997; Pollach, 2012). CATA is therefore well suited for the historical analysis of corporate

environmental reports, because it can easily compare large datasets of reports from various years, countries, or industries. In this study, CATA is used for an empirical examination of the attention cycles of environmental issues by studying the frequencies with which a particular environmental issue appears in corporate reports over a certain period of time. This longitudinal research design enables us to track the appearance of certain issues, their disappearance, or their replacement with other issues.

The software tool *WordStat* (Pollach, 2011) was employed for this purpose. *WordStat* is able to examine a list of words — pre-defined by the researcher — against texts the researcher has uploaded into the software. The researcher can then investigate the frequencies of these words across the different texts. High-frequency words indicate the importance of and emphasis on particular concepts in the texts (Krippendorff, 1980). Similarly, Ihlen (2009) argued in his qualitative study of corporate climate-change discourse that word frequencies indicate whether or not companies discuss an issue at length.

4.3 Environmental Issues

It is the nature of issues that they can be placed in a hierarchy of larger or smaller issues. For example, environmental quality is an issue by itself, but can also be divided into narrower issues, such as plants or animals (Heath & Palenchar, 2009, p. 93). The goal for this study was to identify a number of environmental issues that make it possible to study the attention cycles of environmental problems in corporate reports. To this end, a list of environmental terms was compiled that represent various environmental issues that are relevant for companies. The following sources were used: First, lists of environmental issues were located online (see Appendix). Second, a study by Djerf-Pierre (2012) was used to identify additional environmental issues and terms. Ultimately, a list of all words found in the corporate reports was created with *WordStat*, sorted by frequency, and examined starting with the most frequent words. This list clearly contained a lot of words not related to environmental issues, but additional environmental terms were identified nonetheless and were added to the list. Thus, the word list was compiled from the data as well as based on previous research and external data. The categorization of environmental issues developed by Djerf-Pierre (2012) was adopted for the categorization of the environmental terms, although some issues had to be dropped, as they were irrelevant for this study (e.g. *workplace*, *traffic*, *consumers*, *war*, *politics*). Further, *soil* was added as a new issue, since a number of terms pertaining to soil were found in the other sources. The final list (see Table 2) consists of 13 environmental issues, which contain a total of 105 environmental terms.

All corporate reports were grouped by year and compared against this word list. All multi-word terms (e.g. *global warming*) were searched for only in exactly these word combinations. Further, when applicable, terms or multi-word terms were set to be included in their various word forms, i.e. singular and plurals and/or all possible verb forms. The issue *energy* contains the term *energy*, plus all terms captured by the sub-domain issues *renewable energy* and *non-renewable energy*. This enables us to make a distinction between non-renewable and renewable forms of energy later in the analysis.

Table 2: Environmental Issues and Corresponding Terms

Issue	Terms included
Energy	<i>Energy + Renewable energy + Non-renewable energy</i>
Renewable energy	<i>Bioethanol, biofuel, biogas, hybrid, hydrogen, photovoltaic, renewable, solar, thermal, wind</i>
Non-renewable e.	<i>Coal, fossil fuel, oil, non-renewable</i>
Water	<i>Acidification, anoxic, aquatic, desertification, eutrophication, ground water/groundwater, marine, ocean, overfishing, rain, rainwater, sea level, seabed, sewage, water, water scarcity, wetland</i>
Air	<i>Air, air quality, atmosphere, biosphere, filter, smog, stratosphere, temperature, volatile organic compound</i>
Climate	<i>Carbon, carbon-neutral, climate, climate change, climate conference, CO2, emissions, global warming, greenhouse, Kyoto</i>
Ozone	<i>CFC, chlorofluorocarbon, ozone</i>
Chemicals	<i>Asbestos, beryllium, chemical, DDT, dioxin, hazardous, heavy metals, herbicide, mercury, pesticide, radioactive, toxic, uranium</i>
Conservation	<i>Biodiversity, conservation, endanger, habitat, species, wilderness, wildlife</i>
Disaster	<i>Disaster, earthquake, flood, hurricane, natural disaster, oil spill, tsunami</i>
Forest	<i>Clearcutting/clear-cutting, deforestation, forest(ry), logging, rainforest, timber</i>
Waste	<i>Biodegradable/biodegradability, compost, disposal, dump, landfill, leachate, litter, recycle, waste, wastepaper, wastewater</i>
Soil	<i>Brownfield, carbon sink, fracking, hydraulic fracturing, mining, soil, slurry impoundment</i>

5. RESULTS

The frequencies of all environmental terms subsumed under each issue were added up for each year to calculate the frequency of each issue per year. These frequencies were then averaged by the number of companies represented in each year. Table 3 shows these average frequencies, sorted after the overall growth rates from 2001 to 2010. The majority of the issues underwent positive growth. While *waste* was the most prominent issue in the beginning of the period in 2001, it remained almost stable overall, with only a 7.63% growth from 2001 to 2010. *Energy* and *climate* are the dominant issues in 2010, after having undergone strong growth. Especially *renewable energy* experienced exponential growth in the period studied. Negative growth was only found for two, relatively small issues, viz. *chemicals* and *ozone*, both of which dropped by more than 50%, when comparing the beginning and the end of the 10-year period. These growth rates suggest that, overall, increasing attention is paid to most of the environmental issues, which stands to reason, given that no resolution of these issues is in sight.

Table 3: Average Frequency of Environmental Issues Per Company

Issue	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	Growth 2001-2010
Climate	25.40	29.43	28.19	38.73	48.25	71.93	83.44	82.12	90.69	85.92	238.28%
Energy	33.90	45.13	39.00	48.41	58.16	77.17	90.77	84.44	89.00	108.68	220.59%
- Non-renewable energy	8.75	10.13	7.00	9.29	9.80	12.18	16.31	16.81	16.60	32.23	268.33%
- Renewable energy	3.55	6.03	5.84	8.78	11.29	17.47	19.36	17.42	18.14	21.89	516.71%
Disaster	3.65	2.30	1.84	3.63	7.77	5.00	2.95	3.56	6.05	7.92	116.88%
Conservation	9.80	17.07	10.84	13.57	14.96	13.52	13.77	12.30	15.57	17.63	79.86%
Water	24.70	22.97	35.79	32.90	30.84	33.15	36.72	37.83	43.59	43.55	76.31%
Air	8.75	7.43	5.65	5.76	9.43	8.33	7.63	6.76	8.48	12.85	46.83%
Soil	1.95	1.57	1.47	2.65	2.86	2.23	2.39	1.89	2.28	2.62	34.27%
Forest	8.75	6.83	7.16	9.04	10.86	8.00	7.80	7.32	7.29	9.82	12.19%
Waste	46.25	37.23	39.63	41.00	43.66	52.87	50.22	53.51	53.35	49.78	7.63%
Chemicals	2.70	1.67	2.30	3.24	2.91	1.92	1.97	1.85	1.68	1.25	-53.63%
Ozone	1.50	1.93	1.12	0.82	0.84	0.52	1.32	0.49	0.66	0.52	-65.39%

Each issue is examined in more detailed graphically in Figures 1, 2 and 3, which use different scales to account for the varying frequencies of the issues. Figure 1 presents the average frequencies per company for the four largest issues: *energy*, *climate*, *waste*, and *water*. While *climate* was not written about more than *waste* or *water* in 2001, its importance grew exponentially from 2004 to 2007, parallel with *energy*. In the final year of the analysis, climate and energy seem to be going in opposite directions, with *energy* growing rapidly and *climate* declining slightly. In terms of issue cycles, energy and climate were in a period of growing attention from 2003 to 2007, followed by a punctuated equilibrium. *Waste*, which was given the most attention in the beginning of the 10-year period, declined at first, but picked up again and remained almost stable in the last five years of the period under study, indicating that the issue was addressed consistently from 2006 onwards. *Water* grew strongly around 2003 and exhibited moderate growth levels for the rest of the period. Both *water* and *waste* experienced punctuated equilibriums, with punctuations taking place in 2003 and 2006, respectively.

As can be seen from Figure 2, the average frequencies per company for the sub-domain issue *renewable energy* surpassed *non-renewable energy* in 2004, but was overtaken by the latter again in 2009. Nevertheless, the overall growth rates of both issues suggest that companies addressed the problems associated with non-renewable forms of energy as well as the promises of renewable and therefore more sustainable forms of energy in their sustainability reports to a growing extent. The issue *conservation* fluctuated with a major peak in 2002, which is mainly due to the term *biodiversity*, which experienced this enormous peak in 2002.

Figure 3 displays the average frequencies per company for the remaining six issues. *Air*, *disaster* and *forest* reached a peak around 2005 after a period of decline and growth, but began to grow again around 2009. Thus, for these issues, cycles of growth, maturity, and decline, followed by another period of growth are discernible. For the issue *disaster*, the peak in 2005 can clearly be ascribed to the earthquake and the following tsunami in the Indian Ocean in late 2004, because the environmental

terms *tsunami* and *earthquake*, which are included in this issue, show exactly this peak. In addition, the term *hurricane* peaked in 2005, which can be put down to the fact that the 2005 hurricane season was the most active in recorded history (Schiermeier, 2008), including Hurricane Katrina and the New Orleans flooding in the US. To a lesser extent, a peak was found for the term *natural disaster* in 2005, which is clearly related to the above natural phenomena. The three remaining issues, viz. *ozone*, *chemicals*, and *soil*, were the least frequent ones. The issue *chemicals* went through a cycle of heightened and declining interest, while *soil* fluctuated slightly, and *ozone* declined almost steadily.

6. DISCUSSION

Theoretically, this study has drawn on the concept of issue-attention cycles, which has been developed to explain issue attention in the news-media domain. While articles in the news media are subject to competition for newsworthiness (Hilgartner & Bosk, 1988), journalistic practices (Oh et al., 2012), and limited carrying capacities of the media (Downs, 1972), corporate reports do not face such constraints. Rather, each company can freely determine the length of its report and the issues it wants to address, which makes it relevant to study issue-attention shifts in corporate reports. The findings have shown that companies address all the environmental issues that have been identified as relevant in the literature, albeit not all of them to the same extent. It stands to reason that issues containing very specific terms (*chemicals*) or very few terms (*ozone*) are found less frequently than issues containing more terms and more general-language terms, such as *climate*. The finding that all issues were addressed in all years provides evidence for what Mahon and Waddock (1992) have referred to as issue acceptance in the corporate domain. As the data suggests, large companies cannot afford to ignore these environmental issues because of stakeholder pressure, but their acceptance may only be symbolic with a view to managing public perceptions (Pollach, 2003; Schlegelmilch & Pollach, 2005). Hrasky (2012) argues that reporting content is a form of legitimation for companies seeking to close the gap between their environmental performance and their stakeholders' expectations, which is why companies increasingly talk about climate change in their external communication. Thus, issue acceptance cannot be interpreted as a performance improvement, but should be seen as the acknowledgement that an issue deserves importance on the corporate environmental agenda.

What this study has focused on in particular is changes in issue frequencies throughout the 10-year period. The results have shown that, overall, only the two smallest and most specific issues (*chemicals*, *ozone*) have received decreasing attention, whereas all other issues received growing attention overall, with growth rates between 7.63% and 516.71%. The results show that environmental issues in corporate reporting follow cycles, but not the oscillating patterns of growth and decline in attention as in the news media (cf. Brossard et al., 2004; Djerf-Pierre, 2012). Rather, almost all of the issues have received increasing attention over the 10-year period studied, which can be attributed to the unlimited carrying capacity of environmental reports, whereas the news media make a selection based on news values (Eilders, 2006). Most importantly, the results suggest that the different stages of a cycle in the corporate domain can last for very long periods, as opposed to oscillations in news-media coverage.

Extensive periods of heightened awareness were found for the issues *climate* and *energy*, both of which moved to the top of the corporate environmental agenda within ten years, after beginning to grow exponentially around 2004. Previous research has highlighted two years as particularly significant

for the public climate-change discourse, especially in the US: (1) the year 2005 because of political and policy changes and Hurricane Katrina (Dotson et al., 2012) and (2) the year 2007 because of Al Gore's participation in the documentary *An Inconvenient Truth* as well as the Nobel Peace Prize awarded to him together with the United Nation's Intergovernmental Panel on Climate Change (Hvidtfelt Nielsen & Schmidt Kjærgaard, 2011). While the first event is reflected in the data in the form of exponential growth in reporting on climate change in the years 2005/2006, the same cannot be observed for the year 2007. In their analysis of newspapers from 39 countries, Holt and Barkemeyer (2012) also found that the term *climate change* began to surge in 2004, which validates the findings of this study and emphasizes the influence of news coverage on corporate reporting content. Another issue illustrating the longevity of individual issue stages in corporate reporting is *ozone*. This issue has been found to be a declining issue in the US since the early 1990s (Mazur, 1998), doubtlessly due to the *Montreal Protocol on Substances that Deplete the Ozone Layer*, which entered into force in 1989 (UNEP, 2015). Despite political and technical solutions that have ended its lifecycle in the policy domain a long time ago (Weatherhead & Andersen, 2006), this issue is still found relevant by corporations in their voluntary reporting in the 2000s. Thus, issues that have been resolved by policymakers do not necessarily disappear from corporate environmental agendas.

For four issues, complete cycles of growth and decline were observed. The issues *air*, *forest*, *disaster*, and *chemicals* went through cycles of growth, maturity, and decline within the 10-year period studied. Especially for *air* and *forest*, the peaks observed were preceded by a decline and followed by an increase, suggesting a cyclical development. The drivers behind these cycles identified for *air*, *forest*, and *chemicals* cannot be identified with the data collected for this study. Only for the issue *disaster* can the driving force behind the sudden increase in attention be put down to natural disasters as specific trigger events. Therefore, the issue *disaster* validates the method, because the attention paid to this issue can clearly be attributed to specific weather events in Asia and the US. Given that only large European and US companies were included in the sample, their communication about weather events in Asia also suggests that they take a global perspective on environmental issues.

Another important finding is the observation of punctuated equilibriums alone or in combination with cycles for a number of issues, which was also identified as a pattern in global news-media coverage (Holt & Barkemeyer, 2012). The finding that several issues follow a punctuated equilibrium suggests that companies do not consistently attach the same amount of importance to environmental issues in their external communication. Rather, they seem to be responding to external stimuli, which led to the punctuation, i.e. a very short period of heightened interest followed by another equilibrium. The concrete stimuli cannot be identified with the data collected for this study, but could include national, international, or supranational environmental campaigns and summits, or high-profile climate-change events, such as Al Gore's documentary (Hvidtfelt Nielsen & Schmidt Kjærgaard, 2011). Alternatively, it can be argued that companies are influenced by the CSR activities of their competitors (Matten & Moon, 2008), which may lead them to pay increasing attention to those issues their competitors have addressed.

This study is not without limitations. A limitation of this computer-assisted approach to studying corporate environmental issues is the choice of environmental terms and their groupings into issues. There may be other ways of grouping them into more specific or less specific issues, which may give a different picture of the data. Therefore, care was taken to use and adapt issue categories that have been used in previous research rather than designing new categories from scratch. Since corporate

sustainability reporting began as a consequence of environmental problems, the pre-problem equilibrium conceptualized by Downs (1972) cannot be fully captured in a study of environmental reports, because the issues emerged long before companies issued sustainability reports on the Web. Thus, issue cycles may have peaked before the period studied, e.g. in the case of *ozone*, which we only have indirect evidence for through previous research on US media coverage of ozone (Mazur, 1998). A larger sample would have made possible comparisons across the different regions or industries. However, adding more companies to the sample would have also meant that companies that are certainly large – but not very large – would have been included in the sample, which was not desirable for this study.

Further research is needed to understand the dynamics of issue cycles, especially trigger events and other external stimuli behind the growth in attention. The present study only provides evidence of weather events and other natural disasters as driving forces of attention to disaster-related terms, but cannot furnish evidence of the impact of national and international political events on reporting content. Qualitative research is needed to contextualize the patterns identified. Thus, future research should study individual attention-shift patterns qualitatively in order to provide more detailed explanations for why particular issues rise, while others remain stable or fall during certain periods.

7 CONCLUSION

This study has set out to advance our understanding of how companies operationalize environmental sustainability over time by studying issue cycles in corporate environmental reports over a period of 10 years. This study has added empirical evidence to the theoretical work on issue cycles in the corporate domain. The findings reveal discernible issue cycles for almost all of the issues studied. However, the cycles identified do not follow the oscillating cycles of interest and decline, as previously found for issue cycles in global and US news-media coverage. Rather, the companies studied pay steadily increasing attention to almost all of the issues in their environmental reports, apart from two issues – one of which has been resolved by global policies. The growth phases take the form of either continued interest or punctuated equilibriums. These findings suggest that companies pursue their environmental strategies consistently, but increase their attention as a response to high-profile policy or weather events. Thus, attention shifts in corporate environmental reporting occur generally very slowly, which is also illustrated by the finding that no environmental issue was dropped completely, despite successful policy efforts. This study has also presented a method for the computer-assisted, longitudinal study of issue cycles in corporate environmental reports, which made it possible to compare large text corpora of environmental reports from different years.

FIGURES

Figure 1: Environmental Issues (1)

Figure 2: Environmental Issues (2)

Figure 3: Environmental Issues (3)

APPENDIX

Online sources used to compile environmental terms and issues:

- http://en.wikipedia.org/wiki/List_of_environmental_issues
- http://en.wikipedia.org/wiki/Index_of_sustainability_articles
- http://en.wikipedia.org/wiki/Index_of_conservation_articles
- <http://www.epa.gov/climatechange/glossary.html>
- <http://www.globalissues.org/issue/168/environmental>
- <http://www.worldwatch.org/files/pdf/CCRG.pdf>

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