

Solid Waste Management: Corporate and Third-Party Online Reporting

Irene Pollach¹, Arno Scharl² and Donna Gill³

1. Introduction

Three interrelated forces drive worldwide demand for public access to environmental information: the urgency and scope of environmental problems, the increasingly active character of civil society, and the revolution in information and communication technologies (Scharl 2004). Disseminating environmental information via the World Wide Web, directly or via online media as intermediaries, enhances public knowledge and builds awareness about the interdependency of ecological, economic, and social issues. The importance of environmental communication through scientific exchange, educational programs, and the media has been recognized internationally at least since the United Nations 1972 Conference on the Human Environment in Stockholm (UNEP 1972).

We are witnessing rapid advances in gathering and processing information. These advances are transforming the way society handles the explosive growth and reduced lifespan of information (Bell 1973, Haddad and Draxler 2002, Weingart 2002), particularly in highly dynamic domains such as the environment (Pick et al. 2000). The past decade has seen enormous growth in corporate environmental communication, spurred by companies' realization that environmental communication meets investor demands for performance information, demonstrates environmental leadership (Dando et al. 2003), closes the information gap between companies and their outside stakeholder groups (Lev 1992), and may even steer public attention away from actual problems (Cerin 2002).

Previous research on corporate communication has found a positive correlation between an industry's environmental impact and its degree of environmental disclosure (Kolk et al. 2001; Gray et al. 2001; Cormier et al. 2004). It has been argued that companies view sustainable development as a managerial task rather than a process anchored in democratic public participation that embraces all corporate stakeholders (Springett 2003). The voluntary nature of environmental disclosures makes it tempting for businesses to skew the environmental information they disseminate (Watson et al. 2003). In fact, the content of corporate environmental communication has been found to be almost exclusively positive and self-laudatory while the amount of negative information it contains is negligible (Deegan et al. 1996; Niskanen et al. 2001).

The purpose of this study is to investigate this effect based on the Web coverage of solid waste management, a narrow and thus manageable topic. Using automated content analysis, we compare environmental reporting on corporate Web sites with the Web sites of NGO and news media to determine the attention companies pay to waste management and gauge their attitudes toward this subject matter.

¹ Vienna University of Economics and Business Administration, Department of English Business Communication; Nordbergstrasse 15, A-1090 Vienna, Austria, (p) ++43-1-31336-2999, (f) ++43-1-31336-747, irene.pollach@wu-wien.ac.at

² Vienna University of Economics and Business Administration, Information Systems Department; Augasse 2-6, A-1090 Vienna, Austria, (p) ++43-1-31336-4444, (f) ++43-1-31336-746, scharl@ecoresearch.net

³ Curtin University of Technology, School of Marketing; GPO Box U1987, Perth WA 6845, Australia, (p) +61-8-9266-7735, (f) +61-8-9266-3937, donna.gill@cbs.curtin.edu.au

2. Solid waste management

Most OECD countries have embraced waste prevention and minimization as elements of their sustainable development strategies in order to address the problem of landfill scarcity (OECD 2004). Countries that support recycling not only reduce resource consumption and discharge less waste into the environment, but have also been found to have higher total output rates (Di Vita 2004). Integrated waste management, and in particular composting, may also ease global climate change problems by reducing the net flux of greenhouse gases (BioCycle 2004). Attitude and behaviors of the public at large play a key role in reducing waste and recycling materials, but sustainable waste management is not in their hands alone. Rather, local governments and producers of goods and materials need to be equally committed to waste management (Barr 2004). However, municipal recycling rates are declining (Fialka 2002), while budgetary constraints and resource cutbacks cause companies to reduce spending on waste management technology, failing to acknowledge the environmental return on such investment (Schwartz 2004).

3. Method

To investigate the prevalence of solid waste management terms, this research studied the Web sites in the 2004 edition of the Fortune 1000 (www.fortune.com). Researchers have previously used Fortune Magazine's company rankings to investigate Web content (Perry and Bodkin 2000), online marketing strategies (Palmer and Griffith 1998) and common usage patterns (McManis et al. 2001). A number of studies have concentrated on business ethics (Morf et al. 1999; Weaver et al. 1999; Reicher et al. 2000). For comparative purposes, the sample also included 39 environmental organizations and 114 news media. The project drew upon the *Newslink.org*, *Kidon.com* and *ABYZNewsLinks.com* directories to compile a list of 42 US news organizations and 72 international sites from four other English-speaking countries (Canada, United Kingdom, Australia and New Zealand). Considering the dynamics of Web content, a crawling agent (Scharl 2000) mirrored these Web sites by following their hierarchical structure until reaching 50 megabytes of textual data for news media, and 10 megabytes for commercial and advocacy sites. These limits help compare sites of heterogeneous size, and reduce the dilution of top-level information by content in lower hierarchical levels. The system then identified and removed redundant segments such as headlines and news summaries, whose appearance on multiple pages would otherwise distort frequency counts.

A list of 311 terms related to solid waste management was compiled from almost 100 different English resources, including books, articles, and the Web sites of NGOs, governments, and supranational organizations. The terms were grouped into the following nine concept systems: *solid waste*, *waste management*, *waste prevention*, *waste collection*, *waste processing*, *resource recovery*, *biological waste treatment*, *thermal waste treatment*, and *waste disposal*. The terms included in these concept systems were used for two types of analyses. First, *relative term frequencies* were calculated, capturing the relationship between aggregate term frequencies per concept system and the total number of words in each of the three corpora (companies, NGOs and news media). These frequencies shed light on the breadth and depth of their environmental discourses. The lack of local context, however, limits the explanatory power of relative term frequencies. We therefore assessed the *semantic orientation* of each concept system in all three corpora to determine the intensity and direction of the authors' attitudes towards these concepts. Assuming that text segments reflect local coherence, attitude towards the concept systems was inferred from the distance between a target word and about 7,500 positive and negative words taken from a tagged dictionary (Scharl et al. 2003), which originated from the *General Inquirer* (Stone 1997). A reverse lemmatization added plurals, past tense suffixes and other syntactical variations (e.g. manipulate → manipulates, manipulating, manipulated). Calculating the semantic orientation allowed us to verify whether corporate environmental communication indeed contains primarily positive information (Deegan et al. 1996; Niskanen et al. 2001).

4. Results

4.1 Word frequencies

Overall, only 176 of the 311 terms were found at least once on any of the Web sites. A comparison of the aggregate relative frequencies of these terms shows that *resource recovery* was the most prevalent concept in two of the sub-samples, despite being the smallest concept system consisting of only 16 terms. In relative terms, the use of *resource recovery* and *solid waste* on NGO sites exceeds the use of any other concepts in the three samples by far. Also, *waste disposal* receives significantly more attention on NGO sites than on corporate or media sites. The top three concepts on both corporate and media sites include *resource recovery*, *waste collection* and *waste disposal*. Notably, relative frequencies on corporate sites tend to be greater than those on media sites. While the latter pay next to no attention to the concept of *waste prevention*, companies and NGOs pay the least attention to *biological waste treatment* and *waste processing*, respectively.

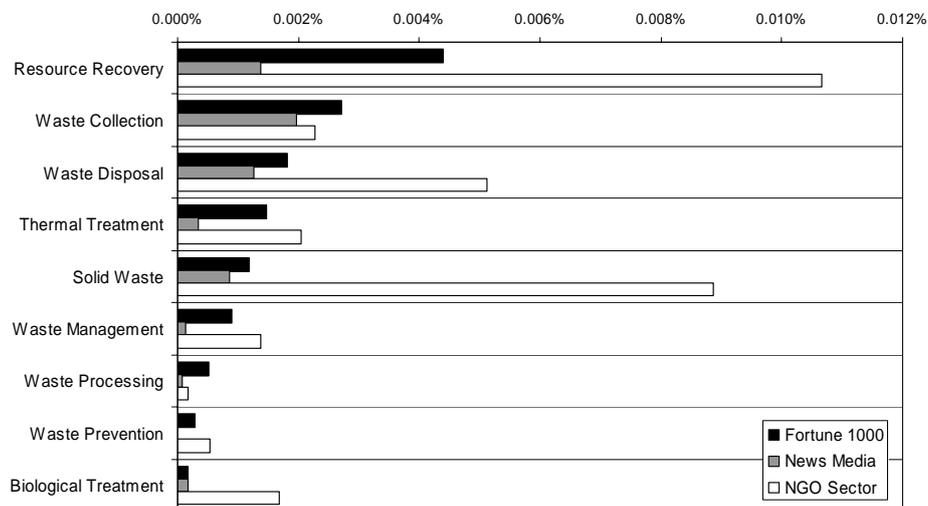


Fig. 1: Frequency of Waste Management Terms by Sector

4.2 Semantic orientation

The semantic orientation of each concept system was calculated by averaging the values obtained for the individual terms in each category. The results indicate that companies view waste management activities overwhelmingly positively, yielding positive results in all nine categories and the highest scores in eight of them. NGOs mirror the positive attitudes of companies for most categories yet to a smaller extent, apart from the categories of *waste processing* and *resource recovery* where they top the score of the corporate sample. NGO attitudes towards *waste disposal* are almost neutral, but slightly on the negative side. The sites in the media sample express positive attitudes toward most concepts, but do so to a lesser extent than companies and NGOs. Notably, semantic orientation in the media sample is highly negative for *thermal treatment* of waste and slightly negative for *solid waste*.

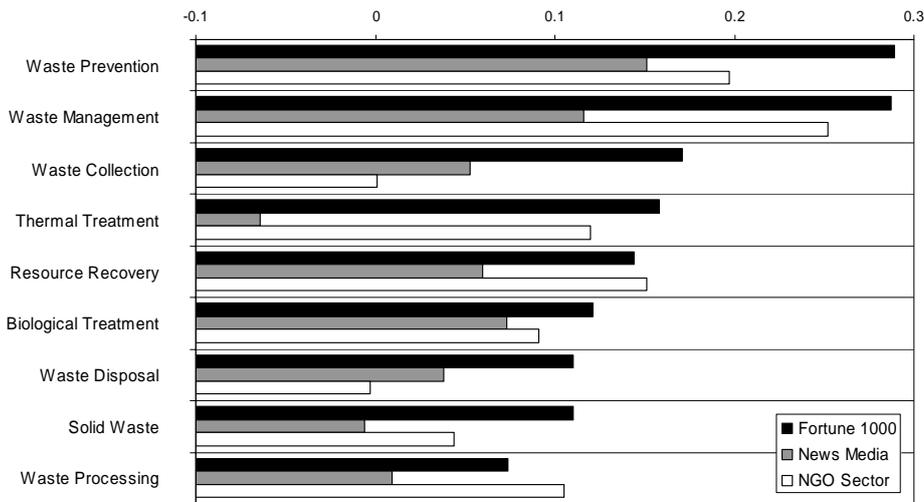


Fig. 2: Semantic Orientation towards Waste Management Terms by Sector

5. Outlook and conclusion

The analysis of environmental communication of companies, NGOs and news media has shown that corporate attention to solid waste management is small compared to that of environmental NGOs, but compares favorably to that of news media. In particular, the little attention both companies and news media pay to waste prevention and biological waste treatment may indicate a certain lack of commitment to more sustainable behavior. Corporate attitudes toward waste management have turned out to be highly positive, suggesting that companies do in fact avoid negative information in environmental communication. News media, by contrast, have expressed negative attitudes toward thermal waste treatment and solid wastes, while NGOs have viewed waste disposal slightly negatively. Those concept systems viewed negatively seem to reflect the most pressing problems in waste management, which validates the chosen approach and suggests further refinements for future studies in environmental online communication.

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