

**Motivations, Organizational Units, and Management Tools.
Taking Stock of the Why, Who, and How of Implementing
Corporate Sustainability Management**

Der Fakultät Nachhaltigkeit der Leuphana Universität Lüneburg
zur Erlangung des Grades

Doktorin der Wirtschafts- und Sozialwissenschaften
- Dr. rer. pol. -

vorgelegte Dissertation von

Sarah Elena Windolph
geb. am 29. August 1982 in Hannover

Eingereicht am: 13. August 2013

Überarbeitet am: 2. Dezember 2013

Betreuer und Gutachter: Prof. Dr. Stefan Schaltegger

Gutachter: Prof. Dr. Timo Busch

Gutachter: Prof. Dr. Martin Müller

Tag der Disputation: 27. November 2013

Acknowledgments

I would like to thank Prof. Stefan Schaltegger for supervising my PhD thesis. Besides continuously challenging me, he impressed me with his enthusiasm and taught me a lot about perseverance. I particularly appreciate the room he gave me to work on my thesis as well as his growing confidence over the years.

Many thanks go to my two reviewers, Prof. Timo Busch and Prof. Martin Müller, for agreeing to evaluate my thesis, and to Prof. Harald Heinrichs for taking part in my thesis defense. Furthermore, I thank Prof. Roger Burritt for getting actively involved in my dissertation process over the years. I am very grateful for his continuous encouragement and his valuable feedback on my framework paper.

Looking back at five years at the Centre for Sustainability Management, I have had the luck to work and do research with great people. In particular, I thank my project team, Dorli and Jacob, and co-authors for turning hard work into worthy results again and again. Many thanks go to Anica and Teresa for a lot of thinking and a lot of laughing during our peer group sessions. Marianne, Jordis, Tina, and Cornelia helped put things into perspective. Florian was always open to discuss the ‘really big questions’, and I enjoyed every single debate with Dimitar over coffee.

Words cannot tell how much I appreciate Jan’s support and encouragement while working on this thesis, and I am very happy that he and my parents never lost their patience with me during various ups and downs. Thanks to Tilmann for always pushing me... we made it.

I dedicate this PhD thesis to my grandmother, who did not have the chance to see its completion.

Sarah Elena Windolph
Lüneburg, August/December 2013

Table of contents

A. Framework paper PhD thesis

Motivations, Organizational Units, and Management Tools. Taking Stock of the Why, Who, and How of Implementing Corporate Sustainability Management (including overview of papers).6

B. Papers included in this cumulative PhD thesis

I. Paper 1

Windolph, S. E.; Harms, D. & Schaltegger, S. (2013): Motivations for Corporate Sustainability: Contrasting Survey Results and Implementation, Corporate Social Responsibility and Environmental Management, Special Issue: Managing Corporate Social and Environmental Responsibility – From Strategies to Implementation (early view).37

II. Paper 2

Windolph, S. E.; Schaltegger, S. & Herzig, C. (2013): Implementing Corporate Sustainability. What Drives the Application of Sustainability Management Tools in Germany? (to be resubmitted).52

III. Paper 3

Windolph, S. E. (2011): Assessing Corporate Sustainability Through Ratings: Challenges and Their Causes, Journal of Environmental Sustainability, Vol. 1, No. 1, 61–80.80

IV. Paper 4

Schaltegger, S.; Harms, D.; Windolph, S. E. & Hörisch, J. (2012): Involving Corporate Functions: Who Contributes to Sustainable Development?, Sustainability, Special Issue: Proceedings of the 3rd International Sustainability Conference (accepted for publication).101

V. Paper 5

Schaltegger, S.; Windolph, S. E. & Herzig, C. (2012): Applying the Known. A Longitudinal Analysis of the Knowledge and Application of Sustainability Management Tools in Large German Companies, Society and Economy, Vol. 34, No. 4, 549–579.125

A. Framework paper PhD thesis

Motivations, Organizational Units, and Management Tools. Taking Stock of the Why, Who, and How of Implementing Corporate Sustainability Management (including overview of papers).

Framework paper PhD thesis

**Motivations, Organizational Units, and Management Tools.
Taking Stock of the Why, Who, and How of Implementing
Corporate Sustainability Management**

Sarah Elena Windolph

Centre for Sustainability Management (CSM)

Leuphana Universität Lüneburg

Scharnhorststr. 1

D-21335 Lüneburg, Germany

Tel. +49.4131.677-2521

Fax +49.4131.677-2186

windolph@uni.leuphana.de

Abstract

This framework paper provides a literature review and a theoretical basis for analyzing the implementation of corporate sustainability management and the different aspects examined in this cumulative PhD thesis, namely the motivations behind sustainability management, the engagement of organizational units, and sustainability management tools. The paper summarizes the research questions, methodology, and findings of the different papers. As a conclusion, the results are consolidated and a meta-analysis against the background of management fashion theory is carried out. The paper demonstrates that corporate sustainability management can be considered as an ongoing development rather than a management fashion or fad for various reasons. In conclusion, the author hopes to make a significant contribution to the discussion on the implementation of corporate sustainability and to stimulate the development of new theoretical approaches.

Lüneburg, 13. August 2013

1. Introduction

In spite of growing interest of society, politics, and business in sustainable development, and although the potential contribution that companies can make to sustainable development is now broadly recognized (Bansal 2005; Schaltegger & Burritt 2005; Starik & Kanashiro 2013), the implementation of sustainability in companies is not well understood (Bansal 2002; Waddock et al. 2002; Cramer 2005; Siebenhüner & Arnold 2007). Some companies or managers consider sustainability activities as just a matter of public image (Laufer 2003; Ramus & Montiel 2005), and that addressing sustainability issues represents a *transitory management fad or fashion* that will decline at some point (Abrahamson 1991; 1996; Zorn & Collins 2006). Others recognize that sustainable development cannot be achieved without the ongoing contribution of companies (Shrivastava & Hart 1995; Bansal 2002; Schaltegger & Burritt 2005; Dunphy et al. 2007) and the combined efforts of individuals, organizations (particularly companies), and society (Starik & Kanashiro 2013). From this perspective, *corporate sustainability management*, requiring both the internal sustainable development of companies as well as a contribution to the sustainable development of the environment and society, is an indispensable step towards addressing today's and tomorrow's environmental, social, and economic challenges (Rondinelli & Berry 2000; Schaltegger & Burritt 2005).

The concept of corporate sustainability may be rather new and challenging to companies which have traditionally followed solely the economic principle of profit maximization (Bansal 2002). The decision to manage sustainability challenges can be characterized by the same stages as any other innovation-decision process, starting with knowledge and leading to implementation and confirmation (Rogers 2003, p. 162ff.). These last two steps refer to putting the innovation into use as well as reinforcing (or revising) this decision (Rogers 2003). Similarly, Damanpour and Aravind (2012), according to whom corporate sustainability management would be classified as *managerial* or *administrative* innovation, describe the result of adopting an innovation as implementation. Accordingly, to become effective, i.e. to actually change business objectives, operations, products, and services, the innovation of corporate sustainability management has to be implemented and maintained (or "institutionalized", see Bansal 2002, 122) in companies and not replaced after a certain period like management fads or fashions (Zorn & Collins 2006; also Røvik 2011).

This PhD thesis evaluates whether such an effective implementation is actually taking place in German companies, or if corporate sustainability mainly consists of communication efforts or even greenwashing (e.g. Laufer 2003; Ramus & Montiel 2005). To do so, the thesis answers

the three questions *why* companies put corporate sustainability management into use, *who* in the company puts it into use, and *how* companies put it into use. The idea to analyze the implementation of corporate sustainability based on these three questions builds on literature dealing with how to embed corporate sustainability across organizations.

First, whether and how effectively corporate sustainability management is implemented primarily depends on the *motivation* behind it ('Why?'). In case companies are mainly concerned with regulations and societal requirements to be accepted, they will keep their activities to a minimum and focus on signaling good behavior (Bansal 2002; Ramus & Montiel 2005). Actual change processes are more likely to be implemented if, e.g. sustainability engagement aims at generating competitive advantages (Bansal & Roth 2000; Schaltegger et al. 2012). Second, today's large companies are divided into specialized *functions* or *units* attending to different tasks and objectives ('Who?'). In order to effectively implement corporate sustainability management, all units and employees in a company have to learn about sustainability and act in concert (Shrivastava & Hart 1995; Schaltegger & Burritt 2005; Dunphy et al. 2007; Darnall et al. 2008; Seuring & Müller 2008). In case certain organizational units of a company are left out, important measures may be neglected, which would hinder a sustainable development of the company. Third, the operationalization and implementation of corporate sustainability management requires learning about and applying sustainability *management tools* ('How?'). Only if suitable management approaches are used and if the challenges of corporate sustainability are integrated into existing practices and management systems, can sustainability be systematically handled (Rondinelli & Berry 2000; Bansal 2002; Waddock et al. 2002; Cramer 2005; Haugh & Talwar 2010).

Taken together, the elements of motivations, organizational units, and management tools are seen as suitable indicators of whether an effective implementation of corporate sustainability management is taking place in German companies. Analyzing these elements, this PhD thesis aims at making two contributions. First, it adds to theorizing on the developing field of *implementing corporate sustainability* by offering insights into the state of the art and potentials for improvement in practice and academia. Thereby, the thesis discusses whether corporate sustainability is a continuing development or just another short-term fad or fashion, and it invites companies, academia, and society to reflect on their approach to and expectations on corporate sustainability. Second, the thesis aims at raising awareness for both the necessity and the challenges of *externally assessing corporate sustainability*. Writing this thesis would not have been possible without the data generated by the Corporate Sustainability Barometer

(CSB) of the Centre for Sustainability Management. External assessments by NGOs, rating institutions, or academia are necessary to evaluate companies' sustainability efforts and to reduce information asymmetries (Akerlof 1970; Schaltegger & Burritt 2005; Chatterji & Levine 2006; Rischkowsky & Döring 2008; Burritt & Schaltegger 2010). The substantial challenges that these approaches face will be discussed in several papers of this thesis.

This paper proceeds as follows. Section 2 reviews literature on the diffusion of *administrative technologies* or *innovations*. It also introduces the three elements of motivations, organizational units, and management tools to provide a conceptual framework for the thesis. Section 3 presents the data basis as well as the different papers and their findings. Section 4 discusses the results, and it derives implications and ideas for future research.

2. Implementing corporate sustainability management: literature and framework

2.1 Corporate sustainability management as administrative technology or innovation

As for most management approaches or ideas, there is no standardized or undisputed best-practice approach to implementing corporate sustainability management, because, e.g., the core business and the specific situation of a company require a tailored approach rather than “off the peg” solutions (Haugh & Talwar 2010, 393; also Cramer 2005). Additionally, the concept of corporate sustainability is highly multifaceted and not well-defined, increasing the complexity of its management (Bansal 2002; Schaltegger & Burritt 2005; Siebenhüner & Arnold 2007). “[T]ranslating the general principles of sustainable development into business practices” (Bansal 2002, 122) is thus essential for corporate sustainability management to become effective. However, as long as corporate sustainability is still as new as it is today, companies will take different approaches towards its implementation.

The underlying rationale of this PhD thesis is that balancing environmental, social, and economic issues and integrating them into the conventional business operations may nonetheless be regarded as a management ‘technology’. Tushman and Anderson (1986, 440) define technology as “those tools, devices, and knowledge that mediate between inputs and outputs (process technology) and/or that create new products or services (product technology).” More specifically, corporate sustainability management can be regarded as “administrative technology”, i.e. “prescriptions for designing organizational structures and cultures” that may “affect the overall structure of organizations” (Abrahamson 1991, 588). In the case of corporate sustainability management, the prescriptions do affect the overall structure of the organization, since implementing corporate sustainability is a company-wide and cross-functional task

(Shrivastava & Hart 1995; Hoffman 2001; Schaltegger & Burritt 2005; Dunphy et al. 2007). In a similar vein, Damanpour and Aravind (2012) refer to “new organizational structures, administrative systems, management practices, processes, and techniques that could create value for the organization” as “managerial innovations” (424) or “administrative innovations” (428).

Having classified corporate sustainability management as *administrative technology* or *innovation*, this thesis aligns itself with the research strand on the diffusion of administrative innovations, management technologies, ideas, concepts, or knowledge, which has been discussed in management literature in the context of neo-institutional theory for more than 20 years. An important approach that is still being used and discussed today is management fashion theory (Abrahamson 1991; 1996; Abrahamson & Eisenman 2001; Nicolai et al. 2010; Røvik 2011; Damanpour & Aravind 2012). A management fashion is defined as “a relatively transitory collective belief” (Abrahamson 1996, 257) that a certain management technology is “at the forefront of management progress” (Abrahamson 1996, 254). According to this theory, organizations tend to imitate the technologies and innovations of other organizations in case of “uncertainty concerning environmental forces, goals, and technical efficiency” (Abrahamson 1991, 595; see also Rogers 2003). This behavior has been coined as (mimetic) ‘isomorphism’ (DiMaggio & Powell 1983). Whereas a management fashion is characterized by a strong influence of ‘management fashion setters’ creating or disseminating management technologies outside a group of organizations, a management fad refers to the imitation of other companies within this group (Abrahamson 1991). The theory claims that after a certain period of time management technologies or practices decline in popularity and are replaced by new ones.

Management fashion theory and isomorphism have also been discussed in the specific context of corporate environmental and sustainability management (Jennings & Zandbergen 1995; Fineman 2001; Hoffman 2001; Bansal 2002; Zorn & Collins 2006). Particularly, some authors have gone further into the question whether corporate sustainability or environmental management is a fad or fashion (Fineman 2001; Zorn & Collins 2006). Fineman (2001) finds significant differences between environmental management and management fashion theory. He argues that the “appeal to organizational profit or productivity is not readily apparent”, that “the green message [...] is more a mix of ideas than a management idea”, and that “greening is difficult to benchmark, readily contestable and offers no obvious reassurance” (Fineman 2001, 18). He continues that the necessity to manage environmental issues is maintained by other forces such as stakeholders and management fashion setters. Zorn and Collins

(2006) respond to Fineman's argumentation by pointing out the business case for sustainability, the fact that other management techniques are complex, too, and that CSR or sustainability does offer reassurance by supporting a company's reputation. The authors analyze criteria for management fashions and conclude that CSR or sustainability fulfills several of them. They continue that "[s]ome fashions last longer than others, however, with some even becoming relatively permanent fixtures", and state to be "optimistic about the prospects for CSR/sustainable business as 'sustainable' business practices" (Zorn & Collins 2006, 18).

Yet, taking management fashion theory literally, it cannot be applied to explain a technology becoming standard practice, since fashions are characterized by the fact that they are continuously replaced (Abrahamson 1991, 1996). Hence, the question whether corporate sustainability represents a fashion or fad remains unanswered. To help lift the fog, this PhD thesis analyzes this question by examining *why* corporate sustainability management is put into use, *who* puts it into use, and *how* it is put into use. Whereas the diffusion of corporate sustainability management can be analyzed through the lens of diffusion of administrative technology and innovation, the three elements of motivations, organizational units, and management tools are related to further theoretical perspectives such as legitimacy theory or the division of tasks in organizations, and they require a close look at sustainability management literature. In the following, the three elements will be introduced.

2.2 The 'Why' element of implementation: motivations

Whether and how effectively corporate sustainability is implemented is largely determined by the motivations or reasons for such engagement. Motivation is a necessary starting point and can be crucial for the decisions who in the company to involve and how to operationalize corporate sustainability. Hence, motives, drivers, and pressures for corporate sustainability have been discussed by a variety of authors. As a synthesis of the existing literature, motivations can be differentiated into three categories (based on Bansal & Roth 2000; Darnall 2003; Epstein 2008). First, governments and society exert pressure on companies, forcing them to gain and secure *legitimacy* (DiMaggio & Powell 1983; Bansal & Roth 2000; Darnall 2003; Bansal 2005; Ramus & Montiel 2005; Campbell 2007; Siebenhüner & Arnold 2007). Second, the demands of consumers and investors and the behavior of competitors can create motivation to achieve *market success* through sustainability management (Miles & Covin 2000; Hockerts & Moir 2004; Moon 2007; Siebenhüner & Arnold 2007; Delmas & Toffel 2008). Third, *internal improvement* refers to the optimization of processes and costs reductions (Miles & Covin 2000; Sarkis 2001; WBCSD 2002; Darnall 2003; Bansal 2005; von Weizsäcker et al. 2009;

Gold et al. 2010). Besides these rational, content-related motivations, the behavior of other companies and institutions in the same organizational field, such as standards and ratings, may also influence the behavior of a company (Bansal 2002; Waddock et al. 2002; Boiral 2011), leading to institutional *isomorphism* (based on DiMaggio & Powell 1983). The potential *motivations* for corporate sustainability are regarded as first element of implementation, and this thesis aims at answering the question *why* companies manage corporate sustainability.

2.3 The ‘Who’ element of implementation: organizational units

Learning about sustainability is a *cross-functional challenge* and “a company-wide necessity” (Haugh & Talwar 2010, 384) that should include all business functions or organizational units (Shrivastava & Hart 1995; Hoffman 2001; Bansal 2002; Waddock et al. 2002; Cramer 2005; Dunphy et al. 2007; Siebenhüner & Arnold 2007). Accordingly, the roles of different units or actors within a company, such as top management, marketing, or logistics, have been discussed by several authors (Shrivastava & Hart 1995; Schaltegger & Burritt 2005; Darnall et al. 2008; Epstein 2008; Seuring & Müller 2008). Although the engagement of top management and strategic planning is of great importance (Wagner 2007; Stead & Stead 2008), the actual operationalization and implementation of corporate sustainability needs to happen in the day-to-day operations of the different functional units, which will have to “re-engineer” (Bansal 2002, 125) their activities (Siebenhüner & Arnold 2007). Yet, the division of tasks into specialized functions may hamper the collaboration of organizational units, e.g. through information and communication barriers or departmental egoism (Hoffman 2001; Darnall et al. 2008; Epstein 2008). Building on this, a second important element of the implementation of corporate sustainability is the *engagement of organizational units*, and this thesis serves to answer *who* is actually involved in corporate sustainability.

2.4 The ‘How’ element of implementation: management tools

To learn about corporate sustainability and to systematically integrate and implement it, a variety of management concepts and tools have been developed (e.g. Rondinelli & Berry 2000; Bansal 2002; Waddock et al. 2002; Schaltegger et al. 2007; Haugh & Talwar 2010). The need to acquire new knowledge and to apply specific measures for implementing environmental and sustainability management has also been discussed by further authors (Banerjee 2001; WBCSD 2002; Brammer & Millington 2004; Lockett et al. 2006). *Sustainability management tools*, such as codes of conduct, stakeholder dialogues, and environmental

or sustainability accounting, serve to break down the idea of corporate sustainability into specific management concepts and techniques and to design organizational structures accordingly (adapted from Tushman & Anderson 1986; Abrahamson 1991; Damanpour & Aravind 2012). Using these tools, corporate sustainability can be implemented in a systematic manner, i.e. integrating environmental and social issues into conventional management and providing companies with guidelines for actions and processes to increase their environmental, social, and economic performance (Bansal 2002; Schaltegger et al. 2012). A multitude of management tools have been developed (e.g. European Commission 2004; Tencati et al. 2004; Biebeler et al. 2005; Hahn & Scheermesser 2006; Schaltegger et al. 2007; Epstein 2008), either with an environmental (e.g. Jennings & Zandbergen 1995; Steger 2000; Banerjee 2001; Schaefer 2007), a social (e.g. Lockett et al. 2006) or, more recently, an integrative focus linking environmental, social, and economic aspects (e.g. sustainability management systems, Oskarsson & von Malmborg 2005; Schaefer 2007). However, according to Haugh and Talwar (2010, 384) it would be a “leap of faith” to “assume that managers and employees are aware of and implementing such policies and procedures.” Accordingly, this thesis analyzes both the *awareness* and the *application* of tools as a third element of implementation to answer the question *how* companies put corporate sustainability into practice.

2.5 Combining the elements of implementation: framework and papers

Combining the three elements of motivations, organizational units, and management tools supplies a framework for discussing the implementation of corporate sustainability management as an administrative technology or innovation (see Figure 1). The different elements given above will be discussed in five papers which together shape this PhD thesis.

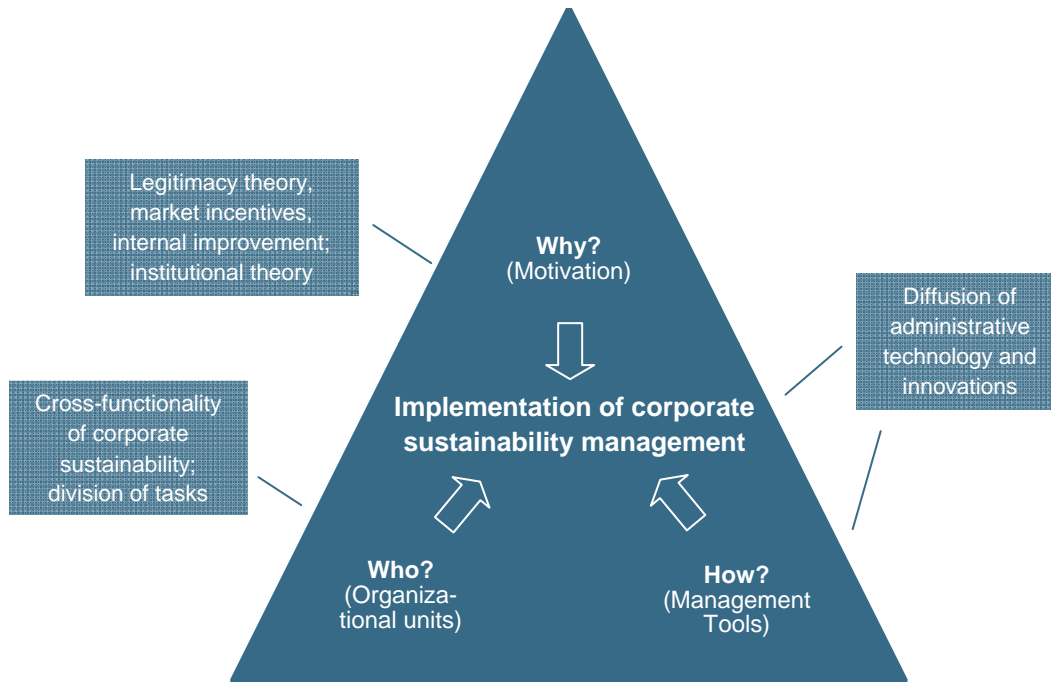


Figure 1: The Why, Who, and How of implementing corporate sustainability and their theoretical lenses

The question *why* companies engage in corporate sustainability is addressed in three papers: ‘Motivations’ (Windolph, Harms & Schaltegger 2013), ‘Isomorphism’ (Windolph, Schaltegger & Herzig 2013), and ‘Ratings’ (Windolph 2011). The ‘Motivations’ paper discusses the relevance of the three different motivations of legitimacy, market success, and internal optimization. The ‘Isomorphism’ paper analyzes whether isomorphism exists in the field of corporate sustainability. The ‘Ratings’ paper takes up one aspect of the ‘Isomorphism’ paper by synthesizing on corporate sustainability ratings. Furthermore, this paper discusses the challenges of externally assessing corporate sustainability, and the ‘Motivations’ paper reveals how the way of data collection may influence the results of surveys on sensitive and socially desired issues such as corporate sustainability. Thereby, these papers also address the aspect of *external assessment*.

To put a spotlight on *who* engages in corporate sustainability, the ‘Involving corporate functions’ paper (Schaltegger, Harms, Windolph & Hörisch 2013) examines to what extent different organizational units are involved in sustainability management and how their involvement could be increased. The question *how* is in the limelight of two papers on sustainability management tools: ‘Applying the known’ (Schaltegger, Windolph & Herzig 2012) and, again, ‘Isomorphism’. These papers analyze the awareness and application of sustainability management tools over time and examine what drives their diffusion. Table 1 gives an overview of the papers forming this PhD thesis (see also Appendix). It relates the papers to the central

elements *Why*, *Who*, and *How* of implementing corporate sustainability and displays the specific contributions of the papers.

Table 1: The Why, Who, and How of implementing corporate sustainability in the papers of this PhD thesis

Central element	Specific analysis/contribution	Papers (short names)
Why? – Motivations	Relevance of legitimacy, market success, and internal optimization	Motivations
	Institutional isomorphism; influence of networks, standards, and indices	Isomorphism
	Synthesis on corporate sustainability ratings and their challenges General challenges of externally assessing corporate sustainability	Ratings
Who? – Engagement of organizational units	Extent to which organizational units are affected by sustainability issues	Involving corporate functions
	Organizational units' support of corporate sustainability Application of function-specific management tools	
How? – Management tools	Awareness and application of sustainability management tools	Applying the known, Isomorphism
	Awareness and application of integrative sustainability management tools	Isomorphism

3. Results on the Why, Who, and How of implementing corporate sustainability

This framework paper presents the five papers in the following way: first, the research question addressing one of the three elements of implementation is presented. Second, the methodology of the papers is briefly described, and in a third step, key findings and conclusions are discussed to derive some overall implications. Beforehand, the following excursus briefly introduces the data basis of most of the findings discussed in this thesis.

Excursus: Corporate Sustainability Barometer

With the exception of one paper ('Ratings'), the data analyzed in this PhD thesis are based on the *Corporate Sustainability Barometer* surveys conducted by the Centre for Sustainability Management among the largest German companies in 2002, 2006, and 2009/2010. For each of the surveys, the sustainability managers or other persons in charge of sustainability management in the companies were asked to fill in a questionnaire sent to them by email or mail. If necessary, the contact persons involved further persons or departments. The respondents were mostly sustainability, environmental, health & safety, or CSR managers (53.2% to

95.5% in the different surveys), or, to a lower extent, public relations or communication managers in case they were the contact persons for corporate sustainability matters (2.3% to 28.4%). Sustainability managers can be expected to have a good overview of the following elements analyzed in this PhD thesis:

- the extent to which organizational units are affected by environmental and social issues
- the support of organizational units for the implementation of corporate sustainability
- the need for developing sustainability management tools in organizational units
- the awareness and application of sustainability management tools.

Furthermore, for some issues it was expected that asking the sustainability managers would reduce the probability of strategic or evasive responses compared to if the corporate functions had been asked directly about their engagement (Banerjee 2001).

The population of the surveys consisted of the largest companies in Germany by turnover (based on FAZ 2002; 2006; Welt online 2009). In 2002 and 2006 only the 120 largest companies were included. In 2010 the survey was expanded to the 500 largest companies, 50 largest banks, and 30 largest insurers. Subsidiaries were excluded from the survey, and for every subsidiary erased the next company in size was considered. Table 2 gives an overview of the data. Since the sample compositions changed in every survey, the data do not constitute a panel.

Table 2. Overview of the Corporate Sustainability Barometer survey samples

Sample characteristics	2002	2006	2009/2010
Basic population	120 largest companies	120 largest companies	500 largest companies, 50 largest banks, and 30 largest insurers
Sample size (and response rate of 120 largest companies)	44 (36.7%)	42 (35.0%)	31 (25.8%)
Sample size (and response rate of 500 largest companies, banks, and insurers)	./.	./.	109 out of 331 questionnaires sent out (32.9%*)

* calculated based on the number of questionnaires sent out after contacting the companies by phone.

3.1 Motivations for implementing corporate sustainability management

Research questions and units of analysis

The potential motivations for corporate sustainability are addressed in three papers of this thesis. The ‘Motivations’ paper evaluates the *relevance of seeking legitimacy, market success,*

and internal optimization for corporate sustainability. The ‘Isomorphism’ paper analyzes whether *institutional factors* drive the implementation of corporate sustainability. The ‘Ratings’ paper assembles and systematizes the main *challenges of corporate sustainability ratings* and discusses their causes.

Methodology

The ‘Motivations’ paper identifies which organizational units engage in corporate sustainability in the 109 companies from the 2010 survey. Based on a literature review, the paper matches organizational units with three potential motivations for corporate sustainability, i.e. seeking legitimacy, market success, and internal improvement. The rationale is that different organizational areas can be expected to engage in corporate sustainability depending on the corporate motivation behind this engagement. The paper compares the findings with other studies on motivations for corporate sustainability and discusses contradictions.

The ‘Isomorphism’ paper analyzes the influence of *networks, indices, and standards* on the application of sustainability management tools. It examines the subsample of 31 of the 120 largest companies from the 2010 survey to analyze ‘global players’ with high revenues, mostly listed on the stock exchange, and generating a large share of their sales revenues abroad. Publicly available data on the companies served to identify which of them participate in corporate sustainability networks, which are listed in corporate sustainability indices, and which apply corporate sustainability standards. Popular examples are chosen for every factor. As dependent variable, first the *total application* of sustainability management tools is analyzed, second the application of *integrative* sustainability management tools (understood as tools considering environmental, social, and economic aspects simultaneously). Both indicators are based on a list of 79 sustainability management tools drawn from a literature review.

The ‘Ratings’ paper carries out a synthesis of both academic and practitioner-oriented literature. It assembles and systematizes the main *criticism* that corporate sustainability ratings face, referring to existing ratings for illustration purposes. Based on a discussion of the *causes of these challenges* the conceptual paper offers recommendations on how to improve the reliability of ratings.

Key findings and conclusions

The ‘Motivations’ paper concludes that reputation and legitimacy are of prior relevance for corporate sustainability, ensuing from the finding that particularly public relations and communications units engage for corporate sustainability. Performance and internal improvement seem to be of minor relevance, which is demonstrated by the lesser engagement of finance,

accounting, and management control. Market success seems to play a moderate but increasing role compared to earlier studies (e.g. Meffert & Kirchgeorg 1998). Furthermore, evidence suggests there is an ongoing process of including corporate sustainability on a strategic level, since the respondents see a relatively high need for developing tools in the strategic planning unit. The identified leading role of public relations contradicts other studies that identify reputation and legitimacy as less important drivers of corporate sustainability. Among the possible reasons for this contradiction is a social desirability bias preventing respondents from naming legitimacy as important motivation when asked directly (e.g. Banerjee 2001). This explanation illustrates the challenges in assessing corporate sustainability.

The 'Isomorphism' paper finds a significant positive influence of corporate sustainability standards on the application of related tools, both with regard to the total application of tools and the application of integrative tools. Accordingly, the implementation of corporate sustainability might be fostered by acknowledged guidelines and standards, which serve as orientation point for companies and often attract public awareness. This, again, underpins the relevance of legitimacy, and it demonstrates that institutional factors drive the implementation of corporate sustainability, which might lead to isomorphism. A possible explanation for this may be uncertainty among companies and managers on how to best handle this relatively novel and complex concept.

The 'Ratings' paper identifies a lack of standardization, a lack of credibility of information, biases, tradeoffs, a lack of transparency, and a lack of independence as most important challenges of assessing corporate sustainability through ratings. It shows that some of these challenges are not rating-specific, but that they result from the concept of corporate sustainability itself. Particularly, the lacks of standardization and credibility of information result from the general lack of data availability on corporate sustainability and its complexity. Yet, some challenges may be ascribed to the particular characteristics of rating suppliers. Specifically, the lacks of transparency and independence can be ascribed to the commercial use of ratings and the intermingled business of rating institutions. The challenges of biases and tradeoffs can be linked to the demand of rating users for a highly simplified score and their mostly financial background. Nonetheless, ratings fulfill an important function in terms of overcoming information asymmetries, and they have the power to foster the implementation of corporate sustainability management.

3.2 Engagement of organizational units in corporate sustainability management

Research question and unit of analysis

The ‘Involving corporate functions’ paper analyzes *to what extent and in which way different corporate functions* are involved in corporate sustainability. The paper employs an involvement model developed in consumer research, containing a cognitive-affective component and a behavioral component, and adapts it to the context of corporate sustainability.

Methodology

The paper is based on the responses from 109 companies in the 2010 survey (similar to the ‘Motivations’ paper). To assess cognitive-affective involvement, the respondents rated the extent to which organizational units are *affected* by environmental and social issues as well as whether they *support* the implementation of corporate sustainability. Additionally, the respondents indicated which sustainability management *tools* were known and applied in their company. To assess the behavioral involvement of corporate functions, three typical tools are assigned to each corporate function based on a literature review, and it is analyzed whether these tools were used. This procedure serves to identify the organizational units (not) engaged in corporate sustainability. The paper also applies a multinomial logistic regression to analyze the relations of the three indicators used in the paper.

Key findings and conclusions

The paper reveals that corporate functions manage corporate sustainability to very different extents. A high level of engagement can be seen in public relations, whereas internal, performance-oriented units show lesser engagement. Between these two extremes, several organizational units occupy moderate positions, e.g. marketing, research & development, and production. Testing the influence of cognitive-affective involvement on the behavioral component implies that the engagement of organizational units might be fostered by increasing the extent to which they are affected by sustainability issues. This increase might originate from outside the company, e.g. through growing stakeholder pressures, or from the inside, e.g. through top management commitment or by integrating corporate sustainability into corporate and functional objectives. Particularly, accounting, management control, and finance seem to be left out. This result challenges a performance-oriented implementation of corporate sustainability, and it reveals that corporate sustainability is currently not implemented as a cross-functional task in large German companies.

3.3 Management tools for implementing corporate sustainability

Research questions and units of analysis

Two publications in this PhD thesis address sustainability management tools. The ‘Applying the known’ paper analyzes the *awareness and application* of environmental, social, and sustainability management tools *over time*. The ‘Isomorphism’ paper seeks to identify what *drives the application* of sustainability management tools by testing (besides several institutional factors) the influence of the awareness of tools on their application.

Methodology

The ‘Applying the known’ paper is based on the data of those companies belonging to the 120 largest in the surveys from 2002, 2006, and 2010. To capture the contemporarily relevant pool of tools in each survey year, the range of tools offered in the questionnaires was extended over time, leading to an increase in the number of tools from 52 to 79 between the first and the last survey. Parts of the ‘Isomorphism’ paper have already been described (see Section 4.1). It also applies multiple regression analysis to examine what drives the application of sustainability management tools. Besides several institutional factors, it tests the influence of the *awareness* of sustainability management tools on their application, first on the *total application* of tools, second on the application of *integrative* tools.

Key findings and conclusions

The ‘Applying the known’ paper shows that between 2002, 2006, and 2010 both the awareness and the application of sustainability management tools have increased. An increase can also be found for the application relative to awareness. Another important finding is that awareness and application are positively related, which is revealed by their strong and significant correlation and a descriptive analysis. This result is strengthened by the ‘Isomorphism’ paper, which shows a statistically highly significant positive influence of the awareness of sustainability management tools on both the total application of tools and the application of integrative tools. In conclusion, it can be argued that an increased awareness of sustainability management tools may drive their application. Thus, an increased discourse on tools and the active dissemination of information, for example by consultants, scholars, and business schools, could foster the contribution of companies to sustainable development.

Figure 2 provides an overview of the findings on corporate sustainability management implementation gained in the different papers. The traffic lights serve as symbols to illustrate where the papers find positive results (green lights at the bottom), where a positive development can be observed (yellow), and where there is need for improvement (red lights at the

top) concerning the three elements analyzed. The following section discusses the findings and their implications and relates them to management fashion theory.

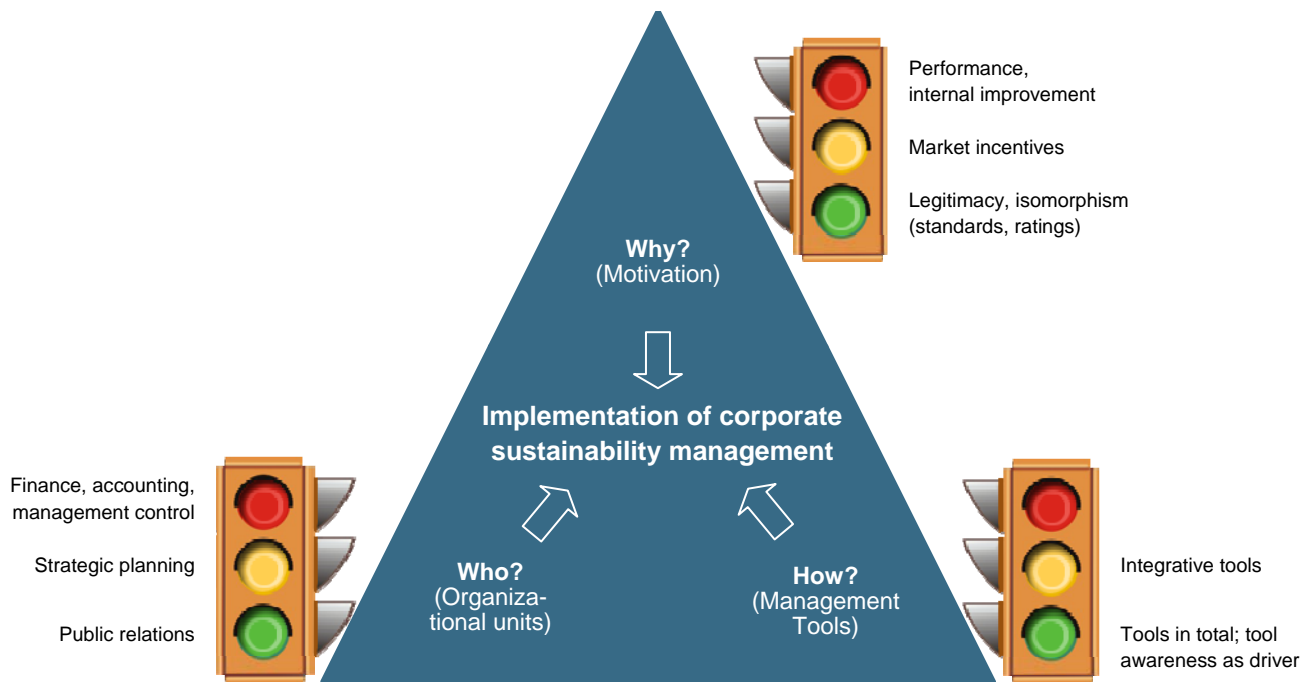


Figure 2: Key findings of the papers in this PhD thesis

4. Lessons learned: discussion, meta-analysis, and implications

The five papers in this PhD thesis all assess central elements of the implementation of corporate sustainability. Taken together, they serve to gain valuable insight into the *Why*, *Who*, and *How* of corporate sustainability management. In essence, the results reveal that large German companies predominantly manage corporate sustainability because they seek legitimacy, rather than a competitive advantage, and because they follow acknowledged standards, guidelines, or ratings (institutional isomorphism) – possibly resulting from uncertainty on how to best handle a concept so complex and novel. Public relations is the organizational unit engaging in sustainability management most strongly, whereas performance-oriented functions such as accounting, finance, and management control engage the least. Hence, corporate sustainability is currently not implemented as a cross-functional approach (see also Burritt et al. 2003). Yet, there is indication of a growing strategic relevance of corporate sustainability, suggesting that its implementation in day-to-day business will be strengthened in the future. This is also reflected in the awareness and application of sustainability management tools, which have been increasing continuously between 2002 and 2010 – both in terms of the total number of sustainability management tools and in terms of integrative tools. Furthermore, it

can be shown that market incentives are gaining in importance, suggesting that new triggers and business opportunities for corporate sustainability are being created.

In addition to this, *institutional* ‘incentives’ or pressures are still being advanced further, as for instance the issuing of new standards such as the ISO 26000 or the ‘Rate the Raters’ initiative (www.sustainability.com/projects/rate-the-raters) illustrate. Corporate sustainability *ratings*, which the thesis also had a close look at, have become more and more important in assessing and fostering the implementation of sustainability management. Nonetheless, the analysis revealed that both rating institutions and rating users compromise the reliability of ratings. Given the potential influence of ratings on corporate behavior, it is essential that rating institutions and users consider the entire concept of corporate sustainability and do not distort it, e.g. by demanding and supplying oversimplified rating scores. To improve the reliability of corporate sustainability ratings, raters might consider coordinated research embracing various disciplines and actors in research and practice, collaborating with third parties perceived as more reliable, e.g. NGOs, and disclosing their rating methodology.

Besides ratings, *standards* were found to have a positive influence on sustainability management. Accordingly, standards, guidelines, and related institutions such as the International Organization for Standardization (ISO) and United Nations Global Compact can help to foster the diffusion of sustainability management tools and practices. Especially integrative tools aiming to balance the economic, environmental, and social dimensions are needed now. The thesis could also show that particularly the awareness of sustainability management tools positively influences their application. This implies that the promotion of sustainability management tools can help to strengthen their popularity and their dissemination, which, in turn, fosters the implementation of corporate sustainability. Bringing new tools up for discussion is a task for standard setters and management fashion setters such as consultants or business schools. Abrahamson and Eisenman (2001, 70) stress that especially scholars should develop techniques fitting specific organizations instead of “quick fixes”, and they demand a stronger influence of scholars on the management knowledge market. A similar conclusion is made by Starik and Kanashiro (2013) with regard to the role of scholars in the context of sustainability.

Combining these findings, it can be concluded that the implementation of corporate sustainability is in full swing. Incentives and pressures as well as corporate activities and practices to address sustainability issues are developing and becoming more sophisticated. This implies that corporate sustainability management – at least so far – does not represent a transitory technology in the sense of a fad or fashion (see also Abrahamson 1991, 1996, Zorn & Collins

2006). Rather, corporate sustainability management is on its way to becoming “anchored in organizational structure, routines and daily activities” (Røvik 2011, 640) and to *actually change business practices*. A similar discussion has been led, e.g., with regard to total quality management (TQM), which is also a cross-functional approach requiring top management commitment. Hackman and Wageman (1995, 309) discussed TQM as either a “historically unique approach to improving organizational effectiveness [...] that takes account of how people and organizations actually operate” or “yet another new management fashion.” Today, it can be argued that quality management has become standard practice (Zorn & Collins 2006). The results of this thesis imply that the same might be true for corporate sustainability management, which is an even more comprehensive concept than TQM. Thereby the thesis supports the deliberations by Røvik (2011), who discusses the staying power of management ideas referring to a virus metaphor as opposed to management fashion theory. The notion of “viral change” has recently also been discussed in the context of sustainability management (Starik & Kanashiro 2013, 25). This thesis reaches conclusions similar to Starik and Kanashiro (2013), particularly that new theoretical approaches for sustainability management are needed to reflect the change of paradigm and to address the omissions of other approaches (such as institutional theory or resource-based view). Whereas Starik and Kanashiro (2013) discuss the elements that a *theory of sustainability management* should consider on the individual, organizational, and societal level, this thesis contributes to the discussion by pointing out the elements which help identify whether an effective implementation of corporate sustainability management is taking place.

Several *implications* of the findings on the three elements of motivations, organizational units, and management tools shall be highlighted. With regard to *motivations*, it could be shown that seeking legitimacy is a predominant driver of corporate sustainability engagement. Yet, in the worst case, institutional and particularly ‘coercive’ pressure might lead to decoupling between the actual implementation of corporate sustainability and what a company communicates (Jennings & Zandbergen 1995; Røvik 2011). Too much institutional pressure may thus have the opposite effect than intended and result in an ineffective or weak implementation of corporate sustainability. Consequently, stronger incentives from the market and from inside organizations are needed. On markets, consumers or investors intending to foster the consideration of sustainability aspects in products and services could voice such demands more strongly. Thereby they could support a proactive and innovative management of corporate sustaina-

bility. Internally, the efforts of sustainability managers and the commitment of top management are needed to widen the range of corporate sustainability drivers and activities.

Similar implications can be drawn from the analysis of *organizational units*, since performance-oriented units such as finance or management control are basically excluded from corporate sustainability management. To address this shortcoming it is necessary that these units as well as companies as a whole appreciate incentives through sustainability issues, and that they recognize business opportunities. That is the only way to turn sustainability management into a true cross-functional task, without which effective implementation is inconceivable. With regard to *sustainability management tools*, the thesis reveals that companies are on a good way. Both the awareness and the application of management tools have increased over the last years. Especially integrative tools serving to balance environmental, social, and economic aspects are needed now. A stronger consideration of market demands and internal performance requirements can help to develop the set of tools applied in a specific company.

In sum, this thesis offers implications and potentials for a variety of societal, market, and company-internal actors and stakeholders such as consumers, investors, consultants, scholars, as well as, of course, companies and their different organizational units. Only the combined efforts of individuals, organizations, and societies can foster the implementation of corporate sustainability and significantly bring forth sustainable development (Rondinelli & Berry 2000; Starik & Kanashiro 2013). These important insights demonstrate that examining elements *Why*, *Who*, and *How* can contribute to the discussion on corporate sustainability and its implementation.

One potential *limitation* of this research is that its results are predominantly based on quantitative surveys. Particularly the large choice of sustainability management tools provided in the Corporate Sustainability Barometer surveys might have been subject to different individual perceptions of the respondents. To assess the awareness and application of these tools in a different way, interviews might be conducted and evidence from the companies might be evaluated such as written documentation or observation by researchers. However, the advantages of such intensive approaches have to be balanced with time constraints and the potential refusal of companies to involve researchers. Yet, keeping in mind the challenges of social desirability biases and information asymmetries when assessing corporate sustainability from the outside (Banerjee 2001; Chatterji & Levine 2006; Rischkowsky & Döring 2008), the *reliability of corporate responses* is of essential importance. Although research in environmental and sustainability management has been carried out for decades now, it has to be taken

into consideration that some aspects, such as motivations, might not be as well researched as one would expect. Edmondson and McManus (2007, 1177) put it like this: “the less that is known about a phenomenon in the organizational literature, the more likely exploratory qualitative research will be a fruitful strategy.” Accordingly, finding appropriate ways to address these challenges and to assess the implementation of corporate sustainability reliably can be considered as some of the most important tasks for future corporate sustainability research.

Since corporate sustainability represents an ongoing and progressing process, its implementation cannot be assessed ‘absolutely’ but has to be related to benchmarks, such as other companies of the same industry or the same company at an earlier point in time. Thus, longitudinal, industry-spanning and flexible assessments adapting to trends and developments (such as the Corporate Sustainability Barometer) are of special importance. However, offering some self-reflection, the growing amount of assessment approaches may add to the institutional pressure exerted on companies in terms of corporate sustainability. Hence, when developing (yet) another assessment approach, its benefits and potential new insights should be carefully balanced against the capabilities of companies to respond to such inquiries. Particularly, it has to be considered that the multitude of assessment approaches might influence the implementation of corporate sustainability in a negative way, since they might cause companies to signal behavior that is not actually implemented due to social desirability biases or decoupling.

Yet, in conclusion, reliable research into the implementation of sustainability in companies and the determinants, drivers, and constraints of this development is important for fostering the sustainable development of companies. The analyses carried out within this thesis suggest that corporate sustainability is far more than a management fashion or fad, and that it represents an ongoing development. Supporting this development is an important task for various actors, such as societal and market stakeholders, corporate sustainability researchers, as well as, of course, companies. The author hopes that the approach and the insights of this thesis can make a significant contribution to this challenge.

References

- Abrahamson, E. (1991): Managerial Fads and Fashions: The Diffusion and Rejection of Innovations, *The Academy of Management Review*, Vol. 16, No. 3, 586–612.
- Abrahamson, E. (1996): Management Fashion, *The Academy of Management Review*, Vol. 21, No. 1, 254–285.
- Abrahamson, E. & Eisenman, M. (2001): Why Management Scholars Must Intervene Strategically in the Management Knowledge Market, *Human Relations*, Vol. 54, No. 1, 67–75.
- Akerlof, G.A. (1970): The Market for “Lemons”: Quality Uncertainty and the Market Mechanism, *The Quarterly Journal of Economics*, Vol. 84, No. 3, 488–500.
- Banerjee, S.B. (2001): Managerial Perceptions of Corporate Environmentalism: Interpretations from Industry and Strategic Implications for Organizations, *Journal of Management Studies*, Vol. 38, No. 4, 489–513.
- Bansal, P. (2002): The Corporate Challenges of Sustainable Development, *The Academy of Management Executive*, Vol. 16, No. 2, 122–131.
- Bansal, P. (2005): Evolving Sustainably. A Longitudinal Study of Corporate Sustainable Development, *Strategic Management Journal*, Vol. 26, No. 3, 197–218.
- Bansal, P. & Roth, K. (2000): Why Companies Go Green. A Model of Ecological Responsiveness, *The Academy of Management Journal*, Vol. 43, No. 4, 717–736.
- Biebeler, H.; Mahammadzadeh, M. & Selke, J.W. (2005): Corporate Instruments for Sustainable Management: Characteristics and Thematic Priorities, *International Journal of Environment and Sustainable Development*, Vol. 4, No. 4, 425–434.
- Boiral, O. (2011): Managing with ISO Systems: Lessons from Practice, *Long Range Planning*, Vol. 44, No. 3, 197–220.
- Brammer, S.J. & Millington, A. (2004): The Development of Corporate Charitable Contributions in the UK: A Stakeholder Analysis, *Journal of Management Studies*, Vol. 41, No. 8, 1411–1434.
- Burritt, R.L. & Schaltegger, S. (2010): Sustainability Accounting and Reporting: Fad or Trend?, *Accounting, Auditing & Accountability Journal*, Vol. 23, No. 7, 829–846.
- Burritt, R.; Schaltegger, S.; Kokubu, K. & Wagner, M. (2003): “Environmental Management Accounting for Staff Appraisal: Evidence from Australia, Germany and Japan”, in: Ben-

- nett, M.; Rikhardsson, P.M. & Schaltegger, S. (Eds): *Environmental Management Accounting – Purpose and Progress*. Dordrecht: Kluwer Academic Publishers, 151–188.
- Campbell, J. (2007): *Why Would Corporations Behave in Socially Responsible Ways? An Institutional Theory of Corporate Social Responsibility*, *The Academy of Management Review*, Vol. 32, No. 3, 946–967.
- Chatterji, A. & Levine, D. (2006): *Breaking Down the Wall of Codes: Evaluating Non-Financial Performance Management*, *California Management Review*, Vol. 48, No. 2, 29–52.
- Cramer, J. (2005): *Company Learning about Corporate Social Responsibility*, *Business Strategy and the Environment*, Vol. 14, No. 4, 255–266.
- Damanpour, F. & Aravind, D. (2012): *Managerial Innovation: Conceptions, Processes and Antecedents*, *Management and Organization Review*, Vol. 8, No. 2, 423–454.
- Darnall, N. (2002): “*Motivations for Participating in a US Voluntary Environmental Initiative. The Multi-State Working Group and EPA’s EMS Pilot Program*”, in: Sharma, S. & Starik, M. (Eds): *Research in Corporate Sustainability. The Evolving Theory and Practice of Organizations in the Natural Environment*. Cheltenham/Northampton: Edward Elgar Publishing, 123–154.
- Darnall, N.; Jolley, G.J. & Handfield, R. (2008): *Environmental Management Systems and Green Supply Chain Management: Complements for Sustainability?*, *Business Strategy and the Environment*, Vol. 17, No. 1, 30–45.
- Delmas, M.A. & Toffel, M.W. (2008): *Organizational Responses to Environmental Demands. Opening the Black Box*, *Strategic Management Journal*, Vol. 29, No. 10, 1027–1055.
- DiMaggio, P.J. & Powell, W.W. (1983): *The Iron Cage Revisited. Institutional Isomorphism and Collective Rationality in Organizational Fields*, *American Sociological Review*, Vol. 48, No. 2, 147–160.
- Dunphy, D.; Griffiths, A. & Benn, S. (2007): *Organizational Change for Corporate Sustainability: A Guide for Leaders and Change Agents of the Future*. London/New York: Routledge, 2nd edition.
- Edmondson, A.C. & McManus, S.E. (2007): *Methodological Fit in Management Field Research*, *The Academy of Management Review*, Vol. 32, No. 4, 1155–1179.

- Epstein, M.J. (2008): *Making Sustainability Work. Best Practices in Managing and Measuring Corporate Social, Environmental, and Economic Impacts*. Sheffield/San Francisco: Greenleaf Publishing Limited/Berrett-Koehler Publishers.
- European Commission, Directorate-General for Employment and Social Affairs (2004): *ABC of the Main Instruments of Corporate Social Responsibility*. Luxembourg: Office for Official Publications of the European Communities.
- FAZ (Frankfurter Allgemeine Zeitung) (2002): *Die 100 größten Unternehmen*. Frankfurter Allgemeine Zeitung, 08.07.2002, Nr. 155, 19–22.
- FAZ (Frankfurter Allgemeine Zeitung) (2006): *Die hundert größten Unternehmen*, Frankfurter Allgemeine Zeitung, 04.07.2006, Nr. 152, 17–21.
- Fineman, S. (2001): *Fashioning the Environment, Organization*, Vol. 8, No. 1, 17–31.
- Gold, S.; Seuring, S. & Beske, P. (2010): *Sustainable Supply Chain Management and Inter-organizational Resources: A Literature Review*, *Corporate Social Responsibility and Environmental Management*, Vol. 17, No. 4, 230–245.
- Hackman, J.R. & Wageman, R. (1995): *Total Quality Management: Empirical, Conceptual and Practical Issues*, *Administrative Science Quarterly*, Vol. 40, No. 2, 309–342.
- Hahn, T. & Scheermesser, M. (2006): *Approaches to Corporate Sustainability Among German Companies*, *Corporate Social Responsibility and Environmental Management*, Vol. 13, No. 3, 150–165.
- Haugh, H.M. & Talwar, A. (2010): *How do Corporations Embed Sustainability Across the Organization?*, *Academy of Management Learning & Education*, Vol. 9, No. 3, 384–396.
- Hockerts, K. & Moir, L. (2004): *Communicating Corporate Responsibility to Investors. The Changing Role of the Investor Relations Function*, *Journal of Business Ethics*, Vol. 52, No. 1, 85–98.
- Hoffman, A.J. (2001): *Linking Organizational and Field-Level Analyses. The Diffusion of Corporate Environmental Practice*, *Organization & Environment*, Vol. 14, No. 2, 133–156.
- Jennings, P.D. & Zandbergen, P.A. (1995): *Ecologically Sustainable Organizations: An Institutional Approach*, *The Academy of Management Review*, Vol. 20, No. 4, 1015–1052.
- Laufer, W.S. (2003): *Social Accountability and Corporate Greenwashing*, *Journal of Business Ethics*, Vol. 43, No. 3, 253–261.

- Lockett, A.; Moon, J. & Visser, W. (2006): Corporate Social Responsibility in Management Research: Focus, Nature, Salience and Sources of Influence, *Journal of Management Studies*, Vol. 43, No. 1, 115–136.
- Meffert, H. & Kirchgeorg, M. (1998): *Marktorientiertes Umweltmanagement. Konzeption, Strategie, Implementierung*. Stuttgart: Schäffer-Poeschel, 3. Auflage.
- Miles, M.P. & Covin, J.G. (2000): Environmental Marketing: A Source of Reputational, Competitive, and Financial Advantage, *Journal of Business Ethics*, Vol. 23, No. 3, 299–311.
- Moon, J. (2007): The Contribution of Corporate Social Responsibility to Sustainable Development, *Sustainable Development*, Vol. 15, No. 5, 296–306.
- Nicolai, A.T.; Schulz, A.C. & Thomas, T.W. (2010): What Wall Street Wants – Exploring the Role of Security Analysts in the Evolution and Spread of Management Concepts, *Journal of Management Studies*, Vol. 47, No. 1, 162–189.
- Oskarsson, K. & von Malmborg, F. (2005): Integrated Management Systems as a Corporate Response to Sustainable Development, *Corporate Social Responsibility and Environmental Management*, Vol. 12, No. 3, 121–128.
- Ramus, C.A. & Montiel, I. (2005): When Are Corporate Environmental Policies a Form of Greenwashing?, *Business Society*, Vol. 44, No. 4, 377–414.
- Rischkowsky, F. & Döring, T. (2008): Consumer Policy in a Market Economy: Considerations from the Perspective of the Economics of Information, the New Institutional Economics as well as Behavioural Economics, *Journal of Consumer Policy*, Vol. 31, No. 3, 285–313.
- Rogers, E.M. (2003): *Diffusion of innovations*. New York: The Free Press, 5th edition.
- Rondinelli, D.A. & Berry, M.A. (2000): Environmental Citizenship in Multinational Corporations: Corporate Responsibility and Sustainable Development, *European Management Journal*, Vol. 18, No. 1, 70–84.
- Røvik, K.A. (2011): From Fashion to Virus: An Alternative Theory of Organizations' Handling of Management Ideas, *Organization Studies*, Vol. 32, No. 5, 631–653.
- Sarkis, J. (2001): Manufacturing's Role in Corporate Environmental Sustainability. Concerns for the New Millennium, *International Journal of Operations & Production Management*, Vol. 21, No. 5/6, 666–686.

- Schaefer, A. (2007): Contrasting Institutional and Performance Accounts of Environmental Management Systems: Three Case Studies in the UK Water & Sewerage Industry, *Journal of Management Studies*, Vol. 44, No. 4, 506–535.
- Schaltegger, S. & Burritt, R.L. (2005): “Corporate Sustainability”, in: Folmer, H. & Tietenberg, T. (Eds): *The International Yearbook of Environmental and Resource Economics 2005/2006*. Cheltenham/Northampton: Edward Elgar Publishing.
- Schaltegger, S.; Herzig, C.; Kleiber, O.; Klinke, T. & Müller, J. (2007): *Nachhaltigkeitsmanagement in Unternehmen. Von der Idee zur Praxis: Managementansätze zur Umsetzung von Corporate Social Responsibility und Corporate Sustainability*. Berlin/Lüneburg: Bundesministerium für Umwelt, Naturschutz und Reaktorsicherheit; econsense – Forum Nachhaltige Entwicklung der Deutschen Wirtschaft e.V./Centre for Sustainability Management.
- Schaltegger, S.; Lüdeke-Freund, F. & Hansen, E.G. (2012): Business Cases for Sustainability: The Role of Business Model Innovation for Corporate Sustainability, *International Journal of Innovation and Sustainable Development*, Vol. 6, No. 2, 95–119.
- Seuring, S. & Müller, M. (2008): From a Literature Review to a Conceptual Framework for Sustainable Supply Chain Management, *Journal of Cleaner Production*, Vol. 16, No. 15, 1699–1710.
- Shrivastava, P. & Hart, S. (1995): Creating Sustainable Corporations, *Business Strategy and the Environment*, Vol. 4, No. 3, 154–165.
- Siebenhüner, B. & Arnold, M. (2007): Organizational Learning to Manage Sustainable Development, *Business Strategy and the Environment*, Vol. 16, No. 5, 339–353.
- Starik, M. & Kanashiro, P. (2013): Toward a Theory of Sustainability Management: Uncovering and Integrating the Nearly Obvious, *Organization Environment*, Vol. 26, No. 1, 7–30.
- Stead, J.G. & Stead, W.E. (2008): Sustainable Strategic Management. An Evolutionary Perspective, *International Journal of Sustainable Strategic Management*, Vol. 1, No. 1, 62–81.
- Steger, U. (2000): Environmental Management Systems: Empirical Evidence and Further Perspectives, *European Management Journal*, Vol. 18, No. 1, 23–37.
- Tencati, A.; Perrini, F. & Pogutz, S. (2004): New Tools to Foster Corporate Socially Responsible Behavior, *Journal of Business Ethics*, Vol. 53, No. 1/2, 173–190.

Tushman, M.L. & Anderson, P. (1986): Technological Discontinuities and Organizational Environments, *Administrative Science Quarterly*, Vol. 31, No. 3, 439–465.

von Weizsäcker, E.U.; Hargroves, K.; Smith, M.H.; Desha, C. & Stasinopoulos, P. (2009): Factor Five: Transforming the Global Economy through 80% Improvements in Resource Productivity. A Report to the Club of Rome. London/Sterling: Earthscan.

Waddock, S.A.; Bodwell, C. & Graves, S.B. (2002): Responsibility: The New Business Imperative, *The Academy of Management Executive*, Vol. 16, No. 2, 132–148.

Wagner, M. (2007): Integration of Environmental Management with Other Managerial Functions of the Firm. Empirical Effects on Drivers of Economic Performance, *Long Range Planning*, Vol. 40, No. 6, 611–628.

WBCSD (World Business Council for Sustainable Development) (2002): The Business Case for Sustainable Development. Making a Difference Towards the Earth Summit 2002 and Beyond, *Corporate Environmental Strategy*, Vol. 9, No. 3, 226–235.

Welt Online (2009): Die 500 größten Unternehmen in Deutschland. <http://top500.welt.de> (13 July 2009).

Zorn, T. & Collins, E. (2006): Green is the New Black: Are CSR and Sustainable Business Just Fads?, Proceedings of the 20th ANZAM (Australian New Zealand Academy of Management) Conference on “Management: Pragmatism, Philosophy, Priorities”, 6-9 December 2006, Central Queensland University, Rockhampton.

Appendix (Revised 2. December 2013)

Overview of papers included in this cumulative PhD thesis

(in accordance with the guideline for cumulative dissertations in Sustainability Science [January 2012], in the following termed “the guideline”)

Title of PhD thesis

Motivations, Organizational Units, and Management Tools. Taking Stock of the Why, Who, and How of Effectively Implementing Corporate Sustainability Management

Papers included

- [1] Windolph, S. E.; Harms, D. & Schaltegger, S. (2013): Motivations for Corporate Sustainability: Contrasting Survey Results and Implementation, *Corporate Social Responsibility and Environmental Management*, Special Issue: Managing Corporate Social and Environmental Responsibility – From Strategies to Implementation (early view).
- [2] Windolph, S. E.; Schaltegger, S. & Herzig, C. (2013): Implementing Corporate Sustainability. What Drives the Application of Sustainability Management Tools in Germany?, *European Management Journal* (to be resubmitted).
- [3] Windolph, S. E. (2011): Assessing Corporate Sustainability Through Ratings: Challenges and Their Causes, *Journal of Environmental Sustainability*, Vol. 1, No. 1, 61–80.
- [4] Schaltegger, S.; Harms, D.; Windolph, S. E. & Hörisch, J. (2012): Involving Corporate Functions: Who Contributes to Sustainable Development?, *Sustainability*, Special Issue: Proceedings of the 3rd International Sustainability Conference (accepted for publication).
- [5] Schaltegger, S.; Windolph, S. E. & Herzig, C. (2012): Applying the Known. A Longitudinal Analysis of the Knowledge and Application of Sustainability Management Tools in Large German Companies, *Society and Economy*, Vol. 34, No. 4, 549–579.

Authors' contributions to the papers and papers publication status (according to §16 of the guideline)

Paper #	Short title	Specific contributions of all authors	Author status	Weighting factor	Publication status	Conference contributions
[1]	Motivations	SEW: conception of research approach, literature review, data collection and analysis, writing of substantial parts of the paper DH: conception of research approach, data collection and analysis, writing of parts of the paper StSch: conception of research approach, data analysis, writing of parts of the paper	Co-author with predominant contribution	1.0	Published in <i>Corporate Social Responsibility and Environmental Management</i> 2013 (early view) (peer reviewed; IF: 1.690; VHB JQ2.1: D)	
[2]	Isomorphism	SEW: conception of research approach, literature review, data collection and analysis, writing of substantial parts of the paper StSch: conception of research approach, data analysis, writing CH: data collection and analysis, writing	Co-author with predominant contribution	1.0	To be resubmitted	BAM 2012
[3]	Ratings		Single author	1.0	Published in <i>Journal of Environmental Sustainability</i> , 1,1, 2011 (peer reviewed, not yet ranked)	EMLS 2011
[4]	Involving corporate functions	StSch: conception of research approach, data analysis, writing DH: conception of research approach, literature review, data collection and analysis, writing SEW: conception of research approach, data collection and analysis, writing JH: conception of research approach, data analysis and interpretation, writing	Co-author with equal contribution	1.0	Accepted for publication in <i>Sustainability</i> , 2014 (peer reviewed, not ranked)	ISC 2012 [†] EURAM 2013 [†]
[5]	Applying the known	StSch: conception of research approach, data analysis, writing SEW: literature review, data collection, data analysis, writing CH: data collection, data analysis, writing	Co-author with equal contribution	1.0	Published in <i>Society and Economy</i> , 34, 4, 2012 (peer reviewed, not ranked)	
				Sum:	5.0	

Explanations

Specific contributions of all authors

CH = Prof. Dr. Christian Herzig, Nottingham Trent University, Nottingham Business School

DH = Dorli Harms, CSM, Leuphana Universität Lüneburg

JH = Jacob Hörisch, CSM, Leuphana Universität Lüneburg

SEW = Sarah Elena Windolph, CSM, Leuphana Universität Lüneburg

StSch = Prof. Dr. Stefan Schaltegger, CSM, Leuphana Universität Lüneburg

Author status

according to §12b of the guideline:

Single author [Allein-Autorenschaft] = Own contribution amounts to 100%.

Co-author with predominant contribution [Überwiegender Anteil] = Own contribution is greater than the individual share of all other co-authors and is at least 35%.

Co-author with equal contribution [Gleicher Anteil] = (1) own contribution is as high as the share of other co-authors, (2) no other co-author has a contribution higher than the own contribution, and (3) the own contribution is at least 25%.

Co-author with important contribution [Wichtiger Anteil] = own contribution is at least 25%, but is insufficient to qualify as single authorship, predominant or equal contribution.

Co-author with small contribution [Geringer Anteil] = own contribution is less than 20%.

Weighting factor

according to §14 of the guideline:

Single author [Allein-Autorenschaft]	1.0
Co-author with predominant contribution [Überwiegender Anteil]	1.0
Co-author with equal contribution [Gleicher Anteil]	1.0
Co-author with important contribution [Wichtiger Anteil]	0.5
Co-author with small contribution [Geringer Anteil]	0

Publication status/rankings

- IF Thomson Reuters Impact Factor/Journal Citation Report 2012,
http://wokinfo.com/products_tools/analytical/jcr/ (05.08.2013)
- HB 2012 Handelsblatt Ranking BWL 2012,
<https://docs.google.com/spreadsheet/pub?key=0AuEtgCUuVBDUdGVpTzE3TEp6QWNTaU43SjZWT2tDVFE&output=html> (05.08.2013)
- VHB JQ2.1 VHB-JOURQUAL 2.1 2011, <http://vhbonline.org/service/jourqual/vhb-jourqual-21-2011/jq21/> (05.08.2013)

Conference contributions

- BAM 2012 26th British Academy of Management Conference, September 11-13, 2012, Cardiff Business School, Cardiff (Wales, United Kingdom),
www.bam.ac.uk/civicrm/event/info?reset=1&id=79
- EMLS 2011 Seventh International Environmental Management Leadership Symposium, May 2-3, 2011, Rochester Institute of Technology, Rochester (New York),
www.environmentalmanager.org/index.php/symposia/upcoming-symposia/
- ISC 2012† 3rd International Sustainability Conference, August 29-31, 2012, University of Applied Sciences Northwestern Switzerland and the University of Basel, Basel (Switzerland), www.sustainabilityconference.ch/cms/index.php
- EURAM 2013† 13th European Academy of Management Conference, June 26-29, 2013, Istanbul Congress Centre & Galatasaray University, Istanbul (Turkey),
www.euram2013.com

† Paper presented by co-author

Declaration (according to §16 of the guideline)

I avouch that all information given in this appendix is true in each instance and overall.

Sarah Elena Windolph

B. Papers included in this cumulative PhD thesis

I. Paper 1

Windolph, S. E.; Harms, D. & Schaltegger, S. (2013): Motivations for Corporate Sustainability: Contrasting Survey Results and Implementation, *Corporate Social Responsibility and Environmental Management*, Special Issue: Managing Corporate Social and Environmental Responsibility – From Strategies to Implementation (early view).

Motivations for Corporate Sustainability Management: Contrasting Survey Results and Implementation

Sarah Elena Windolph,* Dorli Harms and Stefan Schaltegger
Leuphana Universität Lüneburg, Lüneburg, Germany

ABSTRACT

This paper compares empirical findings on the implementation of sustainability management with the results of earlier surveys on corporate motivations to deal with sustainability. We analyze the relevance of three different motivations, i.e. seeking corporate legitimacy, market success, and internal improvement. This is accomplished by matching these motivations with empirical findings on the engagement of functional areas. The underlying rationale is that differences in the engagement of functional areas can be expected to depend on the overall corporate motivation for sustainability management. Our analysis shows low engagement in finance and accounting, whereas the public relations department is actively engaged. Since this functional area commonly aims to legitimize corporate activities, this finding contradicts the results of earlier studies which concluded that legitimacy is not an important motivation for sustainability. We discuss reasons for these contradictions and derive implications for future research and business activities. Copyright © 2013 John Wiley & Sons, Ltd and ERP Environment

Received 1 September 2012; revised 3 March 2013; accepted 19 April 2013

Keywords: corporate sustainability management; functional area; motivation; legitimacy; market success; improvement

Introduction

SUSTAINABLE DEVELOPMENT CANNOT BE REALIZED WITHOUT THE CONTRIBUTION OF COMPANIES (DUNPHY ET AL., 2007; Blindheim and Langhelle, 2010). It is defined as a three-dimensional approach integrating economic, environmental, and social aspects of economic development that aims to consider future generations and intergenerational justice (UNWCED, 1987; Schaltegger and Burritt, 2005). *Sustainability management* on the corporate level includes both the internal development of the company as well as a contribution to the sustainable development of society and the economy (Shrivastava and Hart, 1995; Bansal, 2005; Schaltegger and Burritt, 2005; Küpers, 2011). The extent that companies contribute to this development depends, *inter alia*, on their motivation. Widely discussed motivations for corporate sustainability management in the literature include legitimacy, market success, and internal improvement. This classification has been applied in the literature (Bansal and Roth, 2000; Darnall, 2003; Epstein, 2008) to explain the management of environmental and social issues by companies.

Striving for *legitimacy*, also termed approval or acceptability, refers to a company's ambition to be perceived as 'desirable, proper, or appropriate within some socially constructed system of norms, values, beliefs, and definitions' (Suchman, 1995, p. 574). It is a reaction to sustainability-related laws and pressure from societal stakeholders, which increasingly consider sustainable development as a value (Black and Härtel, 2004). Legitimacy has been described

*Correspondence to: Sarah Elena Windolph, Leuphana Universität Lüneburg, Centre for Sustainability Management (CSM), Scharnhorststr. 1, 21335 Lüneburg, Germany. E-mail: windolph@uni.leuphana.de

as a motivation for sustainability management in several publications (Bansal and Roth, 2000; Bansal, 2005; Hahn and Scheermesser, 2006). *Market success* is a motivation for sustainability management because consumers and investors may reward the company's engagement for sustainable development through their purchase and investment decisions (Miles and Covin, 2000; Beloe *et al.*, 2004; Dunphy *et al.*, 2007; Babiak and Trendafilova, 2011; Ditlev-Simonsen and Midttun, 2011). *Company-internal improvement* refers to optimizing internal processes and related cost savings (Shrivastava, 1995; WBCSD, 2002; von Weizsäcker *et al.*, 2009).

In recent years, a number of empirical studies have investigated corporate motivations for sustainability management, but their results do not provide a clear overall picture. Whereas legitimacy-related aspects such as societal and political demands or avoiding negative publicity are found to be of lesser importance (Bertelsmann Stiftung, 2005; Hahn and Scheermesser, 2006; A.T. Kearney, 2008), several studies find ethical reasons and ecological or social responsibilities to be of high relevance (Graafland and van de Ven, 2006; A.T. Kearney, 2008; Brønn and Vidaver-Cohen, 2009; Babiak and Trendafilova, 2011). Further studies emphasize competitive pressure, branding, or cost advantages (IFO, 2002; Ditlev-Simonsen and Midttun, 2011) as important reasons for sustainability management.

Various explanations may account for the contradicting results between the empirical studies, including the selection of industries, companies, and countries. The results may also be influenced by the data collection methods. The typical method applied for these investigations is a survey explicitly asking company representatives about their motivations for engagement. Due to society's increasing interest in corporate social responsibility (CSR) and sustainable development (Metzler, 2001; Campbell, 2007) and the pressure on survey respondents to protect the company's reputation, the responses to direct questions are likely to be biased by social desirability (Fernandes and Randall, 1992; Banerjee, 2001; Fifka, 2009).

In contrast to these approaches, we apply an indirect measurement approach to investigate motivations for sustainability management and analyze the extent to which functional areas, such as marketing or accounting, engage in sustainability management. The underlying rationale is that the engagement of functional areas depends on the overall company's motivation for sustainability management (Hoffman, 2001). Afterwards, we compare our empirical findings on which functional areas engage in sustainability management with motivations explicitly stated in other studies. This comparison serves to identify and discuss contradictions.

Whereas a large body of literature argues that the implementation of sustainability management requires the coordination across functional areas (Hoffman, 2001; Dunphy *et al.*, 2007; Epstein, 2008; Lauring and Thomsen, 2009), it has to be acknowledged that sustainability management is still at an early developmental stage (Griffiths and Petrick, 2001; Dunphy *et al.*, 2007; Martin *et al.*, 2007). The division of tasks into specialized functions, in addition to information and communication barriers, as well as departmental prerogatives may hamper collaboration within the company (Hoffman, 2001; Darnall *et al.*, 2008; Epstein, 2008). Thus, we anticipate that sustainability management has not yet been fully implemented as a cross-functional task in companies, and that it is embedded to varying degrees in different functional areas (Dunphy *et al.*, 2007; Martin *et al.*, 2007).

The paper proceeds as follows. Based on a literature review, we match the three corporate motivations for sustainability management with functional areas. Drawing on a survey of large German companies, we assess to what extent these functional areas are engaging in sustainability management. We compare our empirical findings with earlier studies that directly ask companies about their motivation for engagement. Finally, the paper discusses reasons for possible contradictions and derives implications for future management research and business activities.

Corporate Motivations for Sustainability Management

Business motivations for corporate sustainability strategies have been analyzed in various papers (Bansal, 2005; Dunphy *et al.*, 2007; Moon, 2007; Delmas and Toffel, 2008; Frondel *et al.*, 2008; von Weizsäcker *et al.*, 2009; Babiak and Trendafilova, 2011; Ditlev-Simonsen and Midttun, 2011). In the *first part* of this literature review, we analyze publications that differentiate between possible motivations. Based on Bansal and Roth (2000), Darnall (2003), and Epstein (2008), this paper groups motivations into the categories of *legitimacy*, *market success*, and *internal improvement*. We refrain from analyzing ethical or moral attitudes of individuals (e.g. the top manager). Rather, we concentrate on motivations generally relevant for business and potentially interesting to any company.

Motivations for Corporate Sustainability Management

Bansal and Roth (2000) describe legitimation and competitiveness (in addition to ecological responsibility) as motivations for ecological responsiveness. They see economic opportunities reducing environmental impacts while lowering costs (e.g. by intensifying production processes) and increasing revenues through selling sustainability-oriented products and services. Darnall (2003) distinguishes external drivers, including regulatory pressures, market pressures, and social pressures, and internal drivers, featuring resources and capabilities, for example, the capability for continuous improvement. Finally, Epstein (2008) describes the motivation for sustainability management (besides societal and moral obligations) as government regulations, stakeholder pressures, and economic profit. More specifically, he stresses a company's need to gain a 'license to operate' from governments, communities, and other stakeholders, and he emphasizes the increase of sales and the reduction of costs, for example, through process improvements, as important business reasons for sustainability management.

To sum up, three main motivations have been highlighted in the existing literature. First, governments and society exert pressure on companies, forcing them to gain and secure legitimacy. Second, the behavior of consumers, investors, and competitors can create the motivation to achieve market success through sustainability management. Third, internal improvement refers to optimizing processes and reducing costs.

The *second part* of this literature review examines how these motivations are expected to influence which functional areas are particularly concerned by sustainability management. This serves to generate a framework, which we will draw upon in the discussion. Ideally, sustainability-related expectations of stakeholders are managed by those corporate functional areas that are best equipped and that have an established relationship to the stakeholders, for example, marketing addresses customers whereas public relations (PR) deals with regulators and society (Hoffman, 2001; Delmas and Toffel, 2008). Depending on what functional areas engage in sustainability management, particular sustainability management activities can be expected. These different emphases on sustainability issues can furthermore influence the sustainability management of the whole company (Delmas and Toffel, 2008). For example, if the PR department engages more in sustainability management than the marketing department, sustainability-related media activities can be expected to be carried out more frequently than market activities (Hoffman, 2001; Delmas and Toffel, 2008).

Yet, it is unlikely that it is left up to individual functional areas to choose which sustainability management activities to undertake, since top management increasingly influences the overall direction of sustainability management in the whole company (Epstein, 2008; Stead and Stead, 2008; Luring and Thomsen, 2009). Thus, the choice of which departments to charge with sustainability management expresses the overall corporate strategy. Corporate departments can also engage in sustainability management on their own, but this engagement eventually requires the acceptance of top management.

The next sections link different functional areas to the motivations of legitimacy, market success, and internal improvement based on a literature review. This is followed by an overview of the match between motivations and functional areas.

Functional Areas Striving for Legitimacy

For companies, legitimacy means that their actions are perceived as desirable or appropriate against the background of societal norms or values (Suchman, 1995). To achieve legitimacy, one aspect of sustainability management is to comply with environmental and social regulations and laws (Wheeler *et al.*, 2003; Ramus and Montiel, 2005; Epstein, 2008; Frondel *et al.*, 2008). Institutional pressures are also created through private or self-regulations (DiMaggio and Powell, 1983; Campbell, 2007), and various actors within industries, for example, associations or trade unions, foster the implementation of sustainability management in companies (Bansal, 2005; Aguilera *et al.*, 2006; Frondel *et al.*, 2008; Ditlev-Simonsen and Midttun, 2011).

When discussing legitimacy as a motivation for sustainability management, society also plays an important role (Darnall, 2003). A variety of societal stakeholders, including non-governmental organizations (NGOs), are able to substantially influence companies (Freeman, 1984; Frondel *et al.*, 2008; Babiak and Trendafilova, 2011). In return for considering stakeholder interests, companies may secure access to ('critical') resources (Pfeffer and Salancik, 1978; Suchman, 1995; Mitchell *et al.*, 1997). These resources include workforce, capital, or the willingness to buy products and services from the company (Hill and Jones, 1992). In addition, company violations can be scrutinized by the media (Bansal, 2005; Ramus and Montiel, 2005). Since the monitoring of companies through stakeholders is

well-established nowadays (Metzler, 2001; Campbell, 2007), companies attempt to gain and maintain a license to operate (Bansal, 2005; Moon, 2007), for example, through the prevention of accidents (Frondel *et al.*, 2008; Brønn and Vidaver-Cohen, 2009) and the publication of sustainability reports (Mitchell *et al.*, 1997).

Establishing and maintaining stakeholder relationships is the main task of *public relations* or *communications* (Clark, 2000; Metzler, 2001). This functional area identifies who is affected by corporate activities, and it collects information on trends, opinions, and risks in the political and societal environment (Clark, 2000; Berg and Holtbrügge, 2001; Metzler, 2001). According to Metzler (2001, p. 321), 'establishing and maintaining organizational legitimacy is at the core of most, if not all, public relations activities.' Similarly, Black and Härtel (2004) argue that social responsiveness results from both the CSR-orientation as well as the public relations-orientation of companies.

Functional Areas Striving for Market Success

While societal and regulatory aspects were decisive factors influencing environmental management in the 1990s, today the market also plays an important role. Customers and consumers ask for the consideration of environmental and social aspects which have thus become a competitive factor (Wier and Calverley, 2002; Beloe *et al.*, 2004; Moon, 2007; Delmas and Toffel, 2008). The notion of 'market success' describes an increase in turnover, competitiveness, brand equity, or innovation (Bansal and Roth, 2000; Miles and Covin, 2000; Bansal, 2005; Dunphy *et al.*, 2007; Epstein, 2008; Brønn and Vidaver-Cohen, 2009; Ditlev-Simonsen and Midttun, 2011).

Besides product and service markets, the labor and capital markets increasingly consider sustainability issues (Hockerts and Moir, 2004; Moon, 2007). Sustainability management can improve employee motivation with the company as well as employer attractiveness (Daily and Huang, 2001; Moon, 2007). On the capital market, socially responsible investing (SRI) has also gained relevance (Peeters, 2003; Beloe *et al.*, 2004; Hockerts and Moir, 2004). SRI is defined as 'an investment process that considers the social and environmental consequences of investments, both positive and negative, within the context of rigorous financial analysis' (Social Investment Forum, 2003, p. 3).

The task of *marketing* and *sales* is to identify sustainability-related customer demands and to develop and promote products and services accordingly (McWilliams and Siegel, 2001; Black and Härtel, 2004; Maignan and Ferrell, 2004; Maignan *et al.*, 2005). Sustainability issues can support the development of a unique selling proposition and a targeted customer approach (Dunphy *et al.*, 2007). Moreover, new markets and business models for sustainability products and services can be created (Frondel *et al.*, 2008; Nidumolu *et al.*, 2009; Ditlev-Simonsen and Midttun, 2011). Examples for linking marketing and sustainability management are sustainable product-service combinations (Hansen *et al.*, 2009) and cause-related marketing (Varadarajan and Menon, 1988; Garriga and Melé, 2004).

Another market-oriented department is *research and development* (R&D) which integrates sustainability expectations of customers into product or process innovations (McWilliams and Siegel 2001; Hall and Vredenburg, 2003).

Functional Areas Striving for Internal Improvement

Internal improvement mainly refers to the sustainability-oriented optimization of processes. More specifically, increases in eco-efficiency or socio-efficiency, i.e. the relation between a firm's value added (economic dimension) and its environmental or social impact (Schaltegger, 1998; Dyllick and Hockerts, 2002; Schaltegger and Burritt, 2005), serve to reduce both resource consumption and costs (Shrivastava, 1995; Miles and Covin, 2000; WBCSD, 2002; Darnall, 2003; Bansal, 2005; von Weizsäcker *et al.*, 2009).

Internal improvement requires the engagement of purchasing, logistics, and the production department, which form essential parts of the supply chain and whose collaboration is crucial for material and information flows (Sarkis, 2001; Nidumolu *et al.*, 2009; Gold *et al.*, 2010). *Purchasing* contributes to sustainability management through considering market and societal demands. They can purchase resources from responsible suppliers, they can use recycled materials, and they can reduce packaging (Carter and Jennings, 2004; Gold *et al.*, 2010; Leire and Mont, 2010). Purchasing also has the potential to shape the supply chain and to foster sustainability efforts in other departments such as production or marketing (Carter and Jennings, 2004; Carter and Rogers, 2008).

Production contributes to sustainability management by developing and implementing material-efficient and energy-efficient manufacturing and service processes (Shrivastava and Hart, 1995; Epstein, 2008). Various authors (de Ron, 1998; Sarkis, 2001; Frondel *et al.*, 2008) discuss 'cleaner' production as the result of a continuous

Motivations for Corporate Sustainability Management

improvement of the quality of products and processes, efficiency, flexibility – for example, handling changes in the material flow or using varying types of material (Sarkis, 2001) – or material recovery – for example, reclaiming recyclable materials from products (Sarkis, 2001). In doing so, companies are able to reduce costs, to realize positive employment effects, and to increase their market share (de Ron, 1998; Frondel *et al.*, 2008). Similarly, *logistics* can improve the efficiency of procedures by reusing resources, reducing waste, and controlling emissions (Kleindorfer *et al.*, 2005; Oglethorpe and Heron, 2010).

Internal improvement also requires the contribution of *finance* and *accounting* departments. These departments provide top management with information for investment decisions, price calculations, as well as product and process designs (Epstein, 2008; Schaltegger and Burritt, 2010). The integration of environmental and sustainability data into corporate information management is essential for well-founded sustainability decisions and for financial reporting and auditing (Epstein, 2008; Schaltegger and Burritt, 2010).

Another issue for internal improvement is employee satisfaction, a task mainly assigned to *human resources* (HR). Sustainability management can contribute to employee motivation and thus enhances productivity (Daily and Huang, 2001; McWilliams and Siegel, 2001; Moon, 2007; Carter and Rogers, 2008; Ehnert, 2009).

Framework: Linking Corporate Motivations and Functional Areas

Many functional areas can be linked to the motivations of legitimacy, market success, and internal improvement. However, not all functions can be unambiguously categorized. For example, PR/communications is not only society-oriented but also internally oriented. Purchasing can be internally oriented and market-oriented as well as society-oriented. In this paper, we match functional areas according to their primary orientation as discussed in literature. Yet, some departments consider societal, market, and internal aspects simultaneously. For instance, *strategic planning* is concerned with all three motivations, as shown by Stead and Stead (2008, p. 72), who describe ‘sustainable development strategies’ as strategies simultaneously aiming at societal legitimacy, market differentiation, and cost savings. The same holds true for *environment, health and safety* (EHS), *sustainability*, and *CSR* units, which are often closely intertwined with strategic planning (Epstein, 2008). These functional areas are not discussed here with regard to a particular motivation for sustainability management. Table 1 offers an overview of the functional areas that we match with motivations for sustainability management. Of course, the nomenclature may differ from company to company.

Motivation	Aspects addressed	Functional area
Legitimacy	Governmental regulation, private and self-regulation, media and society (values, resources)	PR/communications
Market success	Market for products and services, labor market, capital market	Marketing, R&D
Internal improvement	Process improvements, resource use, eco-efficiency and socio-efficiency	Purchasing, logistics/distribution, production, HR, finance/accounting

Table 1. Matching motivations for sustainability management with functional areas

Table 1 shows that if legitimacy is a crucial motivation for a company, it can be expected that PR/communications will particularly engage in sustainability management. By contrast, a strong market-orientation will probably lead to the engagement of marketing and R&D, whereas production and logistics will be more concerned if internal improvement plays an important role. In the following, we analyze the extent that functional areas actually engage in sustainability management in practice.

Annual turnover/total assets/gross premiums (in million Euro)	Frequency	Percentage
> 50–500	12	11.01%
> 500–1500	18	16.51%
> 1500–2500	24	22.02%
> 2500– 000	16	14.68%
> 5000–50 000	17	15.60%
> 50 000	19	17.43%
No answer	3	2.75%
<i>Total</i>	109	100.00%

Table 2. Annual turnover/total assets/gross premiums of the survey sample

Number of employees	Frequency	Percentage
51–250	1	0.92%
251–1000	12	11.01%
1000–10 000	55	50.46%
10 001–100 000	31	28.44%
> 100 000	10	9.17%
<i>Total</i>	109	100.00%

Table 3. Number of employees of the survey sample

Methodology and Sample

To empirically identify which functional areas engage in sustainability management, we use three indicators representing an increasing level of functional engagement: first, which functional areas are *impacted* or affected by sustainability issues; second, which functional areas *promote* the implementation of sustainability management in the company; and third, which functional areas show a *need for development* of management tools (to identify who is concerned with an increased engagement in the future).

The empirical findings are based on a survey of large German companies with more than €50 million turnover and more than 50 employees (based on Welt online, 2009; Tables 2 and 3) conducted between November 2009 and February 2010. We contacted the sustainability managers or those in charge of sustainability issues, and we asked them to take part in our survey. If necessary, they would forward the questionnaire to other departments to secure a high quality response. 331 questionnaires were sent out and the response rate was 32.9% (n = 109). The respondents were mostly sustainability managers, environment, health and safety managers, and CSR managers. In particular cases, PR or communication managers responded as they were the official contact for sustainability management issues. A pre-test was conducted to validate the survey. The data were analyzed with SPSS Statistics 19.

The following section presents the survey findings, which will be compared with the results of other studies in the subsequent section.

Findings and Discussion

Survey Findings

Company representatives were first asked to what extent the departments in their companies are *impacted* or affected by environmental and social issues (Figure 1).

Currently, sustainability/CSR, EHS, and PR/communications are the departments most impacted by both environmental and social issues, whereas HR is particularly impacted by social issues. The findings for

Motivations for Corporate Sustainability Management

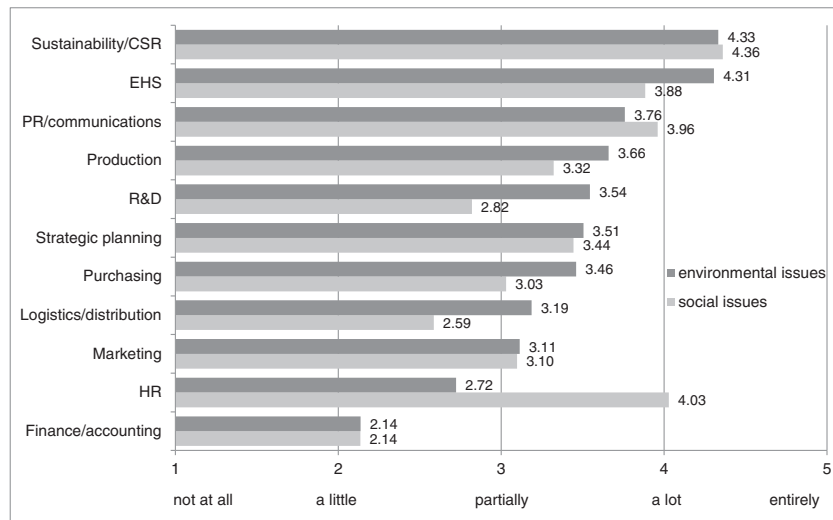


Figure 1. Impact of environmental and social issues

sustainability/CSR and HR are not surprising since their main task is to deal with sustainability and social issues, respectively. By contrast, finance and accounting are only marginally impacted by environmental and social issues. Other functional areas, such as production, strategic planning, and purchasing, are moderately impacted.

The company representatives also assessed which departments *promote* the implementation of sustainability management (Figure 2).

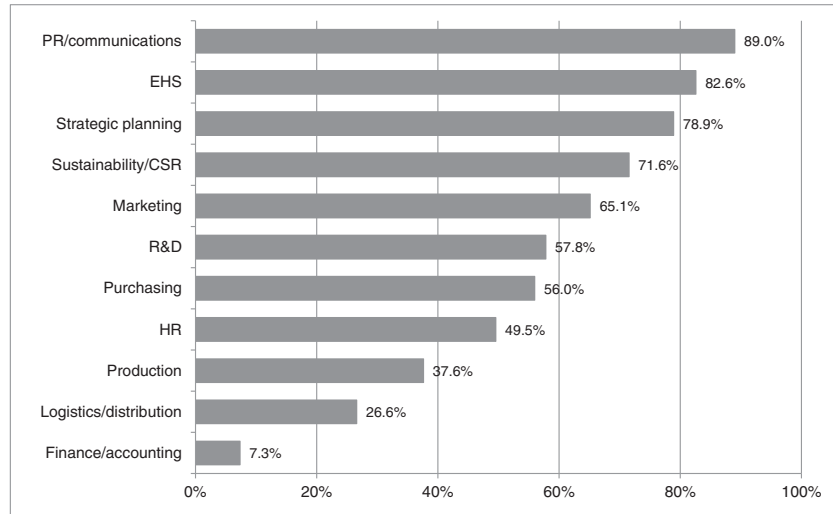


Figure 2. Functional areas promoting sustainability management

PR/communications, EHS, strategic planning, and sustainability/CSR are mentioned most frequently. Moreover, at least half of the surveyed companies evaluate HR, purchasing, R&D, and marketing as promoting the implementation of sustainability management. Production, logistics/distribution, and particularly finance/accounting rank lower. This is also in line with the findings on the impact of environmental and social issues (Figure 1).

Another indication of the engagement of functional areas is the perceived *need for developing* sustainability management tools (Figure 3).

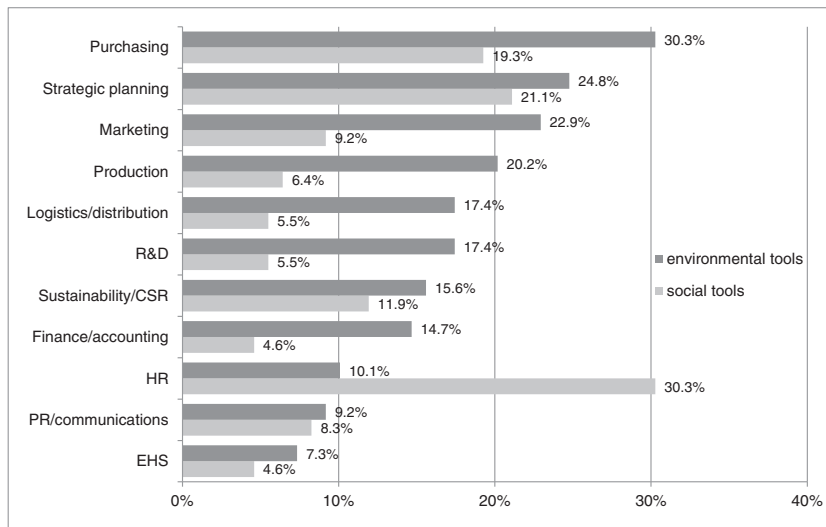


Figure 3. Need for development of environmental and social management tools

The respondents express a particularly strong need for developing new environmental management tools for purchasing and social management tools for the HR function (each more than 30%). More than 20% of the companies perceive a need for developing environmental and social management tools in strategic planning. Combining this with the previous findings on functional areas promoting sustainability management (Figure 2) shows that strategic planning is an important department. Although it is already a strong promoter of sustainability management, the respondents still express a need for the development of further suitable management tools. In comparison, only half of the respondents consider purchasing to promote sustainability management. The pronounced need for sustainability management tools, however, indicates that this functional area has potential to contribute more to sustainability management.

In conclusion, our survey of large German companies reveals that different functional areas place different emphasis on sustainability management, which accordingly is not yet implemented as a cross-functional task. Differences can be found for environmental and social impacts, the extent that functional areas promote sustainability management, and the need for the development of management tools. The survey shows that PR/communications is actively engaged in sustainability management, whereas market-oriented functions such as marketing and R&D are moderately engaged. Finance and accounting, in particular, are only marginally concerned by sustainability management.

Analysis and Discussion

This section analyzes the empirical findings on the engagement of functional areas in sustainability management in German companies. Based on the framework developed earlier (Table 1), the findings are compared with other studies that explicitly examine the motivations for sustainability management. Finally, we discuss contradictions.

Legitimacy as an important motivation

The findings of our survey show high engagement of PR/communications in sustainability management and little need for developing new tools. When matching functional areas with motivations for sustainability management (Table 1), we found PR/communications to be mostly concerned with legitimacy. Thus, our findings indicate that legitimacy is a highly relevant motivation in large German companies.

Other studies which directly asked company representatives about their motivations for sustainability engagement find legitimacy-related aspects to be of lesser importance. In their investigation of German companies, Hahn and Scheermesser (2006) asked for the reasons for sustainability management: environmental and social responsibility was mentioned by more than 50% of the respondents, whereas stakeholder demands and responding to political pressures were rarely classified as 'very important'. Similar results were identified by the Bertelsmann Stiftung

Motivations for Corporate Sustainability Management

(2005). When asked for the reasons of societal engagement, their respondents mentioned NGO requirements least frequently and employee motivation most frequently, which is matched with the motivation of internal improvement in this paper. In their survey among food retailers and drugstores in Germany, Austria, and Switzerland, A.T. Kearney (2008) identified ethical reasons as most important for the implementation of sustainability initiatives, with avoiding negative publicity and complying with statutory rules and guidelines scoring lowest.

Yet, studies with a particular focus on the integration of functional areas into sustainability management support our findings. Deloitte (2009) investigated the integration of CSR into functional areas in large German consumer goods producers and retailers. In their study, PR scored highest, and correspondingly, reputation was the most important reason for pursuing a CSR strategy, followed by legal and NGO requirements. Viehöver *et al.* (2006) confirm this outcome for German-speaking countries when asking for the departments that are impacted by sustainability issues. They identified PR/communications as second most impacted function right behind top management, and they found reputation to be the main reason for sustainability engagement.

Market success as moderately important motivation

Our findings show that market-oriented departments such as marketing and R&D moderately engage in sustainability management. Nevertheless, their engagement is clearly less than PR/communications. This implies that market success is a moderately strong motivation for sustainability management (Table 1).

Whereas some empirical studies of German companies identify competitive pressure and cost advantages as important motivations for sustainability management (ifo, 2002), in most empirical studies market success is not very important. For a considerable time span, legal and societal pressures were crucial for environmental management, but market factors have become increasingly important (Moon, 2007). The results of other studies support this trend towards a growing relevance of market success for sustainability management. For instance, Bertelsmann Stiftung (2005), Hahn and Scheermesser (2006), and A.T. Kearney (2008) find market demand to be of medium importance.

This has also been confirmed in the studies on the engagement of functional areas by Viehöver *et al.* (2006) and Deloitte (2009). Further potential is seen in an expanded use of labels (Deloitte, 2009). On the one hand, market-oriented functions have become more important over time, and companies increasingly try to exploit the potential of market-oriented sustainability management (Dunphy *et al.*, 2007; Nidumolu *et al.*, 2009; Ditlev-Simonsen and Middtun, 2011). On the other hand, the market still plays a smaller role than sometimes predicted in management literature (Meffert and Kirchgeorg, 1998; Wier and Calverley, 2002; Beloe *et al.*, 2004). In the future, a stronger integration of market-oriented departments is conceivable as our survey respondents indicate a need for developing sustainability management tools in marketing.

Internal improvement as less important motivation

Our survey yields diverse findings when analyzing those functional areas matched with the motivation of internal improvement (Table 1), i.e. purchasing, logistics, production, HR, finance and accounting. Whereas purchasing is impacted by sustainability issues and perceived as promoting sustainability management to some degree, finance and accounting are least impacted by sustainability issues and they promote sustainability management the least.

Compared to the potential contributions of internally oriented departments to sustainability management (Daily and Huang, 2001; Sarkis, 2001; Gold *et al.*, 2010), our analysis shows that their overall engagement is rather low. This is supported by the fact that the respondents see a comparatively high need for developing environmental and/or social management tools for purchasing, production, and HR departments.

The low importance of finance and accounting has to be highlighted. The respondents perceive a need for the development of environmental management tools but not of social management tools. Based on the current situation, it is unlikely that these departments will be significantly more engaged in sustainability management, especially social issues, in the future. The low engagement of finance and accounting presents a real dilemma concerning the supply with sustainability information. It has been emphasized in literature that the task of these departments is to provide management with sustainability information (Henri and Journeault, 2010; Schaltegger and Burritt, 2010). Failing to consider this aspect, companies cannot make well-founded decisions on the implementation of sustainability management (Sarkis, 2001).

Several other studies also conclude that internal improvement such as cost reduction and resource efficiency plays a subordinated role for sustainability management (A.T. Kearney, 2008; Deloitte, 2009). Confirming these results, empirical studies on functional areas find CSR to be of little relevance for finance and accounting, and that these departments rarely engage in sustainability management (Viehöver *et al.*, 2006; Deloitte, 2009).

Analysis of Contradictions

Comparing our survey findings with the motivations for sustainability management discussed in other studies reveals support but also contradictions, which are discussed in this section. First, several studies find legitimacy to be of little relevance for the implementation of sustainability management. However, the related departments (i.e. PR/communications) are actively engaging according to our survey. One possible reason for this contradiction is the social desirability bias which has been addressed by Fernandes and Randall (1992) and Banerjee (2001). Asking explicit questions about the relevance of motivations bears the risk that answers are influenced by social desirability, and that respondents overstate or understate particular aspects. Declaring that sustainability management is motivated by the aim to gain legitimacy could be evaluated negatively by stakeholders and provoke criticism of greenwashing or window dressing (Laufer, 2003; Ramus and Montiel, 2005). Hence, company representatives may prefer not to unveil legitimacy as a driver when asked directly. Querying the relevance of motivations indirectly, for instance through the integration of functional areas (as in our survey), might provide an alternative indication of their actual relevance.

A second reason for contradictions might be that some companies do not communicate their sustainability management motivations at all. Advertising and publicly announcing environmental and social engagement could encourage the customers' concern that this commitment leads to price premiums (Delmas and Grant, 2010). Additionally, a company communicating about sustainability may again be more vulnerable in terms of criticism of greenwashing (Laufer, 2003; Ramus and Montiel, 2005).

A third possible reason is that implementing sustainability management could lead to difficulties. In accordance with the goals or strategy of a company, respondents may imply a high relevance of certain motivations, although the company is not (yet) able to implement sustainability management as aspired. Possible reasons are a lack of suitable management tools or the functional areas' disposition to engage in sustainability management. Additionally, the organizational structure and conflicting sustainability goals may inhibit the cooperation of departments (Hoffman, 2001; Luring and Thomsen, 2009), and relevant information for managing sustainability issues may not be available.

Fourth, legitimacy and reputation may be suitable overarching goals serving as a 'source of inspiration' (Luring and Thomsen, 2009, p. 45) for the sustainable development of a company. It allows involving all departments, it is easily understood by everybody, it is accepted to be part of top management's job, and it is broad enough to consider a large number of different sustainability activities. In turn, various functional areas may want to involve PR/communications to leverage the benefits of their engagement and the communication with top management, even if their activities are motivated otherwise, for example, by cost reductions.

Fifth, our paper reveals contradictions between theoretical ideals and corporate practice. Whereas many academic papers postulate the cross-functional implementation of sustainability management, it is currently not implemented as a cross-functional task in practice. Either companies do not see the necessity, or they are not (yet) able to do so. Notwithstanding, the respondents often see a need for developing sustainability management tools, particularly in those units whose main task is to deal with sustainability management and in strategic planning. This indicates a high strategic relevance of sustainability management and that a stronger integration of all functional areas may be achieved in the future.

Limitations

Some limitations of our research have to be highlighted. Matching PR/communications with the motivation of legitimacy may be seen as a simplified approach. First, the field of activity of this department can be wider. Second, legitimacy may also be gained through activities in other areas, for example, offering innovative products or providing solutions to societal problems. Moreover, similar to all surveys, our

Motivations for Corporate Sustainability Management

questionnaire is subject to different interpretations. The respondents may understand or evaluate differently what it means to be impacted by sustainability issues, and their departmental affiliation may influence their response behavior.

In conclusion, rather than showing the 'true' motivations, our research reveals contradictions between the implementation of sustainability management and earlier surveys on the motivations for this engagement.

Conclusions

This paper argues that the choice which functional areas engage in sustainability management depends on the corporate motivation for such engagement. The motivations of legitimacy, market success, and internal improvement were linked with functional areas whose engagement was empirically assessed in large German companies. The findings indicate that legitimacy is a dominating motivation for sustainability management. Market-oriented motivations are of moderate importance and internally oriented motivations are of little relevance. This result contradicts a number of studies that identify legitimacy as less important motivation. The reasons for these contradictions, especially the possibility of a social desirability bias, may bear implications for future research and management practice.

Implications for Management Research

Our analysis shows that the actual implementation of sustainability management can differ from the responses to explicitly asked questions. This insight is relevant for management research in several respects. First, indirect measures may be considered to cross-reference the results of explicit queries when designing company surveys. Second, the insight gained from our analysis calls for caution when interpreting survey results and drawing implications from them. In particular, sensitive and fundamental aspects like the motivation for corporate sustainability management can be influenced by social desirability. The question of how relevant legitimacy is as a motivation shows that the data collection method can substantially influence the results in surveys and interviews.

These challenges call for further profound analyses of the development of sustainability management practices and the reasons why companies care about sustainable development – or why they do not. Particularly in the realm of a normative topic like sustainable development, it is of vital importance that researchers keep in touch with practice. To keep track of developments and trends, it could be helpful to assess the integration of departments and the role of motivations over time. In this context, a long-term analysis could be conducted on whether sustainability management is becoming a cross-functional task (Shrivastava and Hart, 1995; Hoffman, 2001). Future research could also incorporate small and medium-sized enterprises to assess if motivations differ according to exposure, market power, or company size. Moreover, the survey could be expanded to an international comparison to analyze the relevance of motivations in different countries.

Implications for Business and Management Practice

It is essential to know the motivations for corporate sustainability management for the development of practicable management tools, consulting, and developing effective public policies related to sustainable development (Bansal and Roth, 2000). If legitimacy plays an important role in the sustainability management of many large companies, it needs to be considered by researchers, politicians, and society in the design of measures and in the formulation of expectations. Communicating the relevance of sustainability issues for corporate legitimacy and reputation can also help to reduce criticism of greenwashing in the long run. Through a more open communication of motivations, legitimacy may become a 'legitimate' motivation itself, such as ethical, internal, or market-oriented motivations. To prevent sustainability management activities from being assessed as 'only self-serving', it is important to combine and balance corporate with societal benefits. It is exactly this combination which can be an important driver for sustainability measures (Fifka, 2009). The more businesses consider a variety of motivations for sustainability measures, the more they can contribute to sustainable development in different ways, and the better they will be able to benefit from the positive outcomes that corporate sustainability management can generate.

Acknowledgements

The authors would like to thank two anonymous reviewers for their valuable feedback. We also highly appreciate Matthew Johnson's helpful comments on an earlier version of the paper. Our research also benefited from the support of PwC Germany during the data collection phase.

References

- Aguilera RV, Williams CA, Conley JM, Rupp DE. 2006. Corporate governance and social responsibility. A comparative analysis of the UK and the US. *Corporate Governance: An International Review* 14(3): 147–158. DOI: 10.1111/j.1467-8683.2006.00495.x
- A.T. Kearney. 2008. Zwischen Öko-Labels, grüner Logistik und fairem Handel. Lebensmitteleinzelhandel auf der Suche nach Wegen zur Nachhaltigkeit. http://www.atkearney.at/content/misc/wrapper.php/id/50089/area/retail/name/pdf_atkearney_eb_sust_retail_1229089596a7dc.pdf [5 December 2011].
- Babiak K, Trendafilova S. 2011. CSR and environmental responsibility: Motives and pressures to adopt green management practices. *Corporate Social Responsibility and Environmental Management* 18(1): 11–24. DOI: 10.1002/csr.229
- Banerjee SB. 2001. Managerial perceptions of corporate environmentalism: Interpretations from industry and implications for organizations. *Journal of Management Studies* 38(4): 489–513. DOI: 10.1111/1467-6486.00246
- Bansal P. 2005. Evolving sustainably. A longitudinal study of corporate sustainable development. *Strategic Management Journal* 26(3): 197–218. DOI: 10.1002/smj.441
- Bansal P, Roth K. 2000. Why companies go green. A model of ecological responsiveness. *The Academy of Management Journal* 43(4): 717–736. DOI: 10.2307/1556363
- Beloe S, Scherer J, Knoepfel I. 2004. Values for Money. Reviewing the Quality of SRI Research. SustainAbility/Mistra: London/Stockholm.
- Berg N, Holtbrügge D. 2001. Public affairs management activities of German multinational corporations in India. *Journal of Business Ethics* 30(1): 105–119. DOI: 10.1023/A:1006446027130
- Bertelsmann Stiftung. 2005. Die gesellschaftliche Verantwortung von Unternehmen. Dokumentation der Ergebnisse einer Unternehmensbefragung der Bertelsmann Stiftung. Bertelsmann Stiftung: Gütersloh. http://www.bertelsmann-stiftung.de/cps/rde/xbcr/SID-B7B1C456-51B7A407/bst/Unternehmensbefragung_CSR_200705.pdf [4 June 2012].
- Black LD, Härtel CEJ. 2004. The five capabilities of socially responsible companies. *Journal of Public Affairs* 4(2): 125–144. DOI: 10.1002/pa.176
- Blindeheim BT, Langhelle O. 2010. A reinterpretation of the principles of CSR. A pragmatic approach. *Corporate Social Responsibility and Environmental Management* 17(2): 107–117. DOI: 10.1002/csr.235
- Brønn PS, Vidaver-Cohen D. 2009. Corporate motives for social initiative. Legitimacy, sustainability, or the bottom line? *Journal of Business Ethics* 87(1): 91–109. DOI: 10.1007/s10551-008-9795-z
- Campbell J. 2007. Why would corporations behave in socially responsible ways? An institutional theory of corporate social responsibility. *Academy of Management Review* 32(3): 946–967. DOI: 10.5465/AMR.2007.25275684
- Carter CR, Jennings MM. 2004. The role of purchasing in corporate social responsibility. A structural equation analysis. *Journal of Business Logistics* 25(1): 145–186. DOI: 10.1002/j.2158-1592.2004.tb00173.x
- Carter CR, Rogers DS. 2008. A framework of sustainable supply chain management. Moving toward new theory. *International Journal of Physical Distribution and Logistics Management* 38(5): 360–387. DOI: 10.1108/09600030810882816
- Clark CE. 2000. Differences between public relations and corporate social responsibility: An analysis. *Public Relations Review* 26(3): 363–380. DOI: 10.1016/S0363-8111(00)00053-9
- Daily BF, Huang S. 2001. Achieving sustainability through attention to human resource factors in environmental management. *International Journal of Operations & Production Management* 21(12): 1539–1552. DOI: 10.1108/01443570110410892
- Darnall N. 2003. Motivations for participating in a voluntary environmental initiative. The multi-state working group and EPA's EMS pilot program. In *Research in Corporate Sustainability*, Sharma S, Starik M (eds). Edward Elgar: London; 123–154.
- Darnall N, Jolley GJ, Handfield R. 2008. Environmental management systems and green supply chain management: Complements for sustainability? *Business Strategy and the Environment* 17(1): 30–45. DOI: 10.1002/bse.557
- de Ron AJ. 1998. Sustainable production. The ultimate result of a continuous improvement. *International Journal of Production Economics* 56/57(1): 99–110. DOI: 10.1016/S0925-5273(98)00005-X
- Delmas MA, Grant LE. 2010. Eco-labeling strategies and price-premium. The wine industry puzzle. *Business & Society*. DOI: 10.1177/0007650310362254
- Delmas MA, Toffel MW. 2008. Organizational responses to environmental demands. Opening the black box. *Strategic Management Journal* 29(10): 1027–1055. DOI: 10.1002/smj.701
- Deloitte & Touche GmbH Wirtschaftsprüfungsgesellschaft. 2009. Corporate Social Responsibility. Verankert in der Wertschöpfungskette. http://www.deloitte.com/assets/Dcom-Germany/Local%20Assets/Documents/de_CB_CSR_R_80409.pdf [5 December 2011].
- DiMaggio PJ, Powell WW. 1983. The iron cage revisited. Institutional isomorphism and collective rationality in organizational fields. *American Sociological Review* 48(2): 147–160.
- Ditlev-Simonsen CD, Middtun A. 2011. What motivates managers to pursue corporate responsibility? A survey among key stakeholders. *Corporate Social Responsibility and Environmental Management* 18(1): 25–38. DOI: 10.1002/csr.237

Motivations for Corporate Sustainability Management

- Dunphy D, Griffiths A, Benn S. 2007. Organizational Change for Corporate Sustainability. A Guide for Leaders and Change Agents of the Future, 2nd edn. Routledge: London.
- Dyllick T, Hockerts K. 2002. Beyond the business case for corporate sustainability. *Business Strategy and the Environment* 11(2): 130–141. DOI: 10.1002/bse.323
- Ehnert I. 2009. Sustainable Human Resource Management: A conceptual and exploratory analysis from a paradox perspective. Physica: Berlin/Heidelberg.
- Epstein MJ. 2008. Making Sustainability Work. Best Practices in Managing and Measuring Corporate Social, Environmental, and Economic Impacts. Greenleaf: Sheffield, UK.
- Fernandes MF, Randall DM. 1992. The nature of social desirability response effects in ethics research. *Business Ethics Quarterly* 2(2): 183–205.
- Fifka M. 2009. Towards a more business-oriented definition of corporate social responsibility. Discussing the core controversies of a well-established concept. *Journal of Service Science and Management* 2(4): 312–321. DOI: 10.4236/jssm.2009.24037
- Freeman RE. 1984. Strategic Management. A Stakeholder Approach. Pitman: Boston.
- Frondel M, Horbach J, Rennings K. 2008. What triggers environmental management and innovation? Empirical evidence for Germany. *Ecological Economics* 66(1): 153–160. DOI: 10.1016/j.ecolecon.2007.08.016
- Garriga E, Melé D. 2004. Corporate social responsibility theories. Mapping the territory. *Journal of Business Ethics* 53(1/2): 51–71. DOI: 10.1023/B:BUSI.0000039399.90587.34
- Gold S, Seuring S, Beske P. 2010. Sustainable supply chain management and inter-organizational resources: A literature review. *Corporate Social Responsibility and Environmental Management* 17(4): 230–245. DOI: 10.1002/csr.207
- Graafland J, van de Ven B. 2006. Strategic and moral motivation for corporate social responsibility. *Journal of Corporate Citizenship* 22: 111–124.
- Griffiths A, Petrick JA. 2001. Corporate Architectures for Sustainability. *International Journal of Operations & Production Management* 21(12): 1573–1585. DOI: 10.1108/01443570110410919
- Hahn T, Scheermesser M. 2006. Approaches to corporate sustainability among German companies. *Corporate Social Responsibility and Environmental Management* 13(3): 150–165. DOI: 10.1002/csr.100
- Hall J, Vredenburg H. 2003. The challenges of innovating for sustainable development. *MIT Sloan Management Review* 45(1): 61–68.
- Hansen EG, Große-Dunker F, Reichwald R. 2009. Sustainability innovation cube – A framework to evaluate sustainability-oriented innovations. *International Journal of Innovation Management* 13(4): 683–713. DOI: 10.1142/S1363919609002479
- Henri JF, Journeault M. 2010. Eco-control. The influence of management control systems on environmental and economic performance. *Accounting, Organizations and Society* 35(1): 63–80. DOI: 10.1016/j.aos.2009.02.001
- Hill CWL, Jones TM. 1992. Stakeholder-agency theory. *Journal of Management Studies* 29(2): 131–154. DOI: 10.1111/j.1467-6486.1992.tb00657.x
- Hockerts K, Moir L. 2004. Communicating corporate responsibility to investors. The changing role of the investor relations function. *Journal of Business Ethics* 52(1): 85–98. DOI: 10.1023/B:BUSI.0000033109.35980.16
- Hoffman AJ. 2001. Linking organizational and field-level analyses. The diffusion of corporate environmental practice. *Organization & Environment* 14(2): 133–156. DOI: 10.1177/1086026601142001
- IFO (Institut für Wirtschaftsforschung). 2002. Auswertung der Unternehmensbefragung für das Verbundprojekt Ökoradar. Endbericht. Institut für Wirtschaftsforschung: München.
- Kleindorfer PR, Singhal K, van Wassenhove LN. 2005. Sustainable operations management. *Production and Operations Management* 14(4): 482–492. DOI: 10.1111/j.1937-5956.2005.tb00235.x
- Küpers WM. 2011. Integral responsibilities for a responsive and sustainable practice in organization and management. *Corporate Social Responsibility and Environmental Management* 18(3): 137–150. DOI: 10.1002/csr.272
- Lauffer WS. 2003. Social accountability and corporate greenwashing. *Journal of Business Ethics* 43(3): 253–61. DOI: 10.1023/A:1022962719299
- Lauring J, Thomsen C. 2009. Collective ideals and practices in sustainable development: Managing corporate identity. *Corporate Social Responsibility and Environmental Management* 16(1): 38–47. DOI: 10.1002/csr.181
- Leire C, Mont O. 2010. The implementation of socially responsible purchasing. *Corporate Social Responsibility and Environmental Management* 17(1): 27–39. DOI: 10.1002/csr.198
- Maignan I, Ferrell OC. 2004. Corporate social responsibility and marketing. An integrative framework. *Journal of the Academy of Marketing Science* 32(1): 3–19. DOI: 10.1177/0092070303258971
- Maignan I, Ferrell OC, Ferrell L. 2005. A stakeholder model for implementing social responsibility in marketing. *European Journal of Marketing* 39(9/10): 956–977. DOI: 10.1108/03090560510610662
- Martin A, Benn S, Dunphy D. 2007. Towards a model of governance for sustainability. In Corporate Governance and Sustainability. Challenges for Theory and Practice, Benn S, Dunphy D (eds). Routledge: London; 94–121.
- McWilliams A, Siegel D. 2001. Corporate social responsibility. A theory of the firm perspective. *The Academy of Management Review* 26(1): 117–127. DOI: 10.2307/259398
- Meffert H, Kirchgeorg M. 1998. Marktorientiertes Umweltmanagement. Konzeption, Strategie, Implementierung, 3rd edn. Schäffer-Poeschel: Stuttgart.
- Metzler MS. 2001. The centrality of organizational legitimacy to public relations practice. In Handbook of Public Relations, Heath RL (ed). Sage: Thousand Oaks/London/New Delhi; 321–333.
- Miles MP, Covin JG. 2000. Environmental marketing: A source of reputational, competitive, and financial advantage. *Journal of Business Ethics* 23(3): 299–311. DOI: 10.1023/A:1006214509281
- Mitchell RK, Agle BR, Wood DJ. 1997. Toward a theory of stakeholder identification and salience. Defining the principle of who and what really counts. *The Academy of Management Review* 22(4): 853–886. DOI: 10.2307/259247

- Moon J. 2007. The contribution of corporate social responsibility to sustainable development. *Sustainable Development* 15(5): 296–306. DOI: 10.1002/sd.346
- Nidumolu R, Prahalad CK, Rangaswami MR. 2009. Why sustainability is now the key driver of innovation. *Harvard Business Review* 87(9): 56–64.
- Oglethorpe D, Heron G. 2010. Sensible operational choices for the climate change agenda. *International Journal of Logistics Management* 21(3): 538–557. DOI: 10.1108/09574091011089844
- Peeters H. 2003. Sustainable development and the role of the financial world. *Environment, Development and Sustainability* 5(1/2): 197–230. DOI: 10.1023/A:1025357021859
- Pfeffer J, Salancik G. 1978. *The External Control of Organizations. A Resource Dependence Perspective*. Harper & Row: New York.
- Ramus CA, Montiel I. 2005. When are corporate environmental policies a form of greenwashing? *Business Society* 44(4): 377–414. DOI: 10.1177/0007650305278120
- Sarkis J. 2001. Manufacturing's role in corporate environmental sustainability. Concerns for the new millennium. *International Journal of Operations & Production Management* 21(5/6): 666–686. DOI: 10.1108/01443570110390390
- Schaltegger S. 1998. Accounting for eco-efficiency. In *Environmental Management in Practice. Volume I: Instruments for Environmental Management*, Nath B, Hens L, Compton P, Devuyt D (eds). Routledge: London; 272–287.
- Schaltegger S, Burritt R. 2005. Corporate sustainability. In *The International Yearbook of Environmental and Resource Economics*, Folmer H, Tietenberg T (eds). Edward Elgar: Cheltenham; 185–232.
- Schaltegger S, Burritt R. 2010. Sustainability accounting for companies. Catchphrase or decision support for business leaders? *Journal of World Business* 45(4): 375–384.
- Shrivastava P. 1995. The role of corporations in achieving ecological sustainability. *The Academy of Management Review* 20(4): 936–960. DOI: 10.5465/AMR.1995.9512280026
- Shrivastava P, Hart S. 1995. Creating sustainable corporations. *Business Strategy and the Environment* 4(3): 154–165.
- Social Investment Forum. 2003. 2003 Report on Socially Responsible Investing Trends in the United States. SIF Industry Research Program: Washington, DC. http://ussif.membershipsoftware.org/files/Publications/03_Trends_Report.pdf [27 May 2013].
- Stead JG, Stead WE. 2008. Sustainable strategic management. An evolutionary perspective. *International Journal of Sustainable Strategic Management* 1(1): 62–81. DOI: 10.1504/08.18127
- Suchman MC. 1995. Managing legitimacy: Strategic and institutional approaches. *Academy of Management Review* 20(3): 571–610. DOI: 10.5465/AMR.1995.9508080331
- UNWCED (United Nations World Commission on Economic Development). 1987. Report of the World Commission on Environment and Development: Our Common Future. <http://www.un-documents.net/our-common-future.pdf> [25 February 2013].
- Varadarajan PR, Menon A. 1988. Cause-related marketing. A coalignment of marketing strategy and corporate philanthropy. *The Journal of Marketing* 52(3): 58–74. DOI: 10.2307/1251450
- Viehöver MG, Hilf J, Knecht F, Reich S. 2006. *Nachhaltigkeit und Unternehmensführung. Ergebnisse einer Unternehmensbefragung im deutschsprachigen Raum*. URS Deutschland GmbH/Freshfields Bruckhaus Deringer/ConNexiS Strategy Consultants AG: Frankfurt am Main/Basel/Köln.
- von Weizsäcker EU, Hargroves K, Smith M. 2009. *Factor Five: Transforming the Global Economy through 80% Improvements in Resource Productivity*. A report to the Club of Rome. Earthscan: London.
- WBCSD (World Business Council for Sustainable Development). 2002. The business case for sustainable development. Making a difference towards the Earth Summit 2002 and beyond. *Corporate Environmental Strategy* 9(3): 226–235. DOI: 10.1016/S1066-7938(02)00071-4
- Welt Online. 2009. Die 500 größten Unternehmen in Deutschland. <http://top500.welt.de> [13 July 2009].
- Wheeler D, Colbert B, Freeman RE. 2003. Focusing on value. Reconciling corporate social responsibility, sustainability and a stakeholder approach in a network world. *Journal of General Management* 28(3): 1–28.
- Wier M, Calverley C. 2002. Market potential for organic foods in Europe. *British Food Journal* 104(1): 45–62. DOI: 10.1108/00070700210418749

II. Paper 2

Windolph, S. E.; Schaltegger, S. & Herzig, C. (2013): Implementing Corporate Sustainability. What Drives the Application of Sustainability Management Tools in Germany?

(to be resubmitted).

** To be resubmitted **

**Implementing corporate sustainability.
What drives the application of sustainability management tools in
Germany?**

Sarah Elena Windolph^a, Stefan Schaltegger^{a*}, Christian Herzig^b

^aCentre for Sustainability Management (CSM)

Leuphana Universität Lüneburg

Scharnhorststr. 1, D-21335 Lüneburg, Germany

Tel. +49.4131.677-2181

Fax +49.4131.677-2186

windolph@uni.leuphana.de, schaltegger@uni.leuphana.de

^b Nottingham Trent University

Nottingham Business School

Burton Street, Nottingham, NG1 4BU, United Kingdom

Tel. +44.115.848-2168

christian.herzig@ntu.ac.uk

*corresponding author

Abstract

Although a variety of sustainability management tools have been proposed in literature, research on their acceptance in practice is scarce. We conduct an analysis based on a survey of large German companies and publicly available data to enhance understanding of the dissemination of sustainability management tools. Building on recent studies we test the influence of corporate sustainability networks, indices, standards and the awareness of sustainability management tools on their application. Several variables are found to have a positive influence whilst a particularly strong positive relation exists between the awareness and the application of tools. Our findings suggest that the dissemination of sustainability management tools can be fostered through the promotion and awareness of tools.

Keywords: corporate sustainability, management tools, implementation, isomorphism, networks, indices

Lueneburg/Nottingham, 29 July 2013

1. Introduction

For the last two decades the concepts of sustainable and responsible business, corporate social responsibility (CSR) and sustainability management have received increasing attention in the management literature and corporate practice (Banerjee, 2001; Dunphy, Griffiths, & Benn, 2007; Scherer & Palazzo, 2011; Shrivastava, 1995; Shrivastava & Hart, 1995). The implementation of corporate sustainability is considered to be an important management task with the aim of integrating social and environmental issues into the management practices of a company (Epstein, 2008; Shrivastava, 1995; Shrivastava & Hart, 1995). Such integration does not only require companies to embed sustainability issues in their strategies (McWilliams, Siegel, & Wright, 2006; Steger, 2000) but also to acquire new knowledge, to handle new practices and to choose and apply specific management measures (Banerjee, 2001; Bansal, 2002; Boiral, 2011; Haugh & Talwar, 2010; Waddock, Bodwell, & Graves, 2002; WBCSD, 2002).

In response to this, researchers have proposed a large number of environmental, social and, more recently, sustainability management *tools* (Biebeler, Mohammadzadeh, & Selke, 2005; Epstein, 2008; Hahn & Scheermesser, 2006; Schaltegger, Herzig, Kleiber, & Mueller, 2002; Tencati, Perrini, & Pogutz, 2004; Waddock et al., 2002; for an overview of tools see also European Commission, 2004). However, management approaches proposed in literature may not necessarily be useful and applied in corporate practice, as stressed by several scholars for example with regard to the management of stakeholder relations (Ackermann & Eden, 2011), CSR management and assessment (Husted & Allen, 2007) and tools and processes for sustainable supply chain management (Scherer & Palazzo, 2011). Whereas some sustainability approaches such as environmental management systems like ISO 14001 (Dixon, Mousa, & Woodhead, 2005; Morrow & Rondinelli, 2002; Steger, 2000) or sustainability reports (Perrini, 2005) are widely discussed in literature and can often be found in practice, other tools appear not to be adopted broadly although they are discussed in the sustainability management literature. This leads to the question what factors determine the dissemination of tools.

To date, broader empirical research on sustainability management tools and their dissemination has been scarce. Previous studies have focused on the spread of single management tools or systems like charitable giving (Brammer & Millington, 2004), Eco-Management and Audit Scheme (EMAS) or ISO 14001 (Morrow & Rondinelli, 2002; Schaefer, 2007; Steger, 2000), diversity management (Süß & Kleiner, 2008), mission

statements (Bartkus, Glassman, & McAfee, 2002) and social or environmental reporting (Herzig & Godemann, 2010; Kolk, 2010) or they examined, for example, the development and determinants of environmental businesses or corporate sustainability in general (Bansal, 2005; Campbell, 2007; Holt, 2010; Lee & Rhee, 2007). By contrast, we analyse the dissemination of a broad set of sustainability management tools as well as factors that drive their application. Our study is motivated by institutional isomorphism as introduced by DiMaggio and Powell (1983). We review various isomorphic variables which have been discussed in the literature with regard to the dissemination of conventional management tools and corporate sustainability, and we analyse their influence on the application of sustainability management tools. Our study also differentiates between the *awareness* and the actual *application* of sustainability management tools in corporate practice and examines the influence of the awareness of tools on their application. To answer our research question this paper conducts multiple regression analyses based on survey data among large German companies and data collected from publicly available sources, namely the companies' sustainability reports and corporate websites. Our contribution consists in identifying possible drivers of the dissemination of sustainability management tools in order to strengthen corporate sustainability practices in the future.

The paper is structured as follows. After introducing what is understood by sustainability management tools and briefly explaining their role for the implementation of corporate sustainability, we describe the dissemination of corporate sustainability practices and management tools (Section 2). Furthermore, we provide the methodology, data and variables (Section 3) and present the findings of our analyses (Section 4). The findings are discussed (Section 5) and conclusions presented (Section 6).

2. Sustainability management tools and their dissemination

2.1 Sustainability management tools

Management tools can be considered “technologies”, i.e. “those tools, devices, and knowledge that mediate between inputs and outputs (process technology) and/or that create new products or services (product technology)” (Tushman & Anderson, 1986, p. 440). More specifically, “administrative” technologies are “prescriptions for designing organizational structures and cultures” (Abrahamson, 1991, p. 588). In this context sustainability management tools can be described as administrative technologies to manage sustainability issues by structuring, organising, measuring and/or communicating sustainability information and/or developing and defining processes and structures.

Sustainability management tools address various aspects. For example, environmental management standards and systems like ISO 14001 have gained importance for many companies over the last two decades (Banerjee, 2001; Schaefer, 2007; Steger, 2000). They serve to deal with environmental issues in a systematic manner and provide companies with guidelines for actions and processes to increase environmental performance. Furthermore, social responsibility and social issues are in the limelight of social management standards and systems like SA 8000 (Lockett, Moon, & Visser, 2006) and audits of working conditions (Scherer & Palazzo, 2011). Tools which have an integrative focus aim at linking and balancing environmental, social and economic aspects of management (Oskarsson & von Malmborg, 2005). This includes standards for the management of stakeholder relations (like AA 1000; Lockett et al., 2006), sustainability management systems (Schaefer, 2007) or sustainability reporting (Kolk, 2004, 2010).

2.2 Dissemination of sustainability management tools

The dissemination of sustainability management practices is in the literature often explained through institutional isomorphism (Bansal, 2005; Boiral, 2002, 2006, 2011; Hoffman, 2001; Jennings & Zandbergen, 1995). The concept of isomorphism can be used to explain the behaviour of a certain *organisational field*, which is defined as a “recognized area of institutional life” jointly created by “key suppliers, resource and product consumers, regulatory agencies, and other organizations that produce similar services or products” (DiMaggio & Powell, 1983, p. 148). Building on Hoffman (2001, p. 135), who states that an organisational field “forms around a central issue—such as the protection of the natural environment”, we consider corporate sustainability as an organisational field, too, with the application of sustainability management tools representing ‘organisational practices’ subject to isomorphism (DiMaggio & Powell, 1983).

The literature distinguishes three mechanisms of isomorphism. *Coercive* isomorphism can be explained as the choice of management approaches and practices reflective of influences from strong stakeholders such as regulators, non-governmental organisations, standardisation agencies, industry norms, etc. (Aguilera, Williams, Conley, & Rupp, 2006; Bansal, 2005; Campbell, 2007; Epstein, 2008; Ramus & Montiel, 2005). Companies are seen to aim to receive social legitimacy through sustainability management by complying with expectations and by implementing approaches which are required, e.g. by standardisation organisations or sustainability rating agencies (Boiral, 2011; Chatterji & Toffel, 2010; Darnall, Henriques, & Sadorsky, 2010; Nicolai, Schulz, & Thomas, 2010). The efforts to secure legitimacy may go

so far as to apply management tools that will not necessarily improve efficiency or increase firm performance (Abrahamson, 1996; Christmann & Taylor, 2006; Nicolai et al., 2010).

Besides situations in which companies hope to gain legitimacy, such 'irrational' behaviour is also likely to occur in situations of uncertainty (Abrahamson, 1991; DiMaggio & Powell, 1983; Nicolai et al., 2010; Schaefer, 2007; Süß & Kleiner, 2008). Since not all companies have the competencies and experiences to determine which tools are the 'right' ones for them (Boiral, 2002), they may likely apply tools which have already been adopted by a significant number of other companies (Abrahamson, 1991; Banerjee, 2001; Bansal, 2005; Nicolai et al., 2010; Schaefer, 2007). The result of this uncertainty or goal ambiguity can be the imitation of the behaviour of organisations considered successful or legitimate and is referred to as *mimetic* isomorphism. In corporate sustainability mimicry can result from employee transfer and the influence of consulting firms or industry trade associations (DiMaggio & Powell, 1983; Lee & Pennings, 2002; Mizruchi & Fein, 1999). Jennings and Zandbergen (1995), whilst emphasizing the particular role of coercive pressure for the diffusion of structures or practices in a field, hypothesised that "mimicry is more likely than normative pressure to influence organizations in a field to adopt concepts and practices related to ecological sustainability" (Jennings & Zandbergen, 1995, p. 1034). Bansal (2005) examined the influence of coercive and mimetic isomorphism on corporate sustainable development and found them to be relevant especially in early phases of the adoption of new practices.

Normative isomorphism, finally, results from the professionalisation of the members of an occupation defining their working conditions and practices (DiMaggio & Powell, 1983). Sources of normative pressure can be education, training and professional associations diffusing management practices (DiMaggio & Powell, 1983; Mizruchi & Fein, 1999). Corporate sustainability education and training are still novel and only few institutions exist (Matten & Moon, 2004; Sherman & Hansen, 2010). The same holds true for corporate sustainability associations and networks (Bansal, 2002; Campbell, 2007). Thus, sustainability managers can be expected to have a similar training and socialisation.

Taken together, the literature suggests that institutional theory may have a high explanatory power regarding developments in corporate sustainability. It could even be argued that institutional isomorphism plays a bigger role for sustainability than for conventional management. Due to their "visual impact and high externalities" a lot of the issues linked with corporate sustainability "generate greater public concern" than conventional management practices, leading to high institutional pressures, e.g. through media (Bansal, 2005, p. 214).

Boiral (2006, p. 322) emphasises that especially in environmental management “the quest for social legitimacy represents a fundamental drive of organisational change.” This leads to the conclusion that companies might tend to apply similar environmental and sustainability management practices. Moreover, some authors argue that companies face a particularly high degree of ambiguity and uncertainty with regard to the implementation of corporate sustainability (Bansal, 2002, 2005). The integration of environmental and social issues into conventional management can be difficult to accomplish since it may run contrary to the actual business model or rationale of the company (Gond, Grubnic, Herzig, & Moon, 2012). To implement corporate sustainability thus often requires companies to change fundamentally (Dunphy et al., 2007; Schaltegger, Lüdeke-Freund, & Hansen, 2012). Furthermore, the concept of sustainability is complex and still fairly novel, so that no common understanding exists of what it comprises and implies. This challenge is intensified by the fact that education and training for corporate sustainability have only recently been developed. Overall, these circumstances can lead to stronger mimicry, which reinforces the tendency of companies to become increasingly similar in managing corporate sustainability.

These theoretical considerations are the basis for our hypotheses which are introduced next.

3. Hypotheses

In the following we examine the influence of networks, indices and standards as well as the influence of the awareness of sustainability management tools on the application of these tools. These variables have been addressed in publications on isomorphism in the dissemination of conventional management tools or on isomorphism in corporate sustainability in general. We apply the results of this body of research to the dissemination of sustainability management tools in large German companies.

3.1 Networks

Corporate sustainability networks and associations have become increasingly popular. Not only have several environmental and sustainability networks evolved roughly over the last 20 years, but their number of members have also risen. Well-known examples of international corporate sustainability networks are the United Nations Global Compact (founded in 1999, UNGC, 2012a) and the World Business Council for Sustainable Development (founded first as Business Council for Sustainable Development in 1990, WBCSD, 2012a). Companies also participate in regional or local networks, such as CSR Europe on the level of the European Union (founded in 1995, CSR Europe, 2012a), or Econsense on the national level in Germany

(founded in 2000, Econsense, 2012a). These sustainability networks have been initiated by various actors, ranging from businesses over international organisations to NGOs. Being a member in these networks is generally not for free. For example, the membership in the United Nations Global Compact involves an annual fee of up to 10,000 US dollars for large businesses (UNGC, 2012b) and the annual membership fee for CSR Europe is 17,500 Euros (CSR Europe, 2012b).

Several authors have dealt with the influence of networks on corporate sustainability. Campbell (2007, p. 959) argues that companies belonging to international or national trade or employer associations “organized in ways that promote socially responsible behaviour” are more likely to “act in socially responsible ways” (Campbell, 2007, p. 960). He highlights that this is especially true for networks involving stakeholder dialogues with, e.g., unions, employees, community groups and investors (Campbell, 2007). Furthermore, according to Lee and Pennings (2002, p. 150), networks represent a “major spillover mechanism” for innovations, because they link organisations to innovation adopters and exert “conformity pressure” on companies.

All of the above mentioned networks advertise sustainability management practices and offer the provision of and information about management tools as membership benefits. For example, the UNGC offers a “platform to share and exchange best and emerging practices to advance practical solutions and strategies to common challenges” as well as “Global Compact management tools and resources” (UNGC, 2012b). The WBCSD “offers tools to support the implementation of sustainable development into business strategy and operations”, namely guidelines, measurement, footprinting and accounting (WBCSD, 2012b). Furthermore, CSR Europe offers members to “[s]hare and further develop best practice on CSR” (CSR Europe, 2012c) and one objective of Econsense is to “promote sustainability concepts and CSR in the business community” (Econsense, 2012b).

Thus, we formulate our first hypothesis as:

H1: The application of sustainability management tools is higher in companies which are a member in a corporate sustainability network.

3.2 Indices

Sustainability ratings and indices analysing the environmental, social and/or economic performance of companies have gained importance since the capital market’s interest in sustainability and the volume of socially responsible investments have increased substantially over the last fifteen years (Chatterji & Toffel, 2010; Moskowitz, 1997; Schäfer, Beer, Zenker,

& Fernandes, 2006). Besides investors who may base their decisions on ratings and indices, also the media and other stakeholders pay attention to results of sustainability ratings and indices which thus influence a company's reputation (Chatterji & Toffel, 2010). Various actors carry out sustainability ratings, among them specialised rating agencies, analysts in banks, NGOs or conventional indices and credit rating agencies (Delmas & Docteur-Blass, 2010; Schäfer et al., 2006). Among the most prominent sustainability-oriented indices and ratings are the Dow Jones Sustainability Index, the FTSE4Good Index, Oekom's Corporate Responsibility Rating and, more specific, the Carbon Disclosure Project assessment and indices (Székely & Knirsch, 2005). Rating results, mostly expressed in terms of investment recommendations, indicate whether a company qualifies as more sustainable than the industry average, and whether it meets or exceeds a predefined benchmark.

One key element of sustainability indices and ratings is to assess the application of management approaches and tools such as a sustainability report, an environmental management system or stakeholder dialogue (Oekom research, 2012; Ricart, Rodríguez, & Sánchez, 2005; SAM, 2012). Because of the important role of indices and ratings for investment decisions and a company's reputation, it is likely that companies participating in the often time-consuming assessment process adjust their corporate sustainability practices and tools to the criteria applied by the rating schemes (Chatterji & Toffel, 2010). In addition, Nicolai et al. (2010) emphasize the fact that the capital market and its observers can lead companies to "adopt common strategies and popular management concepts, rather than unique strategies, to attract more coverage by analysts and receive higher valuations" (p. 167).

These arguments lead to the second hypothesis:

H2: The application of sustainability management tools is higher in companies which participate and are listed in a corporate sustainability index.

3.3 Standards and guidelines

In order to manage for sustainability and evaluate its implementation, companies and stakeholders alike are guided by widely accepted codified standards for corporate sustainability, environmental or social management (Boiral, 2002). Companies may decide to adopt such institutionalized structures to increase or secure their legitimacy (Boiral, 2002, 2011; Süß & Kleiner, 2008). Standards are here defined as a point of industry or management reference based on a formal document issued by a broadly acknowledged institution such as the International Organization for Standardization (ISO). They include formal standards issued (and certified) by standardisation institutions (e.g. ISO 9000 and ISO 14001),

acknowledged international guidelines (e.g. the sustainability reporting guidelines by the Global Reporting Initiative, Dixon et al., 2005), and international reference documents issued by regulatory bodies (e.g. the policy on corporate social responsibility by the European Union, 2011). Several of these guidelines and standards include the application of tools or represent management systems or tools themselves. Well-known examples are ISO 14001 and EMAS for environmental management systems and eco audits (Dixon et al., 2005; Morrow & Rondinelli, 2002; Steger, 2000) and OHSAS 18001 for occupational health and safety standards. Our third hypothesis thus is:

*H3: The application of sustainability management tools is higher in companies which apply a corporate sustainability *standard* or *guideline*.*

3.4 Awareness of sustainability management tools

A fourth aspect possibly influencing the application of sustainability management tools is tool awareness. This factor has so far gained little attention in the literature. However, Nicolai et al. (2010) have touched upon the relevance of awareness in the dissemination process of conventional management tools by highlighting that an essential part of the spread of tools is the “managerial discourse” about them (Nicolai et al., 2010, p. 171). In a similar vein, Boiral (2006) coins environmental information as crucial for adapting product design to growing environmental regulations, implying that knowledge has to spread first.

According to Rogers (2003), the dissemination of innovations (and in this paper we can regard the introduction of sustainability management tools as innovations) starts with ‘first knowledge’ and is finally manifested by its application. A manager or company has first knowledge and becomes aware of a sustainability management tool when the individual or organisation learns about the existence of the tool and gains an understanding of how it functions (adapted from Rogers, 2003, p. 216f.). First knowledge in the sense of awareness is thus understood as whether a corporate practitioner is informed about the existence of a certain sustainability management tool and knows that it can support the implementation of sustainability management. At the other end of the dissemination spectrum, application is expressed by implementation, i.e. the company puts the tool into use in the whole or at least in some parts of the organisation. This leads to our fourth hypothesis:

*H4: The *awareness* of sustainability management tools positively influences the application of sustainability management tools in companies.*

3.5 Control variable

As the industry sector may also influence the choice of sustainability management tools, we have included it as a control variable in our analysis. Particularly, we control for whether *service companies* apply sustainability management tools differently than companies from the first or secondary industry sectors. This issue has been reflected by Ramus and Montiel (2005) when analysing the implementation of environmental policies. They refer to the lower economic potential of environmental practices in service-providing industries compared to potential cost savings and market advantages in other sector companies (Ramus & Montiel, 2005). Company size is not controlled for since our analysis includes only large companies anyhow, i.e. the 120 largest German companies by sales.

4. Empirical study

4.1 Sample and Data

The analysis of sustainability management tools is based on primary data generated through a company survey and the review of publicly available secondary data on the surveyed companies. The primary data were collected with a survey carried out among large German companies between November 2009 and February 2010. The basic population included the 120 largest German companies by sales (based on the German newspaper Welt online, 2009). We adjusted this list for subsidiary companies, i.e. that subsidiaries were deleted from the list and the next company in size was considered. The sustainability managers or other persons in charge of sustainability issues of the whole company were asked to fill in a questionnaire sent to them by email or mail, where necessary involving other persons or departments in the company to support them. 31 responses (25.8%) could be included in the analysis. The respondents were mostly sustainability, environmental, health & safety or CSR managers (67.7%) or, to a lower extent, public relations or investor relations managers (19.4%) in case they were the official contact persons for corporate sustainability matters. The remaining respondents (12.9%) were located in top management, human resources or did not specify their affiliation. The data were analysed with PASW/SPSS Statistics 18.

The respondents were asked which sustainability management tools they know and which of the known tools are applied at least in parts of their company. Along with those questions a list of 79 tools was provided that had been drawn from a review of sustainability management literature (see Appendix for an overview of tools). The respondents also had the option to add tools which were not listed. To reduce the effect of a common method bias, we collected and

examined additional, publicly available data and data published by the surveyed companies. This secondary data served to analyse the participation of the surveyed companies in networks, their listing in indices and their application of standards. Further details are discussed in the next section.

The study focuses on large German companies for three reasons. Firstly, large companies are publicly exposed which may cause them to engage with sustainability more strongly than small and medium-sized enterprises (Darnall et al., 2010). Secondly, large companies can be expected to have the resources to try out and implement sustainability tools on a large scale (Esrock & Leichty, 1998; Marsden, 2000) and to support the development of tools (Schmidt et al., 2004). Thirdly, the narrow focus on one country eliminates decisive influences related to national contingencies, e.g. in case that some corporate sustainability management activities or tools may be regulated or promoted more in one country than in another (Brammer, Pavelin, & Porter, 2009; Muller & Kolk, 2010).

4.2 Variables

4.2.1 Dependent variables

To measure the application of sustainability management tools in practice we examine two indicators: firstly, the *total number* of environmental, social and sustainability management tools applied in a company, and secondly, the number of *integrative* sustainability management tools applied in a company. We consider applying a large number of tools as an indicator for comprehensive sustainability management since it implies that various topics are addressed and a lot of resources are provided for corporate sustainability. However, applying more tools is not necessarily ‘better’ in a sense that a company would contribute more to sustainable development than by applying fewer tools. Instead, the *kind* of tools applied plays a significant role for organisational development. For example, the balanced consideration of environmental, social and economic issues and the integration of corporate sustainability into the core business and all functional units may be more desirable than the isolated management of a large number of partial aspects of sustainability.

Thus, besides the analysis of how many tools are applied in total we also examine how many *integrative* sustainability management tools are applied in companies, i.e. tools that simultaneously address and balance environmental, social and economic issues. We queried the following 14 integrative sustainability management tools in the company survey: sustainability accounting, audit, benchmarking, control, design, indicators, label, management

What drives the application of sustainability management tools?

system, marketing, mission statement, report, sponsoring, sustainability balanced scorecard and sustainable supply chain management.

4.2.2 Independent variables

To analyse the membership of a company in networks we collected information from the websites of the *United Nations Global Compact* (UNGC, www.unglobalcompact.org), the *World Business Council for Sustainable Development* (WBCSD, www.wbcsd.org) and *Econsense*, a German industry association on corporate sustainability with mainly large company members (www.econsense.de/en). The information on whether companies are listed in indices was collected in the sustainability reports and further publicly available data from the surveyed companies. Particularly, we analysed the participation in the *Dow Jones Sustainability Index* (DJSI) and the *FTSE4Good*. Furthermore, the application of the following standards was checked by analysing the sustainability reports, websites or further information by companies: the guidelines for sustainability reporting of the *Global Reporting Initiative* (GRI), the environmental management standard *ISO 14001* and the occupational health and safety standard *OHSAS 18001*. For every company we checked whether they are a member in at least one of the three networks, listed in at least one of the two indices, and whether they apply at least one of the three standards.

Since it was not possible to analyse the fourth influencing variable, *the awareness of tools*, based on publicly available information, we collected this information with the survey. The information for our control variable *industry sector* was gathered in the German national newspaper that provided the list of companies forming our basic population (Welt online, 2009). The data were crosschecked with the statements that the companies made in our survey on their core business.

5. Data analysis and results

The results of our analysis are presented as follows. First, we provide some descriptive figures on the dissemination of sustainability management tools. Second, we test our hypotheses using two multiple regression analyses, one using the *total* number of tools applied as dependent variable, another one using the number of *integrative* tools applied as dependent variable.

5.1 Dissemination of sustainability management tools in Germany

The survey results show that the queried companies on average know 47.5 of the 79 tools (60.1% of the tools in total) and apply 29.2 tools (36.9%). Of the 14 integrative sustainability management tools they apply 5.6 on average (40.0%). Furthermore, based on the secondary data from organisational websites, sustainability reports and corporate websites, we identified 14 companies which are a member in at least one corporate sustainability network (45.2% of the sample), 12 companies which are listed in at least one index (38.7%), and 25 companies which apply at least one of the standards (80.6%; see also Table 1). The number of companies fulfilling the individual criteria ranges between 6 (member in the WBCSD, 19.4%) and 21 (applying the GRI guidelines, 67.7%). Six companies belong to the service sector (19.4%). To keep the identity of the companies confidential, we stay on an aggregate level and do not further differentiate which criteria are fulfilled by a specific company.

Table 1: Descriptive statistics

Variables	Percentage	
<i>Independent variables</i>		
Member in at least one network ^a	45.2%	
Listed in at least one index ^a	38.7%	
Applying at least one standard ^a	80.6%	
Dummy service sector ^a	19.4%	
	Mean	Standard deviation
Number of known tools	47.45	24.458
<i>Dependent variables</i>		
1) Number of applied tools	29.16	16.211
2) Number of applied integrative tools	5.61	4.104

^a Numbers indicate the percentage of companies in the sample to which the criterion applies

Table 2 displays for companies that are members in the networks, listed in the indices and following the standards how many tools they apply *in total* (in % of the total number of 79 tools) as well as how many *integrative tools* they apply (in % of the 14 integrative tools). We contrast these figures with the companies that do not fulfil the criteria.

Table 2: Application of sustainability management tools distinguished by variables/criteria

Variables/Criteria	Percentage of tools applied (%)		Percentage of integrative tools applied (%)	
	Fulfilled	Not fulfilled	Fulfilled	Not fulfilled
<i>Networks</i>				
Econsense	44.9	33.4	50.0	35.7
Global Compact	44.0	31.9	49.4	29.2
WBCSD	53.4	31.5	58.3	33.1
<i>Indices</i>				
DJSI	44.7	29.8	55.4	27.4
FTSE4Good	56.6	29.4	66.3	30.1
<i>Standards</i>				
GRI	42.7	19.5	49.7	12.7
ISO 14001ff.	37.2	32.2	40.6	32.9
OHSAS 18001	43.7	32.0	46.4	33.8
<i>Control variable</i>				
Service sector	45.4	34.9	52.4	37.1
<i>Average</i>	<i>45.9</i>	<i>30.0</i>	<i>52.0</i>	<i>29.4</i>

Table 2 shows the *total application of tools* (in % of all 79 tools) and the application of *integrative tools* (in % of the 14 integrative tools). A comparison of the columns shows larger figures for companies fulfilling the analysed criteria, i.e. those which are members in the analysed networks, are listed in the analysed indices or apply the analysed standards. Table 2 shows the same tendency for all criteria, particularly for being listed in the FTSE4Good index and applying the GRI guidelines. The results indicate a positive influence of the analysed criteria not only for the *total* number of tools applied but also for the application of *integrative* tools, which is higher in companies fulfilling the analysed criteria. This is again true for every single criterion. In sum, the results imply that there is a positive influence of the analysed networks, indices and standards on the application of tools. Interestingly, the tool application is also higher in companies belonging to the service sector. In the following we will test these relations using multiple regression analysis.

5.2 Total application of sustainability management tools

In a first step we conducted a multiple regression analysis to identify the influence of the variables on the *total* number of sustainability management tools applied (see Table 3). The model results in an R^2 of 0.743, i.e. a high percentage of 74.3% of the variability in the total number of applied tools can be accounted for by the tested variables.

Table 3: Multiple regression – *total* number of sustainability management tools applied

Variables/criteria	Regression coefficient	Standard error	Beta	Significance	VIF
(Constant)	-8.221	5.552		0.151	
Networks	4.797	3.808	0.150	0.219	1.372
Indices	-2.132	4.012	-0.065	0.600	1.459
Standards	10.396	4.518	0.258	0.030	1.217
Number of known tools	0.545	0.073	0.822	0.000	1.188
Service sector	9.388	4.190	0.233	0.034	1.047

Analysing the standardised Beta weights, the awareness of tools (number of known tools) has the strongest influence. This value is statistically highly significant ($p < 0.001$). Furthermore, applying at least one of the analysed standards has the second-strongest positive influence on the number of applied tools, closely followed by the variable for the service sector, i.e. that being a service company positively influences the total number of sustainability management tools applied. The influence of these two variables is also statistically significant ($p < 0.05$). The low Value Inflation Factors (VIF; between 1.047 and 1.459) indicate that there is no multicollinearity problem of the variables. Networks have a smaller positive influence and indices a small negative influence, but both influences are not statistically significant.

5.3 Application of integrative sustainability management tools

In a second step, we conducted a multiple regression analysis with the number of *integrative* sustainability management tools applied as dependent variable (see Table 4).

Table 4: Multiple regression – number of *integrative* sustainability management tools applied

Variables/criteria	Regression coefficient	Standard error	Beta	Significance	VIF
(Constant)	-3.207	1.693		0.070	
Networks	0.557	1.161	0.069	0.636	1.372
Indices	1.083	1.223	0.131	0.384	1.459
Standards	2.894	1.377	0.283	0.046	1.217
Number of known tools	0.112	0.022	0.667	0.000	1.188
Service sector	2.621	1.277	0.256	0.051	1.047

The regression coefficient for this model is $R^2 = 0.627$, i.e. a high percentage of 62.7% of the variability in the application of integrative tools can be accounted for by the model. Since the same independent variables were analysed as in the first linear regression, we have no multicollinearity problem in this analysis either (VIF between 1.047 and 1.459). Again, analysing the standardised Beta weights, the awareness of tools has the strongest influence on the dependent variable and is statistically highly significant ($p < 0.001$). Applying at least one of the analysed standards has the second-strongest positive influence on the number of applied integrative tools ($p < 0.05$), and the variable for the service sector has the third-strongest influence ($p < 0.1$). Indices and networks have smaller but still positive influences, which are, however, not statistically significant.

6. Discussion

The results of our analysis, firstly, indicate that the application of corporate sustainability standards has a positive influence on the application of sustainability management tools. This implies an important role of *institutional pressure* for the implementation of these tools. Secondly, the findings show that *service* companies tend to apply a higher number of tools in total as well as more integrative tools. This result is rather surprising, since it contradicts other authors who argue for the opposite. For instance, Ramus and Montiel (2005, p. 388) find “obvious differences between the potential positive and negative economic impacts from policy implementation” between the service sector and other sectors with regard to environmental policies. They argue that “it is possible that companies in this sector are jumping on the bandwagon of policy commitment without creating new practices to implement specific policies” (Ramus & Montiel, 2005, p. 409). Another example is the analysis by Graafland, van de Ven, and Stoffele (2003, p. 58), who describe that “[f]irms in the metal manufacturing sector more actively use codes of conduct, ISO certification, social reporting, social handbook and ethics committee than firms in the financial service sector or retail sector.” Yet, when comparing these studies it has to be kept in mind that our analysis only contains six companies of the service sector, which suggests examining this relation on a larger scale in the future. The same might be useful with regard to those variables whose influence did not turn out to be significant, namely networks and indices.

Thirdly, and more importantly, we found a particularly strong and highly significant positive influence of the *awareness* of sustainability management tools on their application. Analysing the beta weights the awareness of tools has the strongest influence on their application of all variables analysed. This result can be interpreted in a way that the dissemination of

management tools is fostered by or even requires tool awareness and knowledge. It also supports the conclusion that the application of sustainability management tools may be increased through the promotion of existing and new approaches. Here, academia, consultants, ‘management gurus’ or business schools should get actively involved in advancing and disseminating tools that effectively serve to strengthen the contribution of companies to sustainable development. In a best case scenario, these would be integrative tools serving to balance environmental, social and economic challenges.

Referring to the discussion in Section 2, the results might raise the question whether the variables analysed conform to the three mechanisms of coercive, mimetic and normative isomorphism described by DiMaggio and Powell (1983). Several publications have suggested such a match. For example, Bansal (2005), examining the influence of coercive and mimetic isomorphism on corporate sustainable development, operationalised coercive isomorphism as fines, penalties and media attention. According to the author, mimetic isomorphism was present if a company applied an environmental audit that it had not applied the year before, but a certain percentage of companies in the same industry had done so (Bansal, 2005). Another example is the work by Campbell (2007), who derived several propositions on what influences socially responsible behaviour. He operationalised state regulations, industrial self-regulation and societal stakeholders (NGOs, social movement, media) as part of coercive pressures and the business culture and associations as representing normative pressures.

Accordingly, one might argue that the influence of *networks* is the result of normative isomorphism, since normative isomorphism is exceeded, besides education, via business networks (Campbell, 2007; DiMaggio & Powell, 1983; Lee & Pennings, 2002). However, as Jennings and Zandbergen (1995, p. 1034) put it, “[w]hen an organization is a member of an association, both [mimetic and coercive] pressures appear to be at work.”

The influence of *standards*, which we found to be positively and significantly related to tool application, will most likely be classified as coercive isomorphism by most people, since complying with standards is often required by regulations or expected by society or other organisations companies depend upon. Referring to ISO management standards, Boiral (2011) states that although “the fundamental purpose of these standards is to improve in-house practices” (p. 200), “[e]xternal pressures often make the certification process less voluntary than it would appear” (p. 198). However, applying standards may also be the result of corporate uncertainty about how to best implement sustainability management (Bansal, 2002).

In this case, mimetic isomorphism would be at work referring to the imitation of other companies perceived as successful.

Similarly, *indices* may cause both coercive and mimetic influences, which may, in turn, be influenced by normative pressures through education or networks. Being listed in indices can help companies to increase their reputation (like a label), which may attract further companies to take part in rating and index processes – possibly out of uncertainty and thus as a result of mimetic isomorphism. Furthermore, being listed in certain indices may be regarded as a requirement by investors who base their investment decision on such criteria. For example, Ramus and Montiel (2005, p. 385) find that “stakeholders from the financial markets look at environmental management as a proxy for good management practices [...], giving a coercive pressure across industry sectors to commit to environmental sustainability to qualify for environmentally focused funds”.

Consequently, not only are the specific variables analysed in this paper hard to link to the mechanisms of isomorphism, but the different mechanisms also interact and influence each other in general (Mizruchi & Fein, 1999). Similarly, the motivations of a company to adhere to a standard or guideline can be a mixture of pressure and uncertainty or education, too. Yet, should our finding that standards increase the application of tools be mainly related to coercive isomorphism, it seems necessary to have a closer look at the possible downside of this. For instance, Stienstra, Baaij, van den Bosch, and Volberda (2004, p. 275) speak of an “inevitable push towards increasing homogeneity” possibly limiting companies in their activities. Similarly, Lembergi and Lettieri (2011) highlight “conformity to institutional rules or expectations.” Even more importantly, practices may “tend to lose their original value or meaning if coercive forces and rules for compliance are the basis of that diffusion” (Jennings & Zandbergen, 1995, p. 1033). The result may be a symbolic adoption of required practices, decoupled from the actual activities and their effectiveness and/or existing sustainability challenges. These potential consequences imply that, ideally, coercive pressure should not be the only driver of implementing corporate sustainability practices and tools. In fact, excessive regulations and stakeholder pressure on companies might even be counterproductive (Bansal, 2002). How much isomorphic pressure is most supportive for effective sustainability management is subject to further research.

7. Conclusions

The results of our analysis indicate that the variables analysed are suitable to predict in large part the total application of sustainability management tools in a company as well as the

application of integrative sustainability management tools serving to manage environmental, social and economic issues simultaneously. Of all variables tested, the awareness of sustainability management tools turned out to be most strongly related to the application of these tools. Companies that know more tools apply more tools. One might argue that this correlation is obvious. However, although it is clear that the interrelation between the awareness and the application of tools is a positive one, it had not been clear so far *how* positive and to what *extent*. Building on Nicolai et al. (2010), who emphasize that the dissemination of tools is fostered by the discourse on them, we argue that our analysis may serve as a starting point for the further dissemination of corporate sustainability management tools. An increase in the awareness of tools, e.g. via channels like networks, ratings and standards, can serve to increase the application of (integrative) sustainability management tools and thus support companies to contribute to sustainable development.

Particularly, the application of at least one of the three management standards analysed as well as being a service company significantly and positively influence the application of sustainability management tools. Especially companies that are listed in the FTSE4Good index or use the GRI guidelines apply a large number of sustainability management tools in total and a large number of integrative tools. The reasons why these variables foster the implementation of corporate sustainability particularly well and the implications of this result could be further analysed in the future.

There are potential limitations of interpreting our data. In spite of the high response rate of 25.8%, this paper builds on a small sample of 31 of the largest German companies. Accordingly, this study does not claim to be representative for German companies or companies in general; however, it provides first indications on how different variables influence the dissemination of sustainability management tools. Particularly, the findings for large companies may not be transferable to smaller companies since the influence of outside pressures and the necessity for legitimisation may be particularly strong for large shareholder-owned companies which have a strong impact on the environment and society and which are publicly visible in the media (Darnall et al., 2010). Furthermore, the data on the awareness and the application of tools originate from the same data source, i.e. the respondents of the company survey. Hence, with regard to awareness a potential common method bias has to be taken into account when interpreting the results.

Moreover, when it comes to the different mechanisms of isomorphism, some scholars (e.g. Mizruchi & Fein, 1999) criticise that researchers often only measure a certain behavioural

outcome while assuming the process that results in that outcome. DiMaggio and Powell themselves (1983) emphasised that their typology is analytic and that the types of isomorphism are not always empirically distinct. Similar to earlier research on conventional management approaches and corporate sustainability in general, this paper concentrated on outcomes, in our case the application of sustainability management tools, and did not analyse the processes which led to the application of tools. To avoid the pitfall of misinterpreting our variables as indicating the existence of a certain mechanism of isomorphism, we discussed a *potential* matching between the variables analysed and the types of isomorphism, but we do not claim to have proof for the existence of a certain type. Instead, referring to Mizruchi and Fein (1999), we consider our variables as general institutional forces. Although it is not possible to make reliable statements on the influence of one of the three specific mechanisms of isomorphism, indication of the general phenomenon of isomorphism on the application of sustainability management tools could clearly be found.

Acknowledgements

We would like to thank the reviewers as well as the participants of the ‘Sustainable and Responsible Business’ Track at the British Academy of Management conference 2012 in Cardiff for their valuable feedback on an earlier version of this paper. Many thanks also go to Jacob Hörisch for serving as a sparring partner while writing this paper.

References

- Abrahamson, E. (1991). Managerial fads and fashions: The diffusion and rejection of innovations. *The Academy of Management Review*, *16*, 586–612.
- Abrahamson, E. (1996). Management fashion. *The Academy of Management Review*, *21*, 254–285.
- Ackermann, F., & Eden, C. (2011). Strategic management of stakeholders: Theory and practice. *Long Range Planning*, *44*, 179–196.
- Aguilera, R. V., Williams, C. A., Conley, J. M., & Rupp, D. E. (2006). Corporate governance and social responsibility. A comparative analysis of the UK and the US. *Corporate Governance: An International Review*, *14*(3), 147–158.
- Banerjee, S. B. (2001). Managerial perceptions of corporate environmentalism: Interpretations from industry and implications for organizations. *Journal of Management Studies*, *38*, 489–513.
- Bansal, P. (2002). The corporate challenges of sustainable development. *The Academy of Management Executive*, *16*(2), 122–131.
- Bansal, P. (2005). Evolving sustainably. A longitudinal study of corporate sustainable development. *Strategic Management Journal*, *26*(3), 197–218.
- Bartkus, B. R., Glassman M., & McAfee, R. B. (2002). Do large European, US and Japanese firms use their web sites to communicate their mission? *European Management Journal*, *20*(4), 423–429.
- Biebeler, H., Mahammadzadeh, M., & Selke, J.-W. (2005). Corporate instruments for sustainable management: characteristics and thematic priorities. *International Journal of Environment and Sustainable Development*, *4*, 425–434.
- Boiral, O. (2002). Tacit knowledge and environmental management. *Long Range Planning*, *35*, 291–317.
- Boiral, O. (2006). Global warming: Should companies adopt a proactive strategy? *Long Range Planning*, *39*, 315–330.
- Boiral, O. (2011). Managing with ISO systems: Lessons from practice. *Long Range Planning*, *44*(3), 197–220.
- Brammer, S. J., & Millington, A. (2004). The development of corporate charitable contributions in the UK: A stakeholder analysis. *Journal of Management Studies*, *41*, 1411–1434.
- Brammer, S. J., Pavelin, S., & Porter, L. A. (2009). Corporate charitable giving, multinational companies and countries of concern. *Journal of Management Studies*, *46*, 575–596.

- Campbell, J. (2007). Why would corporations behave in socially responsible ways? An institutional theory of corporate social responsibility. *Academy of Management Review*, 32, 946–967.
- Chatterji, A. K., & Toffel, M. W. (2010). How firms respond to being rated. *Strategic Management Journal*, 31, 917–945.
- Christmann, P., & Taylor, G. (2006). Firm self-regulation through international certifiable standards: Determinants of symbolic versus substantive implementation. *Journal of International Business Studies*, 37, 863–878.
- CSR Europe (2012a). <<http://www.csreurope.org>> Accessed 11.07.13.
- CSR Europe (2012b). *FAQ*. <<http://www.csreurope.org/faq>> Accessed 11.07.13.
- CSR Europe (2012c). *About us*. <<http://www.csreurope.org/about-us>> Accessed 11.07.13.
- Darnall, N., Henriques, I., & Sadorsky, P. (2010). Adopting proactive environmental strategy: The influence of stakeholders and firm size. *Journal of Management Studies*, 47(6), 1072–1094.
- Delmas, M., & Doctore-Blass, V. (2010). Measuring corporate environmental performance: The trade-offs of sustainability ratings. *Business Strategy and the Environment*, 19(4), 245–260.
- DiMaggio, P. J., & Powell, W. W. (1983). The iron cage revisited. Institutional isomorphism and collective rationality in organisational fields. *American Sociological Review*, 48, 147–160.
- Dixon, R., Mousa, G. A., & Woodhead, A. (2005). Environmental initiatives in encouraging companies to engage in environmental reporting. *European Management Journal*, 23(6), 702–716.
- Dunphy, D., Griffiths, A., & Benn, S. (2007). *Organizational change for corporate sustainability* (2nd ed.). London: Routledge.
- Econsense (2012a). <<http://www.econsense.de/en>> Accessed 11.07.13.
- Econsense (2012b). *Positions and Objectives*. <<http://www.econsense.de/en/about-econsense/positions-and-objectives>> Accessed 11.07.13.
- Epstein, M. (2008). *Making sustainability work. Best practices in managing and measuring corporate social, environmental and economic impacts*. Sheffield: Greenleaf.
- Esrock, S. L., & Leichty, G. B. (1998). Social responsibility and corporate web pages: Self-presentation or agenda-setting? *Public Relations Review*, 24, 305–319.
- European Commission (2004). *ABC of the main instruments of corporate social responsibility*. Brussels: European Commission.

- European Union (2011). *A renewed EU strategy 2011-14 for corporate social responsibility*.
<<http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2011:0681:FIN:EN:PDF>>
Accessed 11.07.13.
- Gond, J.-P., Grubnic, S., Herzig, C., & Moon, J. (2012). Configuring management control systems: Theorising the integration of strategy and sustainability. *Management Accounting Research*, 23(3), 205–223.
- Graafland, J., van de Ven, B., & Stoffele, N. (2003). Strategies and instruments for organising CSR by small and large businesses in the Netherlands. *Journal of Business Ethics*, 47(1), 45–60.
- Hahn, T., & Scheermesser, M. (2006). Approaches to corporate sustainability among German companies. *Corporate Social Responsibility and Environmental Management*, 13, 150–165.
- Haug, H. M., & Talwar, A. (2010). How do corporations embed sustainability across the organization? *Academy of Management Learning & Education*, 9(3), 384–396.
- Herzig, C., & Godemann, J. (2010). Internet-supported sustainability reporting: Developments in Germany. *Management Research Review*, 33, 1064–1082.
- Hoffman, A. J. (2001). Linking organizational and field-level analyses. The diffusion of corporate environmental practice. *Organization & Environment*, 14(2), 133–156.
- Holt, D. (2010). Where are they now? Tracking the longitudinal evolution of environmental businesses from the 1990s. *Business Strategy and the Environment*, 20, 238–250.
- Husted, B. W., & Allen, D. B. (2007). Strategic corporate social responsibility and value creation among large firms. Lessons from the Spanish Experience. *Long Range Planning*, 40, 594–610.
- Jennings, P. D., & Zandbergen, P. A. (1995). Ecologically sustainable organizations: An institutional approach. *The Academy of Management Review*, 20(4), 1015–1052.
- Kolk, A. (2004). A decade of sustainability reporting: Developments and significance. *International Journal of Environment and Sustainable Development*, 3, 51–64.
- Kolk, A. (2010). Trajectories of sustainability reporting by MNCs. *Journal of World Business*, 45, 367–374.
- Lamberti, L., & Lettieri, E. (2011). Gaining legitimacy in converging industries: Evidence from the emerging market of functional food. *European Management Journal*, 29, 462–475.

- Lee, K., & Pennings, J. M. (2002). Mimicry and the market: Adoption of a new organizational form. *The Academy of Management Journal*, 45, 144–162.
- Lee, S. Y., & Rhee, S.-K. (2007). The change in corporate environmental strategies: A longitudinal empirical study. *Management Decision*, 45, 196–216.
- Lockett, A., Moon, J., & Visser, W. (2006). Corporate social responsibility in management research: Focus, nature, salience and sources of influence. *Journal of Management Studies*, 43, 115–136.
- Marsden, C. (2000). The new corporate citizenship of big business: Part of the solution to sustainability? *Business and Society Review*, 105, 8–25.
- Matten, D., & Moon, J., (2004). Corporate social responsibility education in Europe. *Journal of Business Ethics*, 54(4), 323–337.
- McWilliams, A., Siegel, D. S., & Wright, P. M. (2006). Corporate social responsibility: Strategic implications. *Journal of Management Studies*, 43, 1–18.
- Mizruchi, M. S., & Fein, L. C. (1999). The social construction of organizational knowledge: A study of the uses of coercive, mimetic, and normative isomorphism. *Administrative Science Quarterly*, 44, 653– 683.
- Morrow, D., & Rondinelli, D. (2002). Adopting corporate environmental management systems: Motivations and results of ISO 14001 and EMAS certification. *European Management Journal*, 20(2), 159–171.
- Moskowitz, M. (1997). Social investing. *The Journal of Investing* 6(4), 9–11.
- Muller, A., & Kolk, A. (2010). Extrinsic and intrinsic drivers of corporate social performance: Evidence from foreign and domestic firms in Mexico. *Journal of Management Studies*, 47, 1–26.
- Nicolai, A. T., Schulz, A.-C., & Thomas, T. W. (2010). What Wall Street wants – Exploring the role of security analysts in the evolution and spread of management concepts. *Journal of Management Studies*, 47, 163–189.
- Oekom research (2012). *Oekom corporate rating Bayerische Motoren Werke AG*. http://www.oekom-research.com/homepage/oekom_Corporate_Rating_BMW-20120525.pdf> Accessed 11.07.13.
- Oskarsson, K., & von Malmborg, F. (2005). Integrated management systems as a corporate response to sustainable development. *Corporate Social Responsibility and Environmental Management*, 12, 121–128.
- Perrini, F. (2005). Building a European portrait of corporate social responsibility reporting. *European Management Journal*, 23(6), 611–627.

- Ramus, C. A., & Montiel, I. (2005). When are corporate environmental policies a form of greenwashing? *Business Society*, 44(4), 377–414.
- Ricart, J. E., Rodríguez, M. Á., Sánchez, P. (2005). Sustainability in the boardroom. An empirical examination of Dow Jones Sustainability World Index leaders. *Corporate Governance*, 5(3), 24–41.
- Rogers, E. M. (2003). *Diffusion of innovations* (5th ed.). New York: The Free Press.
- SAM (2012). *SAM Research Corporate Sustainability Assessment Questionnaire*. <http://www.sustainability-index.com/images/sample-questionnaire_tcm1071-337498.pdf> Accessed 11.07.13.
- Schaefer, A. (2007). Contrasting institutional and performance accounts of environmental management systems: Three case studies in the UK water & sewerage Industry. *Journal of Management Studies*, 44, 507–535.
- Schäfer, H., Beer, J., Zenker, J., & Fernandes, P. (2006). *Who is who in Corporate Social Responsibility Rating? A survey of internationally established rating systems that measure corporate responsibility*. Gütersloh/Stuttgart: Bertelsmann Foundation/University Stuttgart.
- Schaltegger, S., Herzig, C., Kleiber, O., & Mueller, J. (2002). *Sustainability management in business enterprises. Concepts and instruments for sustainable organisation development*. Berlin/Lüneburg: The Federal Ministry for the Environment, Nature Conservation and Nuclear Safety and Federation of German Industries/Centre for Sustainability Management.
- Schaltegger, S., Lüdeke-Freund, F., & Hansen, E. G. (2012). Business cases for sustainability: The role of business model innovation for corporate sustainability. *International Journal of Innovation and Sustainable Development*, 6(2), 95–119.
- Scherer, A. G., & Palazzo, G. (2011). The new political role of business in a globalized world: A review of a new perspective on CSR and its implications for the firm, governance, and democracy. *Journal of Management Studies*, 48, 899–931.
- Schmidt, I., Meurer, M., Saling, P., Kicherer, A., Reuter, W., & Gensch, C.-O. (2004). SEEbalance. Managing sustainability of products and processes with the socio-economic-efficiency-analysis by BASF. *Greener Management International*, 45, 79–94.
- Sherman, P., & Hansen, J., (2010). The new corporate social responsibility: A call for sustainability in business education. *International Journal of Environment and Sustainable Development*, 9(1–3), 241–254.

- Shrivastava, P. (1995). The role of corporations in achieving ecological sustainability. *The Academy of Management Review*, 20, 936–960.
- Shrivastava, P., & Hart, S. (1995). Creating sustainable corporations. *Business Strategy and the Environment*, 4, 154–165.
- Steger, U. (2000). Environmental management systems: Empirical evidence and further perspectives. *European Management Journal*, 18(1), 23–37.
- Stienstra, M., Baaij, M., van den Bosch, F., & Volberda, H. (2004). Strategic renewal of Europe's largest telecom operators (1992–2001): From herd behaviour towards strategic choice? *European Management Journal*, 22(3), 273–280.
- Süß, S., & Kleiner, M. (2008). Dissemination of diversity management in Germany: A new institutionalist approach. *European Management Journal*, 26, 35–47.
- Székely, F., & Knirsch, M. (2005). Responsible leadership and corporate social responsibility: Metrics for sustainable performance. *European Management Journal*, 23(6), 628–647.
- Tencati, A., Perrini, F., & Pogutz, S. (2004). New tools to foster corporate socially responsible behavior. *Journal of Business Ethics*, 53, 173–190.
- Tushman, M. L., & Anderson, P. (1986). Technological discontinuities and organizational environments. *Administrative Science Quarterly*, 31(3), 439–465.
- UNGC (United Nations Global Compact) (2012a). <<http://www.unglobalcompact.org>> Accessed 11.07.13.
- UNGC (United Nations Global Compact) (2012b). *How to participate*. <http://www.unglobalcompact.org/HowToParticipate/Business_Participation/index.html> Accessed 11.07.13.
- Waddock, S. A., Bodwell, C., & Graves, S. B. (2002). Responsibility: The new business imperative. *The Academy of Management Executive*, 16(2), 132–148.
- WBCSD (World Business Council for Sustainable Development) (2002). The business case for sustainable development: Making a difference towards the Earth Summit 2002 and beyond. *Corporate Environmental Strategy*, 9, 226–235.
- WBCSD (World Business Council for Sustainable Development) (2012a). *History*. <<http://www.wbcsd.org/about/history.aspx>> Accessed 24.07.13.
- WBCSD (World Business Council for Sustainable Development) (2012b). *Publications and tools*. <<http://www.wbcsd.org/publications-and-tools.aspx>> Accessed 11.07.13.
- Welt online (2009). *Die 500 größten Unternehmen in Deutschland*. <<http://top500.welt.de>> Accessed 11.07.13.

Appendix

Overview of sustainability management tools listed in the questionnaire (alphabetical order)

Tool	Tool (continued)
(Eco/Social) ABC analysis	Material and energy flow accounting
(Eco/Social) checklist	Material flow analysis
Community advisory panel	Material flow cost accounting
Continuous education	Opportunity risk dialogue
Corporate citizenship	Product carbon footprint
Corporate giving	Product line analysis
Corporate/Employee volunteering	Proposal system
Cross impact analysis	Quality circle
Early detection	Quality management system
Eco audit	Risk analysis
Eco benchmarking	Scenario analysis
Eco budgeting	Social accounting
Eco circle	Social audit
Eco compass	Social benchmarking
Eco control	Social cost accounting
Eco design/Design for environment	Social indicators
Eco indicators	Social management system
Eco label	Social marketing
Eco sponsoring	Social mission statement
Eco-efficiency analysis	Social report
Eco-efficiency indicators	Social/Cultural sponsoring
Environmental accounting	Socio-eco-efficiency analysis
Environmental cost accounting	Socio-efficiency indicators
Environmental declaration	Stakeholder dialogue
Environmental info system	Stakeholder value indicators
Environmental investment appraisal	Sustainability accounting
Environmental management system	Sustainability audit
Environmental mission statement	Sustainability balanced scorecard
Environmental report	Sustainability benchmarking
Environmental shareholder value	Sustainability control
Fair trade label	Sustainability indicators
Flexible working model	Sustainability label
Green purchasing	Sustainability management system
Green supply chain management	Sustainability marketing
Green/Eco marketing	Sustainability mission statement
Human resource control	Sustainability report
Human resource report	Sustainability sponsoring
Incentive system	Sustainable design
Internal emissions trading	Sustainable supply chain management
Life Cycle Assessment	

III. Paper 3

Windolph, S. E. (2011): Assessing Corporate Sustainability Through Ratings: Challenges and Their Causes, *Journal of Environmental Sustainability*, Vol. 1, No. 1, 61–80.

Assessing Corporate Sustainability Through Ratings: Challenges and Their Causes

Sarah Elena Windolph
Leuphana University Lüneburg
windolph@uni.leuphana.de

ABSTRACT: Assessing corporate sustainability is increasingly practice-relevant, not least because the capital market and other markets have been paying growing attention to the topic. Recently, ratings have become an important assessment approach and nowadays a variety of organizations and financial service providers conduct their own ratings. Yet, despite their growing popularity, ratings are criticized in research and practice. Thus, the purpose of this paper is to systematize the challenges that corporate sustainability ratings face: lack of standardization, lack of credibility of information, bias, tradeoffs, lack of transparency, and lack of independence. Furthermore, the paper discusses the causes of these challenges and suggests possible ways to improve the reliability of ratings.

KEYWORDS

Corporate Sustainability Assessment, Corporate Sustainability Measurement, Ratings, Socially Responsible Investment (SRI)

I. INTRODUCTION

Sustainability is a topic of growing significance for companies just like the contribution of companies is becoming essential for sustainable development (Dunphy, Griffiths, and Benn; Dyllick and Hockerts; Epstein; Schaltegger and Burritt). Corporate sustainability (CS) is understood here as an approach to systematically consider environmental and social issues and to integrate them into the economic management of a company (Dunphy, Griffiths, and Benn; Shrivastava and Hart). Increasingly, the demand for CS is not only driven by societal or political expectations, i.e. push factors, but also by the potential for internal organizational

improvements (e. g., cost reduction), as well as the demand of consumers and investors, i.e. pull factors (Dyllick, Belz, and Schneidewind; Meffert and Kirchgeorg; Schaltegger and Wagner). Examples of this latter market pull are the rising demand for organic food (Wier and Calverley) and the growing significance of socially responsible investment (SRI) (Beloe, Scherer, and Knoepfel; Moskowitz; Sparkes and Cowton).

This increasing market demand entails the need for CS assessment and evaluation. But, since the corresponding information on individual companies is rarely publicly available, there is a substantial risk that sustainability-oriented companies are not recognized. Additionally, as sustainability commitments are hard to verify, less responsible companies may make use of this by *greenwashing*, that means intentionally providing incomplete or even false information (Darbi and Karny; Laufer; Ramus and Montiel). If consumers

and investors are willing to make their purchase and investment decisions based on CS but only have information which is incomplete or which they do not trust, sustainability-oriented companies may in the worst case be crowded out of the market, although they actually offer what customers are looking for. This phenomenon is known as *market for lemons* (Akerlof): responsible companies cannot be identified; therefore consumers and investors are not willing to pay for their products or to invest in those companies. Consequently, those companies do not survive in the market. In order to prevent such a *market for lemons*, reliable information intermediaries with more resources to gather information and carry out an external CS assessment become important, for example consumer associations, non-governmental organizations (NGOs), and journalists (Chatterji and Toffel; Healy and Palepu; Lee and Cho; Rischkowsky and Döring).

Recently, *ratings* have become especially important for CS assessment (Chatterji and Toffel; Schäfer, Beer, Zenker, and Fernandes), not least because of the increasing interest of the capital market where ratings are an established tool to estimate the credit worthiness of, for example, companies (econsense; Finch; Healy and Palepu; Schäfer, Beer, Zenker, and Fernandes). Assessing and benchmarking CS through ratings among other things serves to improve accountability and enables cross-company comparison (Graafland, Eijffinger, and Smid). However, despite (or perhaps because of) their increasing relevance, CS ratings are subject to a lot of criticism, especially regarding their *transparency* (e. g., Delmas and Doctori-Blass; Dillenburg, Greene, and Erikson; Fowler and Hope; Sadowski, Whitaker, and Buckingham, *Rate the Raters. Phase One*), their *independence* (e. g., Beloe, Scherer, and Knoepfel; Epstein; Graafland, Eijffinger, and Smid), and their *variety* (e. g., Chatterji and Levine; Chatterji, Levine, and Toffel; Schäfer, Beer, Zenker, and Fernandes).

The fact that ratings try to fulfill a challenging task is revealed by the lack of standardization and best practice methods. Important reasons for this are the missing definition and the subsequent diverse perception of CS (Linnenluecke, Russell, and Griffiths; Schaltegger and Burritt; Seelos; van Marrewijk). This room for interpretation has not only led to a range of CS practices (e. g., philanthropic sponsoring activities or core business relevant sustainability management), but also to heterogeneity of assessment approaches – not only of ratings and SRI research but of CS assessment approaches in general (Delmas and Doctori-Blass; Schäfer, Beer, Zenker, and Fernandes). Table 1 offers an overview of CS assessments and lists examples.

The variety of assessment approaches that consumers, investors, and further stakeholders are increasingly confronted with poses a problem in its own right. This not only holds true for the assessment of companies but also for products. The organic food sector, for instance, has generated a “confusing multitude” of certificates and labels (Wier and Calverley 54). Therefore, it is difficult for consumers to decide which labels to trust and how to compare competing labels (Jahn, Schramm, and Spiller; Wier and Calverley). Accordingly, stakeholders are still unable to judge whether products and companies are really oriented towards sustainability, and thus, depend on the assessment of intermediaries (Rischkowsky and Döring). Against this background, the research question of this paper is what challenges CS ratings face and what their causes are. The paper is structured as follows. Firstly, after a short introduction to the relevance of ratings, it displays and systematizes the challenges for CS ratings based on a literature review. Several ratings are included for illustration purposes. Secondly, the paper determines the causes of these challenges by reviewing more general literature on CS and CS assessment. Thereupon, the paper identifies ways to improve the reliability of CS ratings.

CS assessment approach	Examples
SRI research ('in-house')	Sarasin's Corporate Sustainability Rating (Bank Sarasin & Co Ltd.) ZKB Sustainability Research (ZKB)
Ratings	MSCI (formerly KLD) Environmental, Social and Governance (ESG) Ratings (MSCI Inc.) oekom's Corporate Responsibility Rating (oekom research, <i>oekom Corporate Rating</i>)
Indices	Dow Jones Sustainability Indexes (DJSI) (SAM's Corporate Sustainability Assessment and Dow Jones Indexes; SAM; SAM Indexes GmbH; SAM and PwC) FTSE4Good (EIRIS' sustainability research and Financial Times Stock Exchange Group, EIRIS) Ethibel Sustainability Indices (ESI) (Vigeo's sustainability research and Standard and Poor's, Vigeo and Forum Ethibel)
Rankings	Good Company Ranking (Balzer et al.) Global 100 Most Sustainable Companies in the World (Corporate Knights Inc.)
Awards	German Sustainability Award (Stiftung Deutscher Nachhaltigkeitspreis e.V.)
Assessments by NGOs, consultants, and research organizations	Guide to Greener Electronics (Greenpeace) Carbon Disclosure Project (Carbon Disclosure Project)
Assessments by NGOs, consultants, and research	Guide to Greener Electronics (Greenpeace) Carbon Disclosure Project (Carbon Disclosure Project)

Table 1: Prevalent approaches to externally assess CS.

II. BACKGROUND: RELEVANCE OF RATINGS IN THEORY AND PRACTICE

This section elaborates on the relevance of external CS assessment from a theoretical perspective, and then highlights the practical importance of ratings in particular.

II.I. RELEVANCE OF RATINGS FROM A THEORETICAL PERSPECTIVE

An important difficulty when assessing CS externally lies in *information asymmetries* (Lyon and Maxwell; Rischkowsky and Döring). Consumers, investors, and other stakeholders are not able to verify the sustainability claims made by companies, because they do not have access to the relevant information

(Ramus and Montiel). This not only affects products (Jahn, Schramm, and Spiller) but also processes inside companies and along supply chains (Chatterji and Levine; Epstein). Reliable third party institutions with resources to gather the needed information become important players (Healy and Palepu; Lee and Cho; Rischkowsky and Döring). Ratings or rating organizations are one example of such information intermediaries.

Another important aspect is that CS is socially desired (de Boer; Epstein). Ongoing discussions in the media as well as the increasing meaning of sustainability-oriented products, for example in the financial market, illustrate that society and markets are increasingly concerned with the topic (Hansen, Große-Dunker, and Reichwald; Meffert and Kirchgeorg; Sparkes and Cowton; Wier and Calverley). This fact may not only motivate companies to get involved with sustainability issues and to communicate about them, but also to exclusively communicate positive and leave out negative information. In an extreme case, companies may even perceive an incentive to pass on false information in order to improve their reputation or market share (Darby and Karni; Laufer, Rischkowsky and Döring). The risk of such opportunistic behavior, known as *greenwashing*, is increased by the lack of a definition of CS and the large scope of different interpretations (van Marrewijk).

The outcome of such a situation may be a “market for (organic) lemons”: stakeholders cannot identify sustainability-oriented companies (hidden characteristics) because of a lack of information or of trust in the offered information. This leads to a diminished willingness to pay for the companies’ products or a lower readiness to invest. Ultimately, sustainability-oriented companies may be crowded out of the market (adverse selection) (Akerlof; Rischkowsky and Döring). This market failure probably causes negative effects on the environment and society when sustainability-oriented companies

are replaced by exclusively economically-oriented ones. Accordingly, the contribution of companies to sustainable development of the economy and society will diminish even more.

Both Economics of Information (e. g., Shapiro; Stigler; Stiglitz) as well as the principal-agent theory (Jensen and Meckling) (and related approaches like the stakeholder-agency theory, see Hill and Jones) deal with ways to overcome asymmetric information or adverse selection in markets. They offer two basic approaches to this problem. The first approach is *signaling* (Spence). Signaling in this context means that companies emit credible signals indicating their sustainability orientation. Examples are the publication of sustainability reports offering stakeholders information on sustainability efforts, and the establishment and use of brands or labels transporting and substantiating sustainability related messages about products or companies (de Boer; Finch; Kolk). However, these signals only fulfill their function if the addressees perceive them as reliable (Müller; Rischkowsky and Döring). Yet, reliability is not always given due to the “climate of general distrust towards social organizations” (Renn and Levine 212) and the risk of opportunistic behavior. Therefore, signaling may be insufficient in the context of CS.

An alternative approach to overcome information asymmetries is *screening*, which here means that consumers, investors, or other stakeholders actively search for and evaluate information on the sustainability performance of companies (Rischkowsky and Döring; see also Stiglitz). Compared to earlier times, the Internet allows for much more transparency and information access today (Rezabakhsh, Bornemann, Hansen, and Schrader; Seelos). Yet, consumers and investors cannot access all relevant data as a matter of resource constraints (time and data access). Hence, information intermediaries come into play (Healy and Palepu; Lee and Cho; Rischkowsky and Döring).

Ratings are an important example of this kind of external assessment, although screening for CS is complicated by the diverse perception of the concept. Yet, although several challenges have to be met in order to reliably assess CS by screening, it still appears more promising than signaling which makes opportunistic behavior easier (Graafland, Eijffinger, and Smid). Furthermore, screening simplifies the comparison of companies which could be relevant to consumers and investors. Therefore, this paper focuses on ratings as a practice-relevant application of screening.

Nonetheless, when differentiating between signaling and screening it has to be kept in mind that one approach cannot be seen separate from the other. On the one hand, the assessment made through screening can be used to substantiate companies' signaling approaches, which might be perceived as more reliable than information without external verification (Rischkowsky and Döring). Audits, labels, and certificates also follow this procedure. On the other hand, in order to carry out their assessment, ratings at least partially depend on the disclosure of information by companies, and thus, on suitable internal metrics (Chatterji and Levine). For these reasons, CS signaling and screening are interdependent. Intermediaries carry out the screening process for stakeholders and substantiate companies' signals.

II.II. PRACTICAL RELEVANCE OF CS RATINGS

CS ratings have become increasingly practice-relevant (Chatterji and Toffel; Schäfer, Beer, Zenker, and Fernandes). Whereas conventional, finance-related ratings are used to estimate the credit worthiness of companies (Healy and Palepu), CS ratings serve to systematically and regularly analyze the environmental, social, and economic performance of companies, and, furthermore, allow the comparison of companies (Chatterji, Levine, and Toffel; Finch; Graafland,

Eijffinger, and Smid; Schäfer, Beer, Zenker, and Fernandes). Sustainability ratings are carried out by a variety of organizations, for example specialist rating agencies, analyst departments in banks, operators of (securities) indices, classic credit rating agencies, and few NGOs (Delmas and Doctori-Blass; Finch; Schäfer, Beer, Zenker, and Fernandes) (see Table 1). Most CS ratings have been launched within the last ten to fifteen years, mainly because institutional investors are increasingly interested in sustainability-related or socially responsible investments (Moskowitz; SAM and PwC; Schäfer, Beer, Zenker, and Fernandes). Today, an independent market for the services of CS intermediaries has developed, and it is expected to grow due to the rising social awareness of environmental and social issues and related market demands. For example, the number of assessed companies for *Sustainable Asset Management's (SAM) Corporate Sustainability Assessment* increased from 468 in 1999 to 1,237 in 2009 (SAM and PwC).

Among the variety of CS assessment approaches ratings play a special role, since they not only constitute an assessment approach themselves but also form the basis for further benchmarking approaches like rankings and indices (for more details on ratings see Schäfer, Beer, Zenker, and Fernandes; for the methodologies of major sustainability indices see Fowler and Hope). Therefore, the procedures that ratings apply have consequences for subsequent approaches.

Despite the visible efforts to assess CS, related approaches and particularly ratings are criticized in both research and practice (Beloe, Scherer, and Knoepfel; Chatterji and Levine; Chatterji, Levine, and Toffel; Delmas and Doctori-Blass; Dillenburger, Greene, and Erikson; Fowler and Hope, Graafland, Eijffinger, and Smid; Hansen; Sadowski, Whitaker, and Buckingham, *Rate the Raters. Phase One*; Schäfer, Beer, Zenker, and Fernandes). Hence,

Beloe, Scherer, and Knoepfel (29) conclude that many research organizations “will have to fundamentally review many aspects of their research methodology and approach,” and Sadowski, Whitaker, Lee, and Ayars (5) conclude that “the market will settle on a few “winners”.” The challenges that come along with CS ratings will be discussed in the following. Several practice-relevant ratings are drawn upon for illustration purposes.

III. CHALLENGES FOR CS RATINGS AND THEIR CAUSES

CS ratings are dealt with in research and practice. Although a certain amount of literature deals with the challenges for CS ratings, they have not been systematized so far. In section 3.1 six important aspects will be identified and elaborated: lack of standardization, lack of credibility of information, bias, tradeoffs, lack of transparency, and lack of independence. The synthesis builds

on a review of academic literature as well as practice-relevant publications on ratings, indices, and related assessments of CS and identifies those aspects that are discussed in several publications. Table 2 offers an overview of the challenges and their meaning. Building on this, section 3.2 identifies the causes of the challenges and discusses them on the basis of more general CS literature.

III.I. CHALLENGES FOR CS RATINGS

III.I.I. LACK OF STANDARDIZATION

Although CS ratings have spread, little standardization has been achieved. This is the result of the varying interests and perceptions that raters and stakeholders have in terms of CS. Beyond that, even those ratings that actually do address the same issues and interests apply varying measures and use

Rating challenges	Meaning
Lack of standardization	Diversity of approaches and results, no evaluation of approaches, no comparability (Beloe, Scherer, and Knoepfel; Chatterji, Levine, and Toffel; Graafland, Eijffinger, and Smid)
Lack of transparency	Rarely full disclosure of methodology, criteria, threshold values, etc. (Chatterji, Levine, and Toffel; Delmas and Doctore-Blass; Dillenburg, Greene, and Erikson; Fowler and Hope)
Bias	Emphasis on economic, environmental, or social dimension; focus on investors' needs; focus on larger companies (Beloe, Scherer, and Knoepfel; Chatterji and Toffel; Fowler and Hope)
Tradeoffs	Aim at single score, possible compensation of unsatisfactory partial results (Delmas and Doctore-Blass; Graafland, Eijffinger, and Smid)
Lack of credibility of information	Companies can influence rating results, missing information verification (Beloe, Scherer, and Knoepfel; Fowler and Hope; Healy and Palepu)
Lack of independence	Relation between rating organizations and companies (AI CSRR; Beloe, Scherer, and Knoepfel; Healy and Palepu)

Table 2: Challenges for ratings assessing CS.

their own methodology (Sadowski, Whitaker, Lee, and Ayars). The competing approaches have rarely been evaluated in academic research so far, although this is regarded as crucial for the construction of ratings (Chatterji, Levine, and Toffel; Sharfman) and indices (Fowler and Hope). Exceptions are for example works by Chatterji and Levine; Chatterji, Levine, and Toffel; Chatterji and Toffel; Knoepfel; and Sharfman.

Furthermore, whereas the assessed companies may aim at standardization where possible (econsense), this is not desirable from the stakeholders' point of view because of their different perception of and interest in CS (Beloe, Scherer, and Knoepfel; Dillenburg, Greene, and Erekson; Graafland, Eijffinger, and Smid). Hence, standardization of ratings and the establishment of best practices are unlikely for the time being.

Another cause for the lack of rating standardization is company-internal CS accounting and reporting (Schaltegger). Ratings use publicly available information as well as data disclosed by companies. Yet, the ways that companies gather and communicate information are typically very different. Especially the measurement of social issues as well as the evaluation of the influence of CS on companies' success is difficult and not organized systematically. Therefore, the data that ratings build upon is not necessarily comparable and quality might differ. This fact can distort the rating result.

III.II. LACK OF CREDIBILITY OF INFORMATION

In order to assess CS, ratings depend on suitable information. As already discussed earlier, there is a significant lack of data availability. Thus, besides publicly available data (like company or media reports), raters at least partially depend on self-disclosure of companies. A lot of companies acknowledge the signaling function of ratings

and take part in surveys (Dillenburg, Greene, and Erekson; Fowler and Hope; Schäfer, Beer, Zenker, and Fernandes), for example through investor relations departments which communicate with analysts and investors (Healy and Palepu). For instance, inclusion in the *DJSI* requires companies to “fill in a detailed questionnaire covering a wide range of weighted economic, environmental, and social factors” (Fowler and Hope).

Yet, the credibility of company information may be questioned, “[b]ecause managers have incentives to make self-serving voluntary disclosures” that will not negatively affect their competitive position (Healy and Palepu 425; see also Laufer). That is one reason why many rating organizations use additional publicly available information to verify data (Beloe, Scherer, and Knoepfel). For example, *EIRIS* refers to the information of “government and regulatory agencies, industry organizations, trade publications, campaigning bodies, academic and specialists' reports, and the output of other research bodies” (Schäfer, Beer, Zenker, and Fernandes 72). However, this information does not necessarily have to be credible either. The verification of information remains a “significant challenge” for research organizations (Beloe, Scherer, and Knoepfel 29; see also Laufer; Ramus and Montiel).

Additionally, Beloe, Scherer, and Knoepfel (29) observe that companies are still “by far the most important source of information” for research organizations. *SAM* states that their company questionnaire is “the most important source of information for the assessment” leading to the *Dow Jones Sustainability Index (DJSI)* (SAM Indexes GmbH). *EIRIS* declares that their survey serves to provide “the most recent and accurate information available.” During the *oekom* rating procedure “considerable importance” is attached to the cooperation with companies (*oekom* research, *oekom Corporate Rating*). Despite the inclusion of additional information and the fact that many rating organizations today fill in large parts of the

questionnaires based on public data themselves (Beloe, Scherer, and Knoepfel), these examples demonstrate that companies are to some extent still able to influence rating results.

Another important argument for the increased inclusion of publicly available data is 'questionnaire fatigue' resulting from the intensive surveying of companies (Beloe, Scherer, and Knoepfel; Chatterji and Levine; econsense). Companies have to spend considerable resources to take part in surveys and to interact with research organizations (Fowler and Hope, Chatterji and Levine). Besides the increasing unwillingness to participate in surveys, another possible negative side-effect can be that inexperienced employees like interns accomplish the rating survey process. This questions the credibility of information even more (Hansen).

III.I.III. BIAS

Another challenging aspect for CS ratings are biases. Schäfer, Beer, Zenker, and Fernandes state that many CS ratings are biased, meaning that they put special emphasis either on the environmental, social, or economic dimension. However, overemphasizing either one of the three dimensions is inconsistent with the *integrative character* of CS. According to that, companies are required to simultaneously take account of and harmonize the environmental, social, and economic dimension (Schaltegger and Burritt). The particular *economic* bias is especially strong in conventional ratings that use only selective CS measures as add-on. However, the same bias exists in well-established assessment approaches like the *DJSI*, and thus, *SAM's* rating (Fowler and Hope). Fowler and Hope find that *SAM* does not consider the three dimensions of sustainability in a balanced way. *SAM's* assessment aims at identifying industry-specific *best in class* companies and focuses on those that are "most likely to turn sustainability into shareholder value" (Schäfer, Beer, Zenker,

and Fernandes 101). Accordingly, social and environmental criteria weigh less than economic ones (Fowler and Hope). This also applies to *KLD Research and Analytics, Inc.* (now part of *MSCI Inc.*) whose declared objective is to serve investors (Chatterji and Toffel). Dillenburg, Greene, and Erikson (169) describe the consideration of social criteria in the assessment of large investment firms as "just a collateral service." This undifferentiated approach is criticized by many authors who highlight that ratings should be suitable for various stakeholders with different interests (Beloe, Scherer, and Knoepfel; Dillenburg, Greene, and Erikson; Graafland, Eijffinger, and Smid).

In contrast, special interest ratings may put more emphasis on ethical (or normative) and/or environmental issues while neglecting other dimensions. One example is the sustainability analysis of the *Calvert Social Index*, in which social and ethical aspects are analyzed in more detail than environmental aspects (Calvert Group, Ltd.; Schäfer, Beer, Zenker, and Fernandes).

Biases are also relevant for the type of companies to be rated. A lot of ratings, rankings, and indices aim at identifying sustainability leaders, for instance the *DJSI*. However, most ratings focus on larger companies and include neither small and medium enterprises nor companies from emerging countries (Beloe, Scherer, and Knoepfel; Fowler and Hope; Schäfer, Beer, Zenker, and Fernandes). Consequently, sustainability leaders may not be identified by this procedure, since the raters possibly do not even include them in the sample (Fowler and Hope) or they do not take part in the rating (self-selection bias) (Finch). Another difference in the selection process is the usage of an existing index as "underlying universe" versus actively screening for sustainability-oriented companies. For example, the *Dow Jones Indexes (DJI)* serve as parent indices for the *DJSI* (SAM Indexes GmbH) and several *MSCI* indices for the *MSCI ESG Indices* (MSCI Inc.), whereas the *oekom* universe also

contains smaller companies and “significant non-listed bond issuers” (oekom research, *oekom universe*).

III.IV. TRADEOFFS

Closely connected to biases are tradeoffs. Most ratings ultimately aim at producing one single score that is a number or letter as result of the rating process. For example, *oekom*’s rating uses categories between A+ and D- (oekom research, *oekom Corporate Rating*), and *SAM*’s rating works with percentages (SAM and PwC). Expressing the performance of companies in such a simple way makes it easy to understand companies’ positions and to compare them (Graafland, Eijffinger, and Smid). Nonetheless, when creating a single score of the individual measures across the triple bottom line, raters assume that “values can be reduced to one dimension” (Graafland, Eijffinger, and Smid 151) although they are “pluralistic in nature” (Graafland, Eijffinger, and Smid 140). Aiming at one single score means that shortcomings in one dimension may be compensated by a better performance in another (Delmas and Doctori-Blass). Hence, single scores probably result in a distorted picture of the actual sustainability performance of a company because it is hardly taking into account all facets of CS. Companies are required to embed sustainability management in conventional management instead of dealing with it in parallel. This implies that CS has to be linked to the strategy, core business, and day-to-day processes in all organizational units (Stubbs and Cocklin). This integration challenge complicates the assessment of CS, since activities, outcomes, and budgets are the more difficult to identify as sustainability-oriented the better they are integrated. One single score is hardly able to reflect these interdependencies properly.

Furthermore, CS is not a state to be reached (de Ron; Epstein; Schaltegger and Burritt). Instead, the concept occupies the demand for continuous

improvement which shows its *process character*. Hence, an evaluation of CS should be carried out in relative terms and requires the comparison to a benchmark. One single score can only accomplish this by relating to other scores, for example of other companies or earlier ratings of the same company. Graafland, Eijffinger, and Smid even demand not to conduct cross-sector benchmarking but to limit comparisons to one industry. In fact, rating results often consist of an additional comparative score. For example, *SAM* translates sustainability scores into a relative industry measure (SAM and PwC). *Vigeo* and *Forum Ethibel* state in their rulebook on the *Ethibel Sustainability Indices* that they intentionally do not calculate a global company score or compile a ranking based on the results of the individual research fields. Still, especially rankings normally oversimplify CS assessment.

III.IV. LACK OF TRANSPARENCY

When discussing the lack of transparency it has to be pointed out positively that most of the criteria accounted for in ratings are not determined by the raters alone but together with third parties like NGOs or academia. This first step in the direction of “tripartism” (Laufer 259) serves to ensure that ratings are more balanced and accepted and increases transparency and accountability (Fowler and Hope). Nonetheless, the research components leading to rating results are rarely made fully available, sometimes except for key clients (Beloe, Scherer, and Knoepfel). This refers to the way information is collected, the methodology, assumptions, calculations, weightings, threshold values, and the specific criteria of the analysis (Beloe, Scherer, and Knoepfel; Chatterji and Levine; Chatterji, Levine, and Toffel; Delmas and Doctori-Blass; Dillenburg, Greene, and Erikson; Fowler and Hope; Graafland, Eijffinger, and Smid). Of course, this does not apply for all ratings to the same extent, but, generally,

academics as well as companies criticize these “black box” approaches (AI CSRR; Delmas and Doctore-Blass; econsense). For example, the general part of the questionnaire used for *SAM’s Corporate Sustainability Assessment* rating is open to the public, while the sector-specific questions are not (SAM and PwC; Boms). Graafland, Eijffinger, and Smid point to the importance of disclosing methods and assumptions of benchmarks to stakeholders. Dillenburg, Greene, and Erikson (169) criticize the missing transparency of ratings as “troubling.” As long as rating processes are not transparent, their reliability may be questioned just like the reliability of the companies to be examined. This is especially important for solicited ratings where ratings’ customers, for example institutional investors, choose their own criteria and weightings (Finch).

III.I.VI. LACK OF INDEPENDENCE

The relationship between companies and raters established in order to get the necessary information raises the question whether ratings are independent. Research organizations increasingly depend on the personal interaction with companies (Beloe, Scherer, and Knoepfel). This is especially true when the rating process is carried out repeatedly over time, which is usually the case. For example, *oekom* emphasizes the importance of the cooperation with companies during their rating (*oekom* research, *oekom Corporate Rating*) and *SAM* describes to “proactively engage with companies” (SAM and PwC 21).

The close relationship to companies might call for even more criticism in cases where ratings are conducted by financial service providers which already have or intend to establish further business relations with the companies (e. g., consultancy, financial analysis, or mandated risks assessments) (AI CSRR; Beloe, Scherer, and Knoepfel). These aspects might create conflicts of interest. They are

discussed in the European *Corporate Sustainability and Responsibility Research Quality Standard (CSRR-QS)*, a quality standard for CS and SRI research (see www.csrr-qs.org). Another potential conflict brought up by Healy and Palepu is the personal interest of financial analysts in screening outcomes: “analysts are rewarded for providing information that generates trading volume and investment banking fees for their brokerage houses” (Healy & Palepu 417). This may encourage upward biases of rating results.

One more relevant aspect in this context is the distinction between solicited and unsolicited ratings. Solicited ratings are carried out for a particular client and paid for (Finch). This fact also puts into question the independence of the ratings. So far the paper has identified six important challenges that come along with CS ratings. Of course, more challenges can be found in the literature, for example in the “Rate the Raters” publications (Sadowski, Whitaker, and Buckingham, *Rate the Raters Phase One*) or from a philosophical point of view (Graafland, Eijffinger, and Smid). Still, the six challenges described here together form the most prominently discussed aspects. In the following, the paper analyzes the causes of these challenges and suggests ways to tackle them.

III.II. WHAT ARE THE CAUSES OF THE IDENTIFIED CHALLENGES?

The six challenges that CS ratings face have been identified as lack of standardization, lack of credibility of information, bias, tradeoffs, lack of transparency, and lack of independence. In the following, the paper discusses the causes of these challenges based on general literature on CS and CS assessment.

III.II.I. LACK OF RATING STANDARDIZATION AND THE COMPLEXITY OF CS

The lack of rating *standardization* is not only the outcome of the competitive market for ratings but also the result of the *complexity of CS*. Even if there were a commonly accepted definition of the concept, it would still be highly complex. However, research and practice have widely agreed upon the triple bottom line approach requiring the mutual consideration of environmental, social, and economic aspects (Elkington). According to this approach, CS comprises a contribution to sustainable development of companies on the one hand and to the environment, society, and economy on the other (Loew, Ankele, Braun, and Clausen; Schaltegger and Burritt). CS therefore has to be assessed not only with regard to its various constituent parts, but also to long-term or rebound effects and further interdependencies (Stahlmann and Clausen; Wiedmann, Lenzen, and Barrett). Furthermore, the results of CS cannot be traced by “focusing on what goes on within the factory fences, farm gates, or company premises” (Wiedmann, Lenzen, and Barrett 362). CS typically crosses companies’ boundaries, which implies that their sustainability performance is not only to be assessed in terms of internal measures but also of “impact” (Epstein; Wiedmann, Lenzen, and Barrett). Assessment on the impact level is dealt with more closely for example in development agencies, and despite those agencies’ long experience it remains a complex issue (Roche).

The consequence is that companies’ sustainability performance is very difficult to assess (Graafland, Eijffinger, and Smid). That is why a large variety of internal and external approaches exist that deal differently with the assessment of CS. Of course, this applies for ratings and their varying methodologies, too, and makes standardization efforts like the *CSRR-QS* (AI CSSR) or SustainAbility’s

“*Rate the Raters*” research program (Sadowski, Whitaker, Lee, and Ayars) necessary. Accordingly, missing standardization does not only affect ratings but all CS assessment approaches since it results from the concept of CS itself.

III.II.II. LACK OF CREDIBILITY OF RATING INFORMATION AND THE LACK OF DATA AVAILABILITY

The question of *credibility of the information* that ratings use and offer is directly related to the *lack of CS data availability*. This problem affects internal as well as external CS assessment. Whereas internally the major problems are mostly matters of knowledge, information systems, and other management tools (Schaltegger), externally the question is rather one of limited data access. Most of the information required by ratings, if collected at all, is sensitive and rarely made publicly available (Lyon and Maxwell). Thus, not only rating organizations but all providers of CS assessments depend on self-disclosure of companies in addition to publicly available data. Therefore, suitable internal assessment is indispensable for the accomplishment of external assessment (Chatterji and Levine). Furthermore, due to the complexity of CS the question remains which data to measure. Accordingly, the lack of credibility of information results from the lack of CS data and therefore affects every CS assessment.

III.II.III. RATING BIAS AND THE FINANCIAL BACKGROUND OF RATINGS’ USERS

Another aspect is the *bias* of ratings. As already described, the emphasis on economic issues is a result of the increasing interest of conventional analysts in sustainability. These actors probably have only little interest in the mutual consideration

and integration of the economic, environmental, and social dimension because of their finance-oriented background. Investor-focused ratings rather regard environmental and social issues as add-on.

Other CS assessment approaches may face different biases. For example, organic food labels and consumer-focused ratings may mainly consider environmental aspects. Thus, biases opposing the integrative assessment of CS are a challenge that other assessment approaches have to face alike. Still, the bias to the financial dimension is a problem that affects ratings in particular because of their use within the financial market and their stakeholders' demands.

III.II.IV. RATING TRADEOFFS AND THE DEMAND OF RATINGS' USERS

Tradeoffs also result from the demands of ratings' users. Most ratings are designed to primarily fulfill the needs of their main users, investors, who focus on traditional financial analysis (Beloe, Scherer, and Knoepfel; Delmas and Doctori-Blass; Dillenburg, Greene, and Erikson; econsense). Presenting the rating results in form of single scores makes them easy to compare and communicate, and thus, suitable for investment decisions.

Additionally, many ratings also serve for rankings and indices which makes it inevitable to have a single, comparable figure. Beyond that, the communication of the results of CS assessments in a comprehensive, and at the same time, complete manner is challenging for other approaches, too.

III.II.V. LACK OF RATING TRANSPARENCY AND THEIR COMMERCIAL USE

A widely discussed challenge for ratings is their *lack of transparency*. When rating organizations do not disclose their methodology, weightings, etc.,

stakeholders cannot tell what it is that they measure. As long as ratings lack transparency, their credibility and reliability may be questioned just like the reliability of the companies to be examined.

This particular challenge results primarily from the young, dynamic, and competitive rating market and the aim to maintain commercial advantage (Beloe, Scherer, and Knoepfel; econsense). Since it can be expected that only a few "winners" will remain in the market (Sadowski, Whitaker, Lee, and Ayars 5), raters try to generate and maintain unique selling propositions, and undisclosed methodologies are hard to imitate. However, it has to be pointed out that some rating organizations are already more transparent than others. For example, Beloe, Scherer, and Knoepfel refer to *Ethibel*, *SAM Research*, and *Vigeo* as best practice organizations, and Sadowski, Whitaker, and Buckingham (*Rate the Raters. Phase One*) point to Corporate Knights Inc. Furthermore, transparency does not only affect ratings, but is also discussed with regard to other "quality assurances and the substantiation of socially relevant claims" (de Boer 261), for instance certification processes for labels and audits (de Boer; Jahn, Schramm, and Spiller; Müller)

III.II.VI. LACK OF RATING INDEPENDENCE AND THE INTERMINGLED BUSINESS OF RATERS

The last aspect is the *missing independence* of ratings. Contact between raters and companies may be unavoidable, but in order to guarantee an objective assessment the relation should not be closer than necessary. In order to reliably assess CS, rating organizations should especially not have further bonds with companies because that may in the worst case offer an incentive to manipulate rating results. Graafland, Eijffinger, and Smid (139)

argue that researchers should carry out the analysis in a “disinterested way.” This problem is a matter of governance. As rating organizations often do not only carry out ratings but have intermingled relations to the assessed companies, their independence and objectivity have to be questioned.

This aspect is reflected in a recent survey conducted among sustainability experts by *Globescan*. The survey shows that among different raters, NGOs are most trusted, followed by companies’ employees. Rating and ranking organizations come only in the third place, mainstream investors even later. When asked about the trust in particular ratings and rankings, the highest ranked approach, the *DJSI*, was classified as “highly trusted” by not more than 48 per cent of the respondents (Sadowski, Whitaker, and Buckingham, *Rate the Raters. Phase Two*).

This lack of belief in the credibility of ratings is incompatible with their purpose to increase transparency and reliably reduce information asymmetries. The situation is comparable to that of certifiers and auditors (Epstein; Finch). Epstein (246) states that “some observers have wondered whether, as with financial auditors, verifiers should act as both consultants and auditors [...]” Finch (17) finds that “the provision by auditors of non-audit advisory services to companies undermines the independence of the audit.” In the context of the food market, Jahn, Schramm, and Spiller describe the necessity of reducing auditors’ dependency on the companies to be certified with regard to quality labels. The challenge of independence particularly affects organizations or businesses that have further relations to companies.

The six challenges identified and described may have different causes, but combined they diminish the reliability of ratings. Against the background of their causes, the upcoming section discusses possible improvements for each challenge.

IV. WAYS TO IMPROVE CS ASSESSMENT THROUGH RATINGS

In summary, and as Table 3 shows, the identified challenges have different causes and thus have to be tackled differently. Some of the challenges can be ascribed to the concept of CS itself and constitute *general challenges when assessing CS* (lack of standardization and lack of credibility of information). Furthermore, some challenges for CS ratings result from the *financial background and demands of the ratings’ users* (bias and tradeoffs), whereas other challenges result from *the commercial use of ratings and the intermingled business relations of raters* (lack of transparency and lack of independence). In the following, recommendations are given to improve the reliability of ratings.

IV.I. GENERAL CHALLENGES WHEN ASSESSING CS

The *lack of standardization* and the *lack of credibility of information* of ratings are results of the complexity of CS and the lack of availability of CS data. Meeting these general challenges requires the contribution of various disciplines and actors in research and practice. On the one hand, the concept of CS itself still is hard to grasp. It can be expected and is desirable for the various actors involved to come to an agreement on a basic common definition in the near future. Furthermore, a more precise understanding of CS could be generated within the realm of ratings in particular, ideally in collaboration with third parties to include various perspectives on CS. A common understanding could enable coordinated research like the one of the *Sustainable Investment Research International Group (SIRI)* (Chatterji and Levine; Schäfer, Beer, Zenker, and Fernandes). This is one way to reduce the large number of ratings, which could positively influence

data availability and the credibility of data since fewer inquiries of greater quality would be directed at companies. NGOs and other third parties could furthermore be included in the data generation for external verification. So far, each rating uses their individual measures, which is at least inefficient (Sadowski, Whitaker, Lee, and Ayars).

IV.II. THE FINANCIAL BACKGROUND AND DEMANDS OF RATINGS' USERS

Furthermore, some CS rating challenges result from the interest and demands of ratings' users: *bias* and *tradeoffs*. The particular bias towards financial issues and the demand for single, comparable scores in part even oppose the idea of CS. These challenges derive from the expectations of investors, financial analysts, and other ratings' users with financial background. Instead of using CS as add-on to conventional ratings, financial markets have to learn and acknowledge its integrative character which entails more balanced assessments than what is common practice. This could be achieved by opening ratings for a wider audience (Sadowski, Whitaker, Lee, and Ayars) and the cooperation with stakeholders, especially NGOs and (potential) customers, which represent the environmental and social dimension of sustainability and thus bring in new perspectives (Laufer).

In the context of the financial market, identifying further *Business Cases for Sustainability* (Schaltegger and Wagner) might also help to accomplish a shift in the perception of CS from "knock-out criterion" to a more (economically) relevant aspect. Furthermore, it is desirable to enable stakeholders with differing interests to make use of ratings (Sadowski, Whitaker, Lee, and Ayars). Rating results should be offered to stakeholders in a way that enables them to carry out their own evaluation according to their perceptions of and interests in CS. This could be a way to enhance

the acceptance of ratings and to promote sustainable development. So far, most ratings, especially those used in the financial market, are not designed to handle this evaluative character of CS.

The same holds true regarding tradeoffs: the publication of detailed information on the calculation of a final score could serve to increase the interest of further stakeholders and to promote the use of ratings. Furthermore, biases in the units of analysis of ratings could be reduced by their extension to small and medium-sized enterprises.

IV.III. THE COMMERCIAL USE OF RATINGS AND THE INTERMINGLED BUSINESS RELATIONS OF RATERS

The *lack of independence* and the *lack of transparency* of ratings result from the characteristics of the rating organizations and the commercial use of CS assessment. As the Globecan results show, NGOs are trusted more than rating organizations, possibly because NGOs are less directly trying to make commercial use of CS assessments and because they rarely have further business relations with companies. A possible improvement for the reliability of ratings thus could be the prominent cooperation with one or more NGOs in the rating process (Laufer). However, independence and transparency are also relevant for other CS assessment approaches like audits, certificates, and labels. Similar recommendations apply here, for example consultants should not be auditors at the same time (Epstein).

In order to increase their transparency, rating organizations could furthermore (alone or together with an NGO) disclose their methods, measures, and the content of their surveys. This applies to other assessment approaches like audits and labels, too. A further possibility to increase the reliability of ratings is to make use of independent assurance to verify commitments, ideally with

Rating challenge	Cause	Possible improvements
Lack of standardization	Complexity of CS	Find a common CS understanding including several perspectives, coordinate research
Lack of credibility of information	Lack of data availability	Include NGOs and third parties for external verification
Bias	Financial background of ratings' users	Sensitize ratings' users for the integrative character of CS, open ratings for a wider audience
Tradeoffs	Demand of ratings' users	See above
Lack of transparency	Commercial use of ratings	Disclose methodology
Lack of independence	Intermingled business of raters	Avoid business relations to companies, include independent third parties

Table 3: Rating challenges, causes, and possible improvements

an NGO due to their higher credibility (Laufer; Ramus and Montiel). Additionally, in order to provide reliable information and to enhance their credibility, rating organizations could, at least, disclose potential conflicts and how they are handled. At best, of course, those conflicts should be avoided and analysts completely independent. This applies for other intermediaries carrying out audits or assessments, too, be it on the general capital market (Healy and Palepu) or regarding CS in particular. Besides self-imposed principles, the establishment of standards, such as the *CSRR-QS* (AI CSRR), might help to increase trust in those research organizations. Further research in this area should be a sound combination of practice demands and theoretical contributions.

Table 3 offers a summary of the aspects discussed in this part.

V. CONCLUSION

Fostering sustainable development and CS in particular depends on suitable CS assessment approaches. The paper has shown that ratings, on the one hand, are a practice-relevant approach to

assess CS externally. On the other hand, several characteristics of ratings are criticized in research and practice. This paper served to assemble and systematize the main rating challenges described in the literature: lack of standardization, lack of credibility of information, bias, tradeoffs, lack of transparency, and lack of independence.

An analysis of these challenges reveals that they have different causes. Some *general challenges when assessing CS* result from the concept of CS itself (lack of standardization and lack of credibility of information). Other challenges result from the demand side of ratings and show the *financial background and demands of the ratings' users* (bias and tradeoffs). Last but not least, some challenges result from the supply side of ratings, namely *the commercial use of ratings and the intermingled business relations of raters* (lack of transparency and lack of independence). They also affect other CS assessment approaches like audits and labels.

Improving the reliability of CS ratings is relevant, since they fulfill an important function with regard to overcoming the information asymmetry in the context of CS. Beyond that, ratings are able to positively influence companies' sustainability efforts, foster

the institutionalization of information management, and stimulate competition between companies (Chatterji and Levine; Dillenburg, Greene, and Erikson; Fowler and Hope; Graafland, Eijffinger, and Smid). And despite the somewhat negative effects that it may have on the understanding of CS, “[t]he financial industry is in a unique position to move corporations towards corporate sustainability” (Delmas and Doctori-Blass 245). What is needed now is a “second generation” of ratings and related research (Beloe, Scherer, and Knoepfel 3) including NGOs and thereby other perspectives (Laufer). Especially those challenges resulting from the supplier side of ratings (see 4.3) should be tackled proactively in order to increase the reliability and acceptance of ratings as CS assessment approach. Overcoming CS assessment hurdles can be achieved by several first improvements suggested in this paper. But, due to the interdisciplinary character of CS, these problems cannot be entirely solved by one actor, like raters, but require further research and contributions from several disciplines in research and practice. CS assessment is a process in its own right – just like CS itself.

VI. ACKNOWLEDGMENTS

I would like to thank Stefan Schaltegger, Erik Hansen, Jan-Hendrik Lübben, two anonymous reviewers, as well as Stefano Pogutz, John Morelli, and the other participants at the Environmental Management Leadership Symposium 2011 for their helpful comments on this paper.

VII. REFERENCES

- [1] AI CSRR (Association for Independent Corporate Sustainability and Responsibility Research). CSRR-QS 2.1. *Voluntary Quality Standard for Corporate Sustainability & Responsibility Research (CSRR) Groups*. (2008/2009). Web. 23 Feb. 2011. Web.
- [2] Akerlof, George A. “The Market for ‘Lemons’: Quality Uncertainty and the Market Mechanism.” *Quarterly Journal of Economics* 84.3 (1970): 488-500. Print.
- [3] Balzer, Arno, Kaevan Gazdar, Edeltraud Günther, André Habisch, Jens Hecht and Klaus R. Kirchhoff. *The Good Company Ranking. Evaluation of the Corporate Social Responsibility of Europe’s 90 Biggest Firms*. (2009). Web. 22 Feb. 2011.
- [4] Bank Sarasin & Co. Ltd. *Assessing Corporate Sustainability: Methodology of the Sarasin Company Rating*. (2007). Web. 25 Feb. 2011.
- [5] Beloe, Seb, Jan Scherer, and Ivo Knoepfel. *Values for Money: Reviewing the Quality of SRI Research*. (2004). London/Stockholm: SustainAbility/Mistra.
- [6] Boms, Annette. *Unternehmensverantwortung und Nachhaltigkeit. Umsetzung durch das Sustainability Performance Measurement*. (2008). Lohmar/ Köln: Josef Eul.
- [7] Calvert Group, Ltd. *Sustainable & Responsible Investing Signature Criteria*. (2011). Web. 23 Feb. 2011.
- [8] Carbon Disclosure Project. *Carbon Disclosure Project*. (2009). Web. 23 Feb. 2011.
- [9] Chatterji, Aaron K. and David I. Levine. “Breaking Down the Wall of Codes: Evaluating Non-financial Performance Measurement.” *California Management Review* 48.2 (2006): 29-51. Print.
- [10] Chatterji, Aaron K., David I. Levine, and Michael W. Toffel. “How Well Do Social Ratings Actually Measure Corporate Social Responsibility?” *Journal of Economics & Management Strategy* 18.11 (2009): 125-69. Print.
- [11] Chatterji, Aaron K. and Michael W. Toffel. “How Firms Respond to Being Rated.” *Strategic Management Journal* 31.9 (2010): 917–945. Print.
- [12] Corporate Knights Inc. *Global 100: The Definitive Corporate Sustainability Benchmark*. Web. 17 Feb. 2011.

- [13] Darby, Michael R. and Edi Karni. "Free Competition and the Optimal Amount of Fraud." *Journal of Law and Economics* 16.1 (1973): 67–88. Print.
- [14] de Boer, Joop. "Sustainability Labelling Schemes: the Logic of Their Claims and Their Functions for Stakeholders." *Business Strategy and the Environment* 12.4 (2003): 254-64. Print.
- [15] de Ron, Ad J. "Sustainable production: The ultimate result of a continuous improvement." *International Journal of Production Economics* 56/57.1 (1998):99–110. Print.
- [16] Delmas, Magali and Vered Doctori-Blass. "Measuring Corporate Environmental Performance: the Trade-Offs of Sustainability Ratings." *Business Strategy and the Environment* 19.4 (2010): 245–260. Print.
- [17] Dillenburg, Stephen, Timothy Greene, and Homer Erikson. "Approaching Socially Responsible Investment with a Comprehensive Ratings Scheme: Total Social Impact." *Journal of Business Ethics* 43.3 (2003): 167–177. Print.
- [18] Dunphy, Dexter, Andrew Griffiths, and Suzanne Benn. *Organizational Change for Corporate Sustainability: A guide for leaders and change agents of the future*. London: Routledge, 2003. Print.
- [19] Dyllick, Thomas, Frank Belz, and Uwe Schneidewind. *Ökologie und Wettbewerbsfähigkeit*. München/Zürich: C. Hanser/Verlag Neue Zürcher Zeitung, 1997. Print.
- [20] Dyllick, Thomas and Kai Hockerts. "Beyond the Business Case for Corporate Sustainability." *Business Strategy and the Environment* 11.2 (2002): 130–141. Print.
- [21] econsense. "More Transparency, More Efficiency, More Acceptance." econsense discussion paper on the future of sustainability ratings and rankings. Web. 25 Feb. 2011.
- [22] EIRIS Foundation and Ethical Investment Research Services. *Our research*. (2009). Web. 23 Feb. 2011.
- [23] Elkington, John. *Cannibals with Forks: The Triple Bottom Line of 21st Century Business*. Oxford: Capstone, 1997. Print.
- [24] Epstein, Marc J. *Making Sustainability Work: Best Practices in Managing and Measuring Corporate Social, Environmental, and Economic Impacts*. Sheffield: Greenleaf Publishing, 2008. Print.
- [25] Finch, Nigel "International rating agencies and sustainability." Working Paper, Faculty of Economics and Business, University of Sydney, 2004. Web. 23 Feb. 2011.
- [26] Fowler, Stephen J. and Chris Hope. "A Critical Review of Sustainable Business Indices and their Impact." *Journal of Business Ethics* 76.3 (2007): 243–252. Print.
- [27] Globescan. *Experts Trust Ratings Organizations Less Than NGOs and Employees as Judges of Sustainability Performance*. (2010). Web. 22 Feb. 2011.
- [28] Graafland, Johan J., Sylvester C. W. Eijffinger, and Hugo Smid. "Benchmarking of Corporate Social Responsibility: Methodological Problems and Robustness." *Journal of Business Ethics* 53.1/2 (2004): 137–152. Print.
- [29] Greenpeace. *Guide to Greener Electronics*. (2011). Web. 23 Feb. 2011.
- [30] Hansen, Erik G., Friedrich Große-Dunker, and Ralf Reichwald. "Sustainability Innovation Cube – A Framework to Evaluate Sustainability-Oriented Innovations." *International Journal of Innovation Management* 13.4 (2009):1–31. Print.
- [31] Hansen, Erik G. *Responsible leadership systems. An empirical analysis of integrating corporate responsibility into leadership systems*. Wiesbaden: Gabler, 2010. Print.
- [32] Healy, Paul M. and Krishna G Palepu. "Information asymmetry, corporate disclosure, and the capital markets: A review of the empirical disclosure literature." *Journal of Accounting and Economics* 31.1-3 (2001): 405–440. Print.
- [33] Hill, Charles W. L. and Thomas M. Jones. "Stakeholder-Agency Theory." *Journal of Management Studies* 29.2 (1992): 131–154. Print.

- [34] Jahn, Gabriele, Matthias Schramm, and Achim Spiller. "The Reliability of Certification: Quality Labels as a Consumer Policy Tool." *Journal of Consumer Policy* 28.1 (2005): 53–73. Print.
- [35] Jensen, Michael C. and William H. Meckling. "Theory of the Firm: Managerial Behavior, Agency Costs and Ownership Structure." *Journal of Financial Economics* 3.4 (1976): 305–360. Print.
- [36] KLD Research and Analytics, Inc. *Environmental, Social & Governance*. (2011). Web. 21 Feb. 2011. .
- [37] Knoepfel, Ivo. "Dow Jones Sustainability Group Index: A Global Benchmark for Corporate Sustainability." *Corporate Environmental Strategy* 8.1 (2001): 6–15. Print.
- [38] Kolk, Ans. "A decade of sustainability reporting: developments and significance." *International Journal of Environment and Sustainable Development* 3.1 (2004): 51–64. Print.
- [39] Laufer, William S. "Social Accountability and Corporate Greenwashing." *Journal of Business Ethics* 43.3 (2003): 253–61. Print.
- [40] Lee, Jinkook and Jinsook Cho. "Consumers' Use of Information Intermediaries and the Impact on Their Information Search Behavior in the Financial Market." *Journal of Consumer Affairs* 39.1 (2005):95–120. Print.
- [41] Linnenluecke, Martina K., Sally V. Russell, and Andrew Griffiths. "Subcultures and Sustainability Practices: The Impact on Understanding Corporate Sustainability." *Business Strategy and the Environment* 18.7 (2009): 432–452. Print.
- [42] Loew, Thomas, Kathrin Ankele, Sabine Braun, and Jens Clausen. *Significance of the CSR debate for sustainability and the requirements for companies*. (2004). Web. 23 Feb. 2011.
- [43] Lyon, Thomas P. and John W. Maxwell. "Greenwash: Corporate Environmental Disclosure under Threat of Audit." Ross School of Business Working Paper No. 1055, University of Michigan (2006). Web. 22 Feb. 2011.
- [44] Meffert, Heribert and Manfred Kirchgeorg. *Marktorientiertes Umweltmanagement. Konzeption, Strategie, Implementierung mit Praxisfällen*. 3rd ed. Stuttgart: Schäffer-Poeschel, 1998.
- [45] Moskowitz, Milton. "Social Investing." *The Journal of Investing* 6.4 (1997): 9–11. Print.
- [46] MSCI Inc. MSCI ESG Indices. (2011). Web. 22 Feb. 2011.
- [47] Müller, Martin. *Die Glaubwürdigkeit der Zertifizierung von Qualitäts-, Umwelt- und Sozialstandards*, *Die Betriebswirtschaft* 66.5 (2006): 583–599. Print.
- [48] oekom research. oekom Corporate Rating. (2011a). Web. 23 Feb. 2011.
- [49] oekom research. oekom Universe. (2011b). Web. 23 Feb. 2011.
- [50] Ramus, Catherine A. and Ivan Montiel. "When Are Corporate Environmental Policies a Form of Greenwashing?" *Business Society* 44.4 (2005): 377–414. Print.
- [51] Renn, Ortwin and Debra Levine. "Credibility and trust in risk communication." in: Kasperson, R. E. and Stallen, P. J. M. (eds.). *Communicating Risks to the Public: International Perspectives*. Berlin: Springer, 1991. 175–218. Print.
- [52] Rezapakhsh, Behrang, Daniel Bornemann, Ursula Hansen, and Ulf Schrader. "Consumer Power: A Comparison of the Old Economy and the Internet Economy." *Journal of Consumer Policy* 29.1 (2006): 1, 3–36. Print.
- [53] Rischkowsky, Franziska and Thomas Döring. "Consumer Policy in a Market Economy: Considerations from the Perspective of the Economics of Information, the New Institutional Economics as well as Behavioural Economics." *Journal of Consumer Policy* 31.3 (2008): 285–313. Print.
- [54] Roche, Chris J. R. (1999): *Impact Assessment for Development Agencies: Learning to Value Change*. Oxford: Oxfam Publishing, 1999. Print.
- [55] Sadowski, Michael, Kyle Whitaker, and Frances Buckingham. *Rate the Raters*.

- Phase One. Look Back and Current State.* 2010. Web 23 Feb 2011.
- [56] Sadowski, Michael, Kyle Whitaker, and Frances Buckingham. *Rate the Raters. Phase Two. Taking Inventory of the Ratings Universe.* 2010. Web. 23 Feb. 2011.
- [57] Sadowski, Michael, Kyle Whitaker, Mark Lee, and Alicia Ayars. *Rate the Raters. Phase Four: The Necessary Future of Ratings.* 2011. Web 08 Aug 2011.
- [58] SAM. *Company Assessment.* (2010). Web. 10 Aug. 2011.
- [59] SAM Indexes GmbH. *Information Sources.* (2010). Web. 17 Feb. 2011.
- [60] SAM and PwC *The Sustainability Yearbook 2010.* (2010). Web. 10 Aug. 2011.
- [61] Schäfer, Henry, Jana Beer, Jan Zenker, and Pedro Fernandes. *Who is who in Corporate Social Responsibility Rating? A survey of internationally established rating systems that measure Corporate Responsibility.* (2006). Gütersloh/Stuttgart: Bertelsmann Foundation/University Stuttgart.
- [62] Schaltegger, Stefan. "Information Costs, Quality of Information and Stakeholder Involvement—The Necessity of International Standards of Ecological Accounting." *Eco-Management and Auditing* 4.3 (1997): 87–97. Print.
- [63] Schaltegger, Stefan and Roger Burritt. "Corporate Sustainability," in: Folmer, Henk and Tom Tietenberg (eds.): *The International Yearbook of Environmental and Resource Economics.* Cheltenham: Edward Elgar, 2005. 185–232. Print.
- [64] Schaltegger, Stefan and Marcus Wagner. "Managing and Measuring the Business Case for Sustainability. Capturing the Relationship between Sustainability Performance, Business Competitiveness and Economic Performance," in: Schaltegger, Stefan and Marcus Wagner (eds.): *Managing the business case for sustainability. The integration of social, environmental and economic performance.* Sheffield: Greenleaf, 2006. 1–27. Print.
- [65] Seelos, Christian. "Finding a path in the sustainability jungle: a framework for corporate action." (2004). IESE Working Paper, OP No 05/1, IESE Business School, Universidad de Navarra. Web. 22 Feb. 2011.
- [66] Shapiro, Carl. "Consumer information, product quality, and seller reputation." *The Bell Journal of Economics* 13.1 (1982): 20–35. Print.
- [67] Sharfman, Mark. "The Construct Validity of the Kinder, Lydenberg and Domini Social Performance Ratings Data." *Journal of Business Ethics* 15.3 (1996): 287–296. Print.
- [68] Shrivastava, Paul and Stuart Hart. "Creating sustainable corporations." *Business Strategy and the Environment* 4.3 (1995): 154–65. Print.
- [69] Sparkes, Russell and Christopher J. Cowton. "The Maturing of Socially Responsible Investment: A Review of the Developing Link with Corporate Social Responsibility." *Journal of Business Ethics* 52.1 (2004): 45–57. Print.
- [70] Spence, Michael. "Job Market Signaling." *Quarterly Journal of Economics.* 87.3 (1973): 355–374. Print.
- [71] Stahlmann, Volker and Jens Clausen. *Umweltleistung von Unternehmen. Von der Öko-Effizienz zur Öko-Effektivität.* Wiesbaden: Gabler, 2000. Print.
- [72] Stiftung Deutscher Nachhaltigkeitspreis e. V. *German Sustainability Award.* (2011). Web. 23 Feb. 2011.
- [73] Stigler, George J. "The Economics of Information." *The Journal of Political Economy* 69.3 (1961): 213–225. Print.
- [74] Stiglitz, Joseph E. "The Theory of 'Screening,' Education, and the Distribution of Income." *The American Economic Review* 65.3 (1975): 283–300. Print.
- [75] Stiglitz, Joseph E. "The Contributions of the Economics of Information to Twentieth Century Economics." *The Quarterly Journal of Economics* 115.4 (2000): 1441–1478. Print.
- [76] Stubbs, Wendy and Chris Cocklin. "An Ecological Modernist Interpretation of Sustainability: the Case of Interface Inc." *Business Strategy and the Environment* 17.8 (2008): 512–523. Print.

- [77] Van Marrewijk, Marcel. "Concepts and Definitions of CSR and Corporate Sustainability: Between Agency and Communion." *Journal of Business Ethics* 44.2/3 (2003): 95–105. Print.
- [78] Vigeo and Forum Ethibel. *The Ethibel Sustainability Indices (ESI)*. Rulebook. (2007). Web. 23 Feb. 2011..
- [79] Wiedmann, Thomas O., Manfred Lenzen, and John R. Barrett. "Companies on the Scale: Comparing and Benchmarking the Sustainability Performance of Businesses." *Journal of Industrial Ecology* 13.3 (2009): 361–383. Print.
- [80] Wier, Mette and Carmen Calverley. "Market potential for organic foods in Europe." *British Food Journal* 104.1 (2002): 45–62. Print.
- [81] ZKB (Zürcher Kantonalbank). *Research*. (2011). Web. 25 Feb. 2011.

IV. Paper 4

Schaltegger, S.; Harms, D.; Windolph, S. E. & Hörisch, J. (2012): Involving Corporate Functions: Who Contributes to Sustainable Development?, Sustainability, Special Issue: Proceedings of the 3rd International Sustainability Conference (accepted for publication).

Article

Involving Corporate Functions: Who contributes to Sustainable Development?

Abstract: A large body of literature claims that corporate sustainable development is a cross-functional challenge which requires all functional units to be involved. However, it remains uncertain to what extent and in which way different corporate functions are actually involved in corporate sustainability management. To bridge this research gap, our paper draws on a concept of involvement introduced in the field of consumer behaviour. Based on this previous research, our paper distinguishes two components of involvement: first, a cognitive-affective component – incorporating being affected by sustainability issues and being supportive of corporate sustainability – and second, a behavioural component – represented by the application of sustainability management tools. We use this concept to empirically analyse the involvement of corporate functions in sustainability management and find considerable differences in large German companies. Whereas public relations and strategic management are heavily involved, finance, accounting and management control appear not to be involved. A multinomial logistic regression shows that the cognitive-affective component significantly influences the behavioural component, with a functional unit's being affected influencing the application of tools the most. Building on the model proposed the paper provides implications on how to increase a functional unit's involvement in sustainability management.

Keywords: companies; corporate sustainability; environment; functional unit; Germany; involvement; management tool; sustainability management.

1. Introduction

Sustainable development requires the contribution and involvement of many actors. Governments, for example, design the necessary regulations and support sustainability efforts of private households and companies, voters elect governments and consumers influence companies with their consumption patterns. Companies are important players as they influence the natural environment and society with their product designs and offers, their production processes, purchasing decisions and their business models. Sustainable development therefore requires companies to get actively involved in shaping and implementing sustainability measures [e.g. 1-6]. Like sustainability on the societal level, the sustainable development of a company requires the involvement of a variety of company-internal actors, since many challenges of sustainability management demand the contribution of several corporate functions [7-9].

The *involvement* of all functional units is considered to be necessary to create comprehensive sustainability solutions and to impede sustainability problems from being partially or superficially ‘solved’ or from being shifted back and forth between functional units [10-13]. This implies that all steps of value creation have to be included for sustainability management to become effective [14-16]. Shrivastava and Hart [10] emphasise that cross-functional concepts and practices can be seen as a prerequisite for the integration of sustainability into day-to-day operations, since many sustainability challenges touch several functional units within a company. Gattiker and Carter [17] stress the importance of cross-functional collaboration also for non-routine sustainability challenges [see 18]. Research and development (R&D), marketing and production as well as supply chain related departments, such as purchasing and logistics, have to be involved to develop and promote new successful sustainable products and services [7-9]. In addition, the involvement of supporting functions such as strategic planning, public relations (PR), accounting, management control and finance as well as human resources (HR) is relevant to ensure strategic embedding of sustainability management, provision of adequate information and personnel motivation [10,14,19]. In line with these illustrative examples, literature assigns every corporate function a role in sustainability management.

Nonetheless, management research has so far neglected to empirically analyse to what extent different corporate functions within a company are involved in the management of corporate sustainability. This research gap evokes the following question: *To what extent and in which way are different functional units involved in corporate sustainability management and what increases a functional unit’s involvement?*

Extant sustainability management literature highlights the importance of involving a variety of actors using terms such as “stakeholder involvement” [e.g. 10,20,21], “employee involvement” [e.g. 22] and “departmental involvement” [e.g. 23]. Yet, when investigating the engagement of stakeholders, departments, etc. in sustainability management, involvement is mostly used generically and not precisely defined. In contrast, to investigate the engagement of different corporate functions in sustainability management in more detail, this article draws on a concept of involvement previously introduced in the field of consumer behaviour research [e.g. 24,25]. According to Hansen ([24], p. 32) “the concept of involvement can be useful as a measure of the degree of individual motivation in a particular information-acquisition or choice situation”. He states that “variations in involvement reflect the extent

to which the individual is more or less motivated toward a specific piece of information, product, or the like” ([24], p. 32).

For corporate sustainability, we argue that Hansen’s [24] understanding of involvement can be transferred to better comprehend a functional unit’s motivation for dealing with sustainability issues, such as energy use, emissions and occupational health and safety. Accordingly, we draw on the concept of involvement proposed by Hemetsberger and Pieters [25] in the context of consumer behaviour research to empirically analyse the involvement of functional units in sustainability management. This concept distinguishes two components of involvement, a cognitive-affective component (i.e. how much a functional unit is affected by sustainability issues and whether it supports corporate sustainability) and a behavioural component (i.e. to what extent sustainability management is implemented by the application of tools).

In doing so, this paper extends the deliberations on involvement in the research area of consumer behaviour to corporate sustainability management and adds new insights into the analysis of the involvement of different functional units. The following Section argues that this transition is possible by demonstrating similarities between the consumer involvement approach and the involvement of functional units in sustainability management. Building on this, the paper develops a model distinguishing levels of corporate sustainability involvement of functional units. In a next step, this model serves to examine the involvement of functional units in corporate practice based on an empirical analysis of large German companies. The paper concludes with implications how to strengthen the contribution of the whole company to sustainable development.

2. Involvement of Functional Units in Sustainability Management

2.1. The Role of Functional Units in Sustainability Management

A large body of literature agrees that the sustainable development of a company is an overarching and cross-functional challenge that requires all corporate functions and departments to be involved [e.g. 10-13,15,16].

The *production* department, for instance, is responsible for clean production processes and securing compliance with regulatory requirements on safety, air emissions and toxic waste [26,27]. *Marketing* is challenged to conduct market research on consumer preferences for sustainability attributes and to develop eco-marketing campaigns [28,29], whereas *R&D* is frequently seen as a driving force for sustainability innovation [30-32]. *Purchasing* is expected to deal with issues such as green procurement [7] and sustainable supply chain management [9], while *logistics* is expected to reduce carbon emissions and to optimise distribution [33].

In addition to those functional units linked to the company-internal and external supply chain, further units are challenged to undertake supporting activities to bolster the core business. *Strategic planning* is often ascribed in the sustainability management literature to have a core role in cooperating with top management to develop and employ the company’s sustainability strategy [34]. *PR and communications* can fulfil an important role in sustainability communications, e.g. by designing stakeholder dialogues and sustainability reports [35,36]. *HR* needs to deal with employee and social issues

[37,38], whereas *finance, accounting and management control* should provide management with sustainability-relevant information and performance measures [39-41].

In sum, all corporate functions are challenged to contribute to corporate sustainability, no matter whether they engage in company-internal activities or in externally visible measures. However, while in the literature there may be an agreement on the expected contribution of each functional unit, it is uncertain how the different corporate functions are involved in the actual sustainability management practice and by which means the involvement of currently uninvolved functional units could be increased.

The analysis of the involvement of functional units considers each unit as one entity with its own goals and tasks and characterised by its own subculture and subenvironment [42-45]. For instance, in the context of environmental management Hoffman [43] argues that functional units differ in how they approach environmental issues because of their distinct interests and values. These differences may also be demonstrated by their varying use of language and can be ascribed, e.g., to the similar education of people belonging to one functional unit [43,44]. The following Section discusses in how far these differences between functional units play a role for their involvement in sustainability management.

2.2. Components of Sustainability Management Involvement

Sustainability management can be defined as the systematic integration of environmental and social issues into the conventional management of a company [10,19]. To empirically investigate the degree of involvement of functional units, this paper draws on a model based on the involvement approach previously introduced in consumer behaviour research. Specifically, we refer to the approach by Hansen [24] which is complemented by the involvement concept introduced by Hemetsberger and Pieters [25]. Their concept ([25], p. 276 with reference to Houston and Rothschild [46]) distinguishes a cognitive-affective and a behavioural component. The *cognitive-affective component* refers to a consumer's perceived relevance of an issue in terms of "being involved with an issue" ([25], p. 276). In the context of a functional unit's involvement in sustainability management this component is assumed to incorporate two elements, namely the functional unit's being affected by sustainability issues and its support for corporate sustainability. The *behavioural component* refers to how a consumer behaves and engages in terms of "being involved [...] in a behavior" ([25], p. 276). Behavioural involvement of a corporate function is in this paper operationalised as a function's application of sustainability management tools. These tools, such as labels in marketing, reports in PR or a suggestion scheme in HR, serve to systematically implement sustainability in corporate practice. The application of sustainability management tools thus indicates that a functional unit engages in tangible sustainability management activities.

In the context of consumer behaviour research, Hemetsberger and Pieters [25] show that these two components of involvement are positively related. Thus, it can be expected that this relation is also valid for a functional units' involvement in sustainability management. More precisely, the expectation can be formulated that cognitive-affective involvement (i.e. being affected and being supportive) positively influences the behavioural involvement of functional units (i.e. the application of tools).

We are aware that consumer behaviour research refers to consumers and thus individuals. Still, we argue that there are similarities in the consumer involvement approach and the approach developed in this paper which allow us to analyse the involvement of functional units in sustainability management. This argument is based on the understanding that a functional unit, like an individual, can be distinguished from other units in terms of motivations, information-acquisition and choice-making (adapted from [24]). Accordingly, the involvement of corporate functions in sustainability management can be defined as the extent to which a function acquires information, makes choices and takes actions related to sustainability such as reducing material use and emissions, promoting occupational safety and health, designing fair-trade products or improving technologies. Moreover, similar to our proposed adaptation, Lorenzoni et al. [47] have used the concepts of cognitive, affective and behavioural involvement in the context of public engagement for climate change.

For the analysis of a functional unit's level of involvement and to empirically test the interrelation of the cognitive-affective and behavioural components of involvement, the following Section explains the two components in more detail and formulates hypotheses.

2.2.1. Cognitive-affective Involvement

Firstly, cognitive-affective involvement can be understood as *being affected* by a particular issue [e.g. 25,46]. Correspondingly, management literature describes that companies can be affected by environmental and social issues with regard to their operations, their products and market-oriented business activities [e.g. 48,49]. The idea of being affected by sustainability issues is also reflected in Freeman's definition of stakeholders [45,50] as "any group or individual who is affected by or can affect the achievement of an organization's objectives" ([51], p. 46). In line with this argument, Speis and Czymmek [49] elaborate on the significant role of stakeholders, located either on the market, in society or inside the company, for the extent that companies are affected by environmental issues. Facing stakeholder demands can be a decisive cause or trigger for companies to actively engage in environmental activities, especially if neglecting these demands can lead to sanctioning [45,49].

Following this argument and adopting Freeman's [51] stakeholder definition to the approach of this paper, a functional unit can be affected by sustainability issues raised by stakeholders, such as material, energy and water consumption or child, forced and compulsory labour. In addition, being affected may originate from a functional unit's internal or even intrinsic motivation to deal with challenges of sustainable development [11,51,52]. Similarly, Hemetsberger and Pieters [25] describe extrinsic and intrinsic goals as well as beliefs and relationships with others, for instance, as possible sources of consumers' cognitive-affective involvement.

In a nutshell, responding to societal stakeholders such as non-governmental organisations (NGOs) or the local community mostly serves to secure legitimacy [20,52-54], whereas being affected by customers is mostly related to securing market share and success [20,53,55]. Internally, top management is one possible driver leading functional units to engage with sustainability. If a corporate function is affected by environmental, social or economic sustainability issues, we define this as the first element of cognitive-affective involvement.

Although being affected is considered important for undertaking sustainability management activities [e.g. 48,49], it can be argued that it is not sufficient. Therefore, we introduce *being supportive*, un-

derstood as a functional unit's support for sustainability activities, as a second element of cognitive-affective involvement (adapted from Hemetsberger and Pieters [25]) in corporate sustainability management. If a functional unit is supportive it displays its motivation to get involved in sustainability management by promoting its implementation, e.g. through supporting activities and projects in other departments or the overall company. The provision of knowledge or resources and the contribution of experience are only some examples. Reasons for being supportive of sustainability management may be very different. Possible explanations are an intrinsic interest in sustainability-related improvements, the possibility to establish long-term collaborations with other departments or the intention to signal the functional unit's disposition to get involved towards top management [e.g. 45,56].

With regard to both being affected and being supportive it can be argued that one functional unit may perceive sustainability challenges differently than other departments due to its particular goals, tasks, subculture and subenvironment [42-45]. This argument supports the expectation that different functional units are affected by sustainability issues to different extents and that they also support corporate sustainability to different degrees. Examples are sales, production or R&D which are established to specifically cope with the demands of the market, the technical-economic subenvironment or the scientific subenvironment [42].

2.2.2. Behavioural Involvement

The behavioural component of a functional unit's involvement is based on the understanding that companies can make use of management tools to manage business issues such as quality or employee participation [e.g. 57,58]. The wide range of sustainability management tools proposed and discussed in literature [e.g. 4,55,59] addresses different issues of sustainability: an environmental declaration, for instance, focuses on environmental aspects, continuous education addresses employee and social issues, environmental cost accounting is directed to the economic dimension, whereas a sustainability audit covers the whole range of sustainability aspects and their integration. As sustainability management tools are often applied by functional units, the functional units' involvement within a company is of utmost importance. Several publications document that a range of different practices or tools exist for each functional unit [4,13,59].

For the purpose of this paper, each corporate function was matched with three sustainability management tools widely discussed with respect to the particular functional unit. To do so, we reviewed the literature on management tools applied in functional units (*Table 1*) and consulted existing matches of tools and units [e.g. 4,60]. Of course, there are more sustainability management tools available, yet we decided to select an identical number of well-documented tools for each functional unit to allow comparing the results of the statistical analysis. *Table 1* provides an overview of the matching between each functional unit and three selected typical tools as well as the according references in literature. Knowing that the number and nomenclature of the corporate functions may vary depending on the company or the industry and that the tool application may depend on the practicability of the tools, the budget of the functional unit, the expertise, etc., *Table 1* is not conclusive but indicative.

Table 1. Corporate functions and selection of typical sustainability management tools.

Functional unit	Selection of typical sustainability management tools	Literature
Production/R&D	Design (eco, sustainable) Product carbon footprint Eco-efficiency-analysis	[26,27,30-32]
Marketing	Label (eco, social, sustainability) Sponsoring (eco, social, sustainability) Marketing (eco, social, sustainability)	[28,29]
Purchasing/logistics	Green purchasing Green/sustainable supply chain management Material flow analysis/material and energy flow accounting	[7,9,33]
Strategic planning	Mission statement (environmental, social, sustainability) Risk/scenario analysis Early detection	[34,61]
PR	Report (environmental, social, HR, sustainability) Environmental declaration Stakeholder dialogue	[35,36]
HR	Continuous education Suggestion scheme Employee/corporate volunteering	[37,38]
Corporate finance/accounting/ management control	Controlling (eco, social, sustainability) Accounting (environmental, material and energy flow, social, sustainability) Cost accounting (environmental, material flow, social)	[39-41]

Based on this choice of sustainability management tools the paper examines the application of tools to assess the behavioural involvement of functional units in the implementation of sustainability management. The following Section summarises the two components of involvement in two hypotheses and a model.

2.3. Towards an Involvement Model of Functional Units

To empirically analyse a functional unit's involvement in sustainability management, this paper formulates hypotheses for cognitive-affective (i.e. being affected by sustainability issues and being supportive of corporate sustainability) and behavioural involvement (i.e. the application of sustainability management tools). Similar to the concept of involvement in the context of consumer behaviour [25], this paper expects these two components of involvement to be positively related.

2.3.1. Being Affected by Sustainability Issues and the Application of Tools

Various studies have shown that companies need to become affected by sustainability issues (e.g. through stakeholder pressure) in order to get actively involved with tangible sustainability measures [49,54,62,63]. Transferring these insights to functional units, this paper expects that if a functional unit is affected by sustainability issues, it is more likely to take action and apply appropriate sustainability management tools to address sustainability issues in a systematic manner (e.g. the PR department initiates a stakeholder dialogue with an NGO). Following this argumentation the first hypothesis is:

H1: Being affected by sustainability issues fosters a functional unit's application of sustainability management tools.

2.3.2. Being Supportive of Corporate Sustainability and the Application of Tools

In addition to being affected, a functional unit may also support the implementation of sustainability in the company with its knowledge, experience and skills, e.g., through the promotion of sustainability measures and projects of other functions and the whole company. This argument emphasises both the statement that corporate sustainability represents a cross-functional challenge and the rationale that the functional unit's contribution is beneficial for the implementation of sustainability management [13].

Being supportive as an element of involvement in sustainability management becomes effective in the interaction between corporate functions of the company. For example, when the marketing department decides to implement green marketing and to use eco-labels, the R&D department may support this activity by implementing sustainable design. Similarly, the production can support the marketing endeavours by improving the eco-efficiency of the production processes, applying, e.g., an eco-efficiency analysis.

A functional unit's support for sustainability thus expresses the intensity of motivation (adapted from Hemetsberger and Pieters [25], p. 276) and constitutes a second element of cognitive-affective involvement in addition to being affected. This leads to the second hypothesis:

H2: Being supportive of corporate sustainability fosters a functional unit's application of sustainability management tools.

To control for effects which are external to the presented hypotheses, but which may influence a functional unit's application of sustainability management tools, further factors were included in the analysis. Firstly, various authors [e.g. 27,64] found a significant impact of a company's *core business* or industry on its sustainability-related behaviour (e.g. the introduction of an environmental management system, abatement activities or the choice of sustainability strategies). For instance, Frondel et al. [27] demonstrate that companies from the chemical or minerals industries tend to undertake abatement activities more frequently than companies belonging to other industries. Thus, to control for the influence of industry affiliation, all companies included in our analyses were asked to describe their core business, which was then categorised according to the companies' main sustainability challenges. Four clusters were distinguished (manufacturing, capital goods industry & construction; consumer goods, trade & logistics; finance & services; commodities, auxiliary materials, energy, chemical & pharmaceutical industry).

Additionally, *company size* may influence the sustainability engagement of a company, since larger companies usually experience more external pressures and possess more resources to deal with sustainability issues [65-67]. As numerous studies indeed reveal positive effects of company size on single aspects of corporate sustainability management [27,64,68], the covariate 'revenue' was also considered in our analysis.

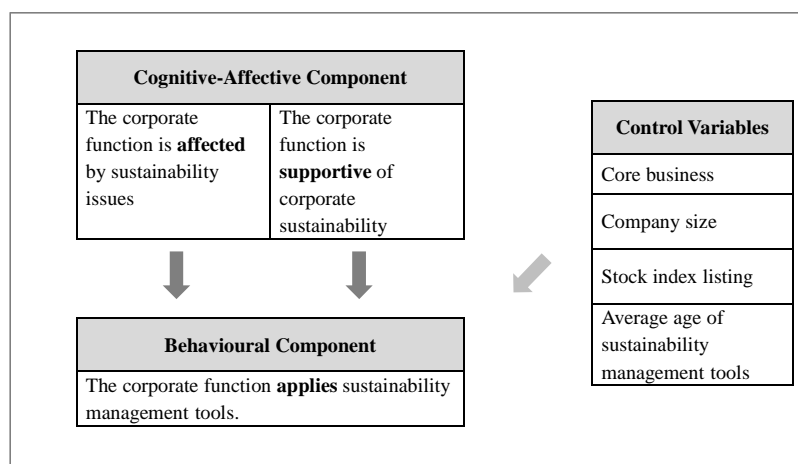
Similarly, it is frequently argued that publicly owned companies experience more external pressure due to a higher degree of public exposure [65,66]. Additionally, certain incentives motivating companies to pursue sustainability management can be identified which only impact *stock index listed* com-

panies, such as the opportunity to be included in prestigious sustainability indices like the Dow Jones Sustainability Index [69-71]. To control for the effect of being listed in well-known stock indices, another dummy variable was introduced indicating whether or not a company belongs to either the DAX or the MDAX, the two major German stock indices.

Lastly, it can be expected that sustainability management tools which are more established, as they have existed for many years and have been widely discussed for a longer period, are more likely to be applied. Thus, to avoid distortions caused by differences in the degree that sustainability management tools are established, the *age of sustainability management tools* was also included as a control variable.

In sum, the proposed links between the two components of involvement as well as the other factors of potential influence are displayed in *Figure 1* and will be analysed in Section 4.

Figure 1. Components of a functional unit's involvement in sustainability management.



3. Research Design

3.1. Methodology and Sample

The research findings presented in Section 4 are based on an empirical survey carried out between November 2009 and February 2010 among the largest German companies by revenues (according to the German newspaper Welt online [72]; see *Tables 2, 3 and 4* for the sample characteristics). The study focuses on large German companies for several reasons: Firstly, large companies are publically exposed which may drive them to engage with sustainability more strongly than small and medium-sized enterprises [65,66]. Secondly, large companies can be expected to have the resources to inform themselves about sustainability management tools and to apply them on a large scale, e.g. in different departments, divisions, etc. [67,73,74]. Thirdly, a large company has a major impact on environmental and social issues. The contribution of large firms is thus of vital importance if significant contributions to sustainable development are to be achieved. By focusing on one country, the study, fourthly, excludes influences related to contingencies that some corporate sustainability management tools may be regulated or promoted more in one country than in another [75-77].

The contact persons for the survey were managers in charge of sustainability issues like the chief sustainability managers, because they are expected to have a good overview of who is affected by corporate sustainability and who supports its implementation. Furthermore, the sustainability managers are expected to have a good insight into the engagement of all departments, since they interact with many different corporate functions to implement sustainability management in the company. To reduce the probability of strategic or evasive responses of the corporate functions, they were not contacted directly [e.g. 2,78].

The corporate sustainability managers were contacted by phone and asked to fill in a questionnaire sent to them by email or mail. 331 questionnaires were sent out and the response rate was 32.9% ($n = 109$). The respondents were mostly sustainability, environmental, health and safety (EHS) or corporate social responsibility (CSR) managers (53.2%) or, to a lower extent, associated with PR or communications (28.4%) in case the main contact persons for corporate sustainability issues were based in this unit. The remaining 18.3% either belonged to other functional units (16.5%) such as corporate development or did not reveal their departmental affiliation (1.8%). To validate the survey a pre-test was conducted. The data was analysed using SPSS Statistics 20.

Table 2. Annual turnover/total assets/gross premiums of the companies surveyed.

Annual turnover/total assets/ gross premiums (in million Euros)	Frequency	Percentage
0 – 50	0	0%
> 50 – 500	12	11.0%
> 500 – 1,500	18	16.5%
> 1,500 – 2,500	24	22.0%
> 2,500 – 5,000	16	14.7%
> 5,000 – 50,000	17	15.6%
> 50,000	19	17.4%
No answer	3	2.8%
<i>Total</i>	<i>109</i>	<i>100.0%</i>

Table 3. Number of employees of the companies surveyed.

Number of employees	Frequency	Percentage
0 – 50	0	0%
51 – 250	1	0.9%
251 – 1,000	12	11.0%
1,001 – 10,000	55	50.5%
10,001 – 100,000	31	28.4%
> 100,000	10	9.2%
<i>Total</i>	<i>109</i>	<i>100.0%</i>

Table 4. Core business of the companies surveyed.

Industry	Frequency	Percentage
Manufacturing, capital goods industry & construction	24	22.0%
Consumer goods, trade & logistics	33	30.3%
Finance & services	32	29.4%
Commodities, auxiliary materials, energy, chemical & pharmaceutical industry	20	18.3%

The questionnaire, *inter alia*, offered a set of functional units (to measure to what extent they are affected by sustainability issues and whether they support corporate sustainability) and a list of 79 sustainability management tools (to assess the application of these tools) drawn from a review of contemporary sustainability management literature as discussed above (for an overview see e.g. [4]). In this paper we limit our analysis to three typical sustainability management tools per functional unit (see Section 2.2.2).

3.2. Measures

3.2.1. Elements of Involvement

To measure the degree that a functional unit is affected by sustainability issues the respondents were asked to what extent they perceive the different corporate functions to be affected by environmental and social issues, evaluated on a five-point semantic differential scale. To measure whether the functional unit is supportive of corporate sustainability, the respondents were asked to assess for each unit whether it supports the implementation of corporate sustainability. To quantify behavioural involvement, the representatives were asked which sustainability management tools are applied in their company. Based on the matching of corporate functions with three typical sustainability management tools (*Table 1*) the values for the application of tools range from 0 to 3. Within the analysis the following three types of application of tools are distinguished:

- No application: the functional unit does not apply any of the selected tools (0 tools).
- Partial application: the functional unit applies some, but not all of the selected tools (1-2 tools).
- Comprehensive application: the functional unit applies all selected tools (3 tools).

3.2.2. Control Variables

To capture the effects external to the hypotheses presented, the participating companies were asked to describe their core business. In a second step, four clusters were distinguished (1 = manufacturing, capital goods industry & construction; 2 = consumer goods, trade & logistics; 3 = finance & services; 4 = commodities, auxiliary materials, energy, chemical & pharmaceutical industry). Moreover, company size was controlled on the basis of the annual revenue published in the Top 500 database Welt online [58] which was also used for the selection of companies. The third control variable covers the effect of being listed on the stock index. We researched whether the companies participating in the survey were listed in the DAX or the MDAX while the survey was carried out. To do so, we benefited from the data on the index compositions offered on the website of the DAX indices [79]. To consider the age of sustainability management tools (i.e. for how many years it has been discussed in literature), the library service databases Ebsco (www.ebsco.com) and Web of Science (sub3.webofknowledge.com) were checked for when each tool was mentioned in academic literature for the first time.

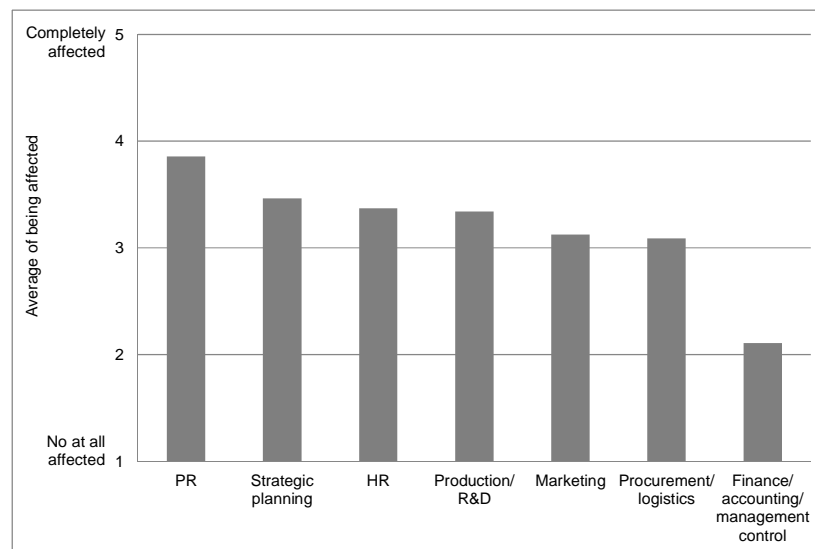
4. Empirical Results and Analysis

4.1. Varying Involvement of Different Corporate Functions

The model is based on the argument that the involvement of functional units encompasses being affected by sustainability, being supportive of corporate sustainability and the application of specific sustainability management tools.

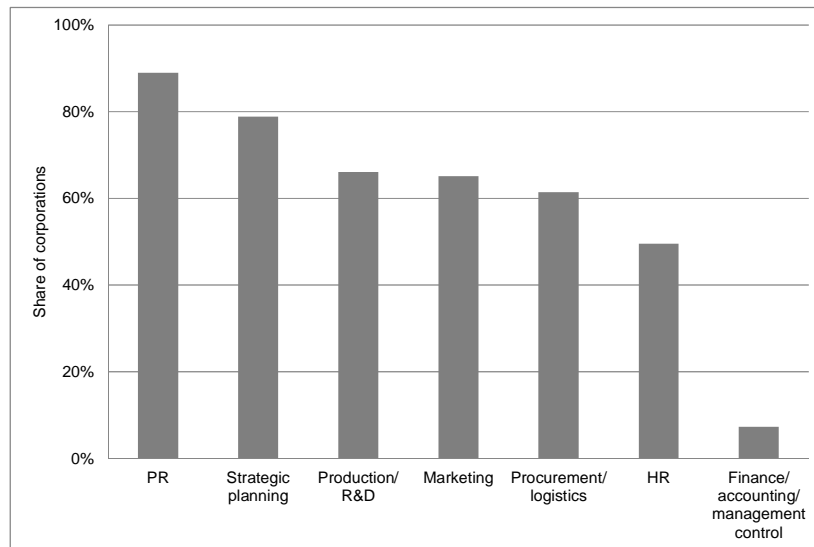
Figure 2 shows for several functional units the average extent to which they are affected on a range from 1 to 5 (where 1 means not at all affected and 5 means completely affected).

Figure 2. Corporate functions' being affected by sustainability issues.



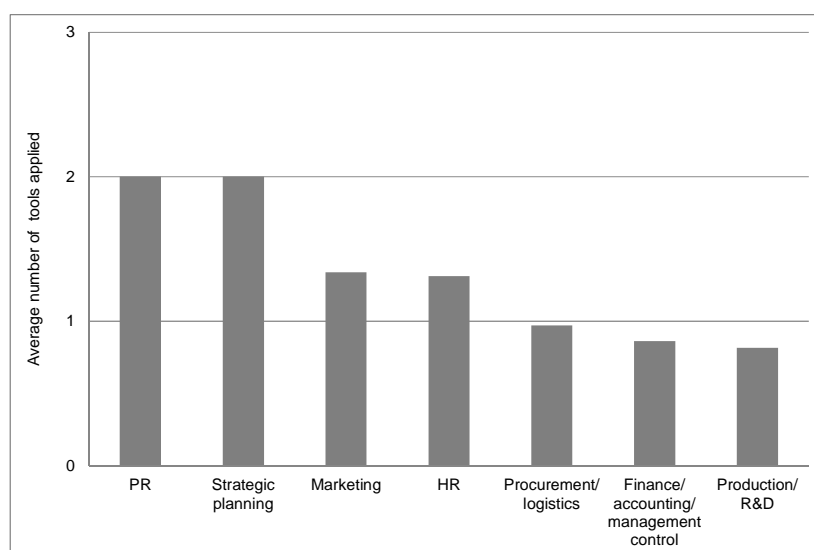
(based on the question: “To what extent are the following organisational units of your company affected by environmental/social/societal issues?”)

With regard to the first element of involvement, all functional units seem to be affected by sustainability issues to a certain degree (Figure 2). Nevertheless, substantial differences between the functional units exist. PR, for instance, is perceived to be most strongly affected by sustainability issues, whereas finance, accounting and management control are affected only to a much smaller degree. All other functions can be found in the middle of the scale, ranging from 3.1 on average (procurement/logistics) to 3.5 (strategic planning).

Figure 3. Functional units' being supportive of corporate sustainability.

(based on the question: “Which of the following functional units have a supporting influence on the implementation of sustainability in your company?”)

Compared to the evaluation of the extent to which they are affected, even bigger differences can be found for the corporate functions' support for corporate sustainability (*Figure 3*): the functions which support corporate sustainability most are PR (89.0% of all companies) and strategic planning (78.9%), while finance, accounting and management control are supportive in only 7.3% of all companies. In contrast to the extent of being affected, where HR ranks third, this corporate function is perceived to be among the least supportive units.

Figure 4. Application of sustainability management tools by corporate functions.

(based on the question “Which sustainability management tools are applied in your company?”, for the assignment of tools to corporate functions see *Table 1*)

Finally, similar differences between functional units exist for the average application of sustainability management tools (*Figure 4*). This result provides first hints on the explanatory power of the model. Whereas PR and strategic planning apply 2.0 of the 3 specific tools on average, only 0.8 and 0.9 tools are applied in production/R&D and finance, accounting and management control on average. As it is the case for the extent of being affected (*Figure 3*), purchasing and logistics (1.0), HR (1.3) and marketing (1.3) occupy moderate positions (*Figure 4*).

It could be argued, however, that the results are distorted to a certain degree because some of the survey respondents were associated with PR or communications. To test whether this causes the above-average evaluation of the PR department a t-test was performed. This test compares the extent that PR is affected by sustainability issues as evaluated by sustainability managers belonging to that unit with the evaluations of sustainability managers not belonging to the PR department. As *Table 5* displays, the difference of the mean is small (3.95 compared to 3.85) and clearly not significant (0.561). Thus, no significant influence of the respondents' affiliation could be identified.

Table 5. Influence of departmental affiliation

PR's being affected as evaluated by sustainability managers in...	N	Mean	T	Significance	Difference in means
the PR unit	30	3.95	-0.584	0.561	-0.100
other functional unit	70	3.85			

4.2. Being Affected, Being Supportive and Their Effects on the Application of Tools

To analyse whether being affected by sustainability issues and being supportive of corporate sustainability are related to a functional unit's application of sustainability management tools, first the direct effects of such influence were tested. Since being supportive was measured as a dichotomous variable, only the coefficient of contingency and the Eta coefficient could be used to assess its statistical connection to the application of sustainability management tools (AT), which is operationalised as the number of selected tools applied by a specific unit (ratio scale). Being affected, however, was measured using a five-point semantic differential scale. It can thus be treated as interval-scaled [80]. Therefore, the product moment correlation coefficient by Pearson can be used in addition to the coefficient of contingency and the Eta coefficient to assess the connection between being affected and the application of tools. The coefficient of contingency and the Eta coefficient for both variables are displayed to enable comparing the strengths of effects.

Table 6. Effects of being affected and being supportive on the application of tools.

Influencing variables (IV)	C (IV*AT)	Eta coefficient (Eta ²)	r (Pearson)
Being affected	0.393***	0.353 (0.124)	0.313***
Being supportive	0.257***	0.252 (0.064)	-

C (AT): Coefficient of contingency of the influencing variable and the number of applied tools (AT)
 *** 1% level of significance; ** 5% level of significance; * 10% level of significance

As shown in *Table 6*, both being affected and being supportive are significantly connected with the application of tools. The Eta coefficients as well as a more detailed analysis of the contingency table suggest that being affected and being supportive indeed stimulate the application of sustainability management tools. Since the coefficient for being affected is higher than for being supportive, it can be assumed that the former has a somewhat stronger positive effect on the application of tools.

Additionally, since being affected and being supportive may be interrelated as well, their relationship was tested. Again, since being supportive was operationalised on a nominal scale, no product moment correlation coefficient can be calculated. Instead the coefficient of contingency was used. *Table 7* displays that a significant relation between these two factors exists, but still more than half of the variance cannot be explained by this relationship.

Table 7. Coefficient of contingency of being affected and being supportive.

C (AF*S)
0.466***
C (AF*S): Coefficient of contingency (of being affected and being supportive)
*** 1% level of significance; ** 5% level of significance; * 10% level of significance

Since the contingency coefficient between being affected and being supportive is only of intermediate strength, a further analysis testing the combined effect of being affected and being supportive on the application of tools can be performed. For the dependent variable, i.e. the application of sustainability management tools, functional units which apply all (three) selected tools were distinguished from those units which do not apply any tools and those which apply only some (i.e. one or two) tools. Thus, the dependent variable is measured on an ordinal scale, which is why a multinomial logistic regression needs to be performed. To control for effects which are external to the hypotheses presented, but are expected to influence a functional unit's application of sustainability management tools, the covariates 'core business', 'revenue', 'stock index listing' and 'average age of tools' were included in the analysis (*Table 8*).

To include the variable 'core business', for each of the four categories presented in Section 3.2.2. a separate dummy variable was set up, differentiating companies which belong to the respective group from companies which do not. Similar, the dummy variable 'stock index listing' was included in the model to segregate companies listed in the DAX or MDAX stock indices from other companies.

The category 'comprehensive application' of sustainability management tools (i.e. application of all three typical tools) was used as a category of reference for the multinomial logistic regression. The regression coefficients (B) thus describe the influence of each variable on the probability to belong to the respective group (no application or partial application) compared to the probability of belonging to the group 'comprehensive application'. Lastly, the control variable 'revenue' was included as a metric variable.

Table 8. Multinomial logistic regression.

Test of likelihood quotients		Chi ²	Significance
	AF (Being affected)	31.408***	0.000
	S (Being supportive)	7.015**	0.030
	Core business	13.978**	0.030
	Revenue	2.091	0.352
	Stock index listing	2.121	0.346
	Age of tools	8.025**	0.018
Parametric rating		B	Significance
No application of typical tools	Constant term	2.252***	0.000
	AF (Being affected)	-0.777***	0.000
	S (Being supportive) ^a	0.720***	0.009
	Core business = 1	0.842**	0.013
	Core business = 2	0.537*	0.098
	Core business = 3	0.007	0.984
	Core business = 4 ^b	0	
	Revenue	0.000	0.179
	Stock index listing ^a	0.358	0.166
	Age of tools	-0.020***	0.006
Partial application of typical tools	Constant term	1.362**	0.014
	AF (Being affected)	-0.421***	0.001
	S (Being supportive) ^a	0.444*	0.073
	Core business = 1	0.576*	0.054
	Core business = 2	0.683**	0.014
	Core business = 3	0.415	0.180
	Core business = 4 ^b	0	
	Revenue	0.000	0.700
	Stock index listing ^a	0.252	0.252
	Age of tools	-0.007	0.240
Category of reference: Comprehensive application of typical tools			
Number of observations: 654			
Pseudo R ² (Nagelkerke): 0.169			
^a S and stock index listing are dummy variables. The effects of S = 0 (not supportive) and of being listed are tested.			
^b This parameter is set to zero as it is redundant.			
*** 1% level of significance; ** 5% level of significance; * 10% level of significance			

Based on the results of the multinomial logistic regression the existence of the above mentioned effects can be confirmed. The highly significant likelihood quotients suggest that both being affected and being supportive influence the application of sustainability management tools. Similarly, significant effects can be identified for the control variables core business and age of tools. However, the effect size of the latter is very small (-0.020 and -0.007) and only significant for the group of 'no application'. Finally, no statistically significant influence of the companies' revenues or of being listed in a stock index on a functional unit's application of tools could be identified. However, since the sample only contains the largest German companies, the differences in size may not be as pronounced as they might have been, had also medium or small-sized companies been taken into account.

As the highly significant negative regression coefficients (B) of being affected demonstrate (Table 8), a functional unit which is affected by sustainability issues to a high degree is less likely to belong to the category of units which apply no or only some sustainability management tools. Since the

coefficient for no application is even stronger (-0.777***) than that of partial application (-0.421***), using comprehensive application as the reference category, functional units with high levels of being affected are most unlikely to belong to the group of no application of sustainability management tools.

As expected, the analysis suggests that functional units which are not supporting corporate sustainability are less likely to apply sustainability management tools. The positive regression-coefficients for the cases of no application (0.720***) and partial application (0.444*) demonstrate that if a functional unit is not supportive ($S = 0$) it is unlikely to be involved in the application of sustainability management tools, but most likely to belong to the group of no application.

The difference in strength between the regression coefficients of being affected and being supportive as well as the contingency coefficients displayed in *Table 6* provide an insight into the size of effects if both variables are taken into account. The higher coefficients of being affected reveal that it has a stronger influence on the application of tools than being supportive. Taken together the results confirm hypotheses *H1* and *H2*.

5. Discussion

Based on the view that corporate sustainability as a cross-functional challenge requires the involvement of all corporate functions, this paper investigates who is involved in corporate sustainability management. To operationalise the empirical examination of this question, the involvement approach of Hemetsberger and Pieters [25] used in consumer behaviour research was adopted to distinguish two components of involvement of corporate functions. Firstly, cognitive-affective involvement was measured through being affected by sustainability issues, expressing the relevance of an issue, and through being supportive of corporate sustainability, expressing the intensity of motivation to contribute to sustainability. Secondly, behavioural involvement in sustainability management was measured on the basis of the application of a set of function-specific sustainability management tools. The analysis demonstrates that both being affected and being supportive foster the application of sustainability management tools by a functional unit and, thus, their involvement in sustainability management.

The analysis furthermore shows large differences between the involvement of different corporate functions in sustainability management. In particular, the involvement is highest for PR/communications while finance, accounting and management control show the lowest involvement. Yet, the data also reveals an important role for strategic planning when it comes to corporate sustainability. For all three aspects of involvement analysed – i.e. being affected by sustainability issues, being supportive of corporate sustainability and the application of tools – the strategic planning unit ranks second behind the PR department. This could indicate an on-going process in companies: not only is sustainability a corporate communication task, but it is also of strategic relevance. This gives reason to expect a stronger implementation of corporate sustainability in more performance-oriented functional units such as production and purchasing in the future.

In order to increase the involvement of corporate functions in sustainability management, being affected and being supportive may be useful starting points. Both the extent that functional units are affected and their support for corporate sustainability may be increased through, e.g., awareness programs, information campaigns or an increased strategic relevance of sustainability for top management. The data suggests that an increase in the extent to which functional units are affected is even

slightly more effective to foster corporate sustainability than an increase of their support for corporate sustainability.

6. Conclusions

Companies are challenged and have the potential to significantly contribute to sustainable development. Sustainability management literature argues that the involvement of all functional units is important to realise this potential and especially to master non-routine sustainability tasks, which usually pose cross-functional challenges [e.g. 11,13,19,81].

This paper adapted a model to capture the involvement of different functional units based on findings from consumer behaviour research. The paper analysed two components of involvement, i.e. cognitive-affective and behavioural involvement. Original data from 109 large Germany companies clearly shows that externally-oriented departments like PR and communications are most involved, whereas internal, performance-oriented units like finance, accounting and management control are (nearly fully) excluded. These findings reveal a gap between the status quo in practice and the demands formulated in academia to handle corporate sustainability as a cross-functional challenge. Furthermore, the results indicate that large German companies are mainly concerned with securing their reputation and legitimacy through sustainability management and less with their actual sustainability performance. However, keeping in mind that accounting and management control design and manage core information systems for managers and that they serve as links between top management and other corporate functions, a stronger involvement of these functional units is highly recommended.

Acknowledgments

The authors would like to thank two anonymous reviewers for their valuable feedback. We are furthermore grateful for the feedback we received by the participants of the 3rd International Sustainability Conference 2012 in Basel. Our research also benefited from the financial support of PwC Germany for the ‘Corporate Sustainability Barometer’ 2009/2010.

Conflict of Interest

The authors declare no conflict of interest.

References and Notes

1. Shrivastava, P. The role of corporations in achieving ecological sustainability. *Acad. Manage. Rev.* **1995**, *20*, 936–960.
2. Banerjee, S.B. Managerial Perceptions of Corporate Environmentalism. Interpretations from Industry and Implications for Organizations. *J. Manage. Stud.* **2001**, *38*, 489–513.
3. WBCSD (World Business Council for Sustainable Development). The business case for sustainable development: Making a difference towards the Earth Summit 2002 and beyond. *Corp. Environ. Strategy* **2002**, *9*, 226–235.
4. BMU German Federal Ministry for the Environment and Federation of German Industries, Ed. *Sustainability Management in Business Enterprises. Concepts and Instruments for Sustainable*

- Development*; BMU/Centre for Sustainability Management (CSM): Berlin/Lueneburg, Germany, 2003.
5. Burger, P.; Daub, C.-H.; Scherrer, Y. New Perspectives on Sustainable Business (Editorial). *J. Bus. Ethics* **2009**, *85*, 479–481.
 6. Marcus, J.; Kurucz, E.C.; Colbert, B.A. Conceptions of the Business-Society-Nature Interface: Implications for Management Scholarship. *Bus. Soc.* **2010**, *49*, 402–438.
 7. Carter, C.R.; Dresner, M. Purchasing's Role in Environmental Management. Cross-Functional Development of Grounded Theory. *J. Supply Chain Manag.* **2001**, *37*, 12–27.
 8. Darnall, N.; Jolley, G.J.; Handfield, R. Environmental Management Systems and Green Supply Chain Management. Complements for Sustainability? *Bus. Strateg. Environ.* **2008**, *17*, 30–45.
 9. Seuring, S.; Müller, M. From a Literature Review to a Conceptual Framework for Sustainable Supply Chain Management. *J. Clean. Prod.* **2008**, *16*, 1699–1710.
 10. Shrivastava, P.; Hart, S. Creating sustainable corporations. *Business Strategy and the Environment* **1995**, *4*, 154–165.
 11. Dunphy, D.; Griffiths, A.; Benn, S. *Organizational Change for Corporate Sustainability. Guide for leaders and change agents of the future*, 2nd ed.; Routledge: London, UK, 2007.
 12. Martin, A.; Benn, S.; Dunphy, D. Towards a model of governance for sustainability. In *Corporate Governance and Sustainability. Challenges for Theory and Practice*; Benn, S., Dunphy, D., Eds.; Routledge: London, UK, 2007; pp. 94–121.
 13. Epstein, M.J. *Making Sustainability Work. Best Practices in Managing and Measuring Corporate Social, Environmental and Economic Impacts*; Greenleaf: San Francisco, USA, 2008; pp. 90–93.
 14. Porter, M.E. *Competitive advantage. Creating and sustaining superior performance*; Free Press: New York, USA, 1985.
 15. Carter, C.R.; Rogers, D.S. A framework of sustainable supply chain management. Moving toward new theory. *Int. J. Phys. Distr. Log.* **2008**, *38*, 360–387.
 16. Singh, R.K.; Murty, H.R.; Gupta, S.K.; Dikshit, A.K. Integrated environment management in steel industries. *International Journal of Management and Decision Making* **2008**, *9*, 103–128.
 17. Gattiker, T.F.; Carter, C.R. Understanding Project Champions' Ability to Gain Intra-organizational Commitment for Environmental Projects. *J. Oper. Manag.* **2010**, *28*, 72–85.
 18. Schmidt, I.; Meurer, M.; Saling, P.; Kicherer, A.; Reuter, W.; Gensch, C.-O. SEEBalance. Managing Sustainability of Products and Processes with the Socio-Eco-Efficiency Analysis by BASF. *Greener Management International* **2004**, *45*, 79–94.
 19. Schaltegger, S.; Burritt, R. Corporate Sustainability. In *The International Yearbook of Environmental and Resource Economics* Folmer, H., Tietenberg, T., Eds.; Elgar: Cheltenham, UK, 2005; pp. 185–232
 20. Nijhof, A.; de Bruijn, T.; Honders, H. Partnerships for corporate social responsibility. A review of concepts and strategic options. *Manage. Decis.* **2008**, *46*, 152–167.
 21. Voiculescu, A. Challenges and innovation in the legal discourse: Achieving corporate responsibility for human rights. *Society and Business Review* **2011**, *6*, 278–291.
 22. Hanna, M.D.; Newman, W.R.; Johnson, P. Linking operational and environmental improvement through employee involvement. *Int. J. Oper. Prod. Man.* **2000**, *20*, 148–165.

23. Nikolaou, I.E; Evangelinos, K.I. Towards a generally accepted CSR accounting framework: a literature mapping. *World Review of Entrepreneurship, Management and Sustainable Development* **2009**, 5, 26–41.
24. Hansen, F. Hemispherical Lateralization. Implication for Understanding Consumer Behavior. *J. Consum. Res.* **1981**, 8, 23–36.
25. Hemetsberger, A.; Pieters, R. When Consumers Produce on the Internet. An Inquiry into Motivational Sources of Contribution to Joint Innovation. In *Proceedings of the Fourth International Research Seminar on Marketing Communications and Consumer Behavior* Derbaix, C., Kahle, L.R., Merunka, D., Strazzieri, A., Eds.; La Londe, 2001; pp. 274–291.
26. Veleva, V.; Ellenbecker, M. Indicators of Sustainable Production. Framework and Methodology. *J. Clean. Prod.* **2001**, 9, 519–549.
27. Frondel, M.; Horbach, J.; Rennings, K. What triggers environmental management and innovation? Empirical evidence for Germany. *Ecol. Econ.* **2008**, 66, 153–160.
28. Kotler, P.; Nancy, L. *Corporate Social Responsibility: Doing the Most Good for Your Company and Your Cause*; Wiley & Sons: New York, USA, 2004.
29. Belz, F.-M.; Peattie, K. *Sustainability marketing: A global perspective*, 2nd ed.; Wiley: Chichester, UK, 2012.
30. Hart, S.L. Beyond greening. Strategies for a sustainable world. *Harvard Bus. Rev.* **1997**, 75, 66–76.
31. Prahalad, C.K.; Hart, S.L. The fortune at the bottom of the pyramid. *strategy+business* **2002**, 26, 1–14.
32. Hansen, E.G.; Grosse-Dunker, F.; Reichwald, R. Sustainability Innovation Cube. A Framework To Evaluate Sustainability-Oriented Innovations. *International Journal of Innovation Management* **2009**, 13, 683–713.
33. Oglethorpe, D.; Heron, G. Sensible operational choices for the climate change agenda. *Int. J. Logist. Manag.* **2010**, 21, 538–557.
34. Wagner, M. Integration of Environmental Management with Other Managerial Functions of the Firm. Empirical Effects on Drivers of Economic Performance. *Long Range Plann.* **2007**, 40, 611–628.
35. Clark, C.E. Differences between public relations and corporate social responsibility. An analysis. *Public Relat. Rev.* **2000**, 26, 363–380.
36. Black, L.D.; Härtel, C.E.J. The five capabilities of socially responsible companies. *Journal of Public Affairs* **2004**, 4, 125–144.
37. Daily, B.F.; Huang, S. Achieving sustainability through attention to human resource factors in environmental management. *Int. J. Oper. Prod. Man.* **2001**, 21, 1539–1552.
38. Ehnert, I. *Sustainable Human Resource Management: A conceptual and exploratory analysis from a paradox perspective*; Physica: Berlin/Heidelberg, Germany, 2009.
39. Schaltegger, S.; Burritt, R. *Contemporary Environmental Accounting. Issues, concepts and practice*; Greenleaf: Sheffield, UK, 2000.
40. Burritt, R.; Hahn, T.; Schaltegger, S. Towards a Comprehensive Framework for Environmental Management Accounting. Links Between Business Actors and Environmental Management Accounting Tools. *Aust. Account. Rev.* **2002**, 12, 39–50.

41. Henri, J.-F.; Journeault, M. Eco-control. The Influence of Management Control Systems on Environmental and Economic Performance. *Accounting, Organizations and Society* **2010**, *35*, 63–80.
42. Lawrence, P.R.; Lorsch, J.W. Differentiation and Integration in Complex Organizations. *Admin. Sci. Quart.* **1967**, *12*, 1–47
43. Hoffman, A.J. Linking Organizational and Field-Level Analyses. The Diffusion of Corporate Environmental Practice. *Organ. Environ.* **2001**, *14*, 133–156.
44. Schein, E.H. *Organizational Culture and Leadership*; Wiley & Sons: San Francisco, USA, 2010.
45. Schaltegger, S.; Harms, D.; Windolph, S.E. Who is involved? – Integrating corporate functions into sustainability management. In *Proceedings of the 13th EURAM conference 2013*, Istanbul, Turkey, 2013.
46. Houston, M.J.; Rothschild, M.L. Conceptual and Methodological Perspectives on Involvement. In *Research frontiers in Marketing Dialogues and Directions*; Jain, S.C., Ed.; American Marketing Association: Chicago, USA, 1978; pp. 184–187.
47. Lorenzoni, I.; Nicholson-Cole, S.; Whitmarsh, L. Barriers perceived to engaging with climate change among the UK public and their policy implications. *Global Environ. Chang.* **2007**, *17*, 445–459.
48. Roome, N. Business Strategy, R&D Management and Environmental Imperatives. *R&D Manage.* **1994**, *24*, 65–82.
49. Speis, H.; Czymmek, F. *Die Bedeutung der ökologischen Betroffenheit für die umweltschutzorientierten Wettbewerbsstrategien von Unternehmen*. Arbeitsberichte zum Umweltmanagement, Arbeitsbericht Nr. 15, Köln, Germany, 2003.
50. Altholz, V. The advantages and limitations of developing an external perspective for analyzing corporate strategic alignment. *Economic and Environmental Studies* **2010**, *10*, 35–48.
51. Freeman, R.E. *Strategic management. A stakeholder approach*; Pitman: Boston, USA, 1984.
52. DiMaggio, P.J.; Powell, W.W. The Iron Cage Revisited. Institutional Isomorphism and Collective Rationality in Organizational Fields. *Am. Sociol. Rev.* **1983**, *48*, 147–160.
53. Bansal, P.; Roth, K. Why companies go green. A model of ecological responsiveness. *Acad. Manage. J.* **2000**, *43*, 717–736.
54. Marais, M. CEO rhetorical strategies for corporate social responsibility (CSR). *Society and Business Review* **2012**, *7*, 223–243.
55. Hahn, T.; Scheermesser, M. Approaches to corporate sustainability among German companies. *Corp. Soc. Resp. Env. Ma.* **2006**, *13*, 150–165.
56. Schaltegger, S. Sustainability as a Driver for Corporate Economic Success. Consequences for the Development of Sustainability Management Control. *Society and Economy* **2011**, *33*, 15–28.
57. Abrahamson, E. Managerial Fads and Fashions: The Diffusion and Rejection of Innovations, *Acad. Manage. Rev.* **1991**, *16*, 586–612.
58. Abrahamson, E.; Fairchild, G. Management fashion: Lifecycles, triggers, and collective learning processes. *Admin. Sci. Quart.* **1999**, *44*, 708–740.

59. Tencati, A.; Perrini, F.; Pogutz, S. New Tools to Foster Corporate Socially Responsible Behavior. *J. Bus. Ethics* **2004**, *53*, 173–190.
60. Schaltegger, S.; Hörisch, J.; Herzig, C. Methodische Operationalisierung unternehmerischer Nachhaltigkeit. Methodenbekanntheit, -anwendung und förderpolitische Implikationen. *Zeitschrift für Umweltpolitik und Umweltrecht* **2013**, *1*, 87–115.
61. Schaltegger, S.; Burritt, R.; Petersen, H. *An Introduction to Corporate Environmental Management: Striving for Sustainability*; Greenleaf: Sheffield, UK, 2003.
62. Herzig, C.; Schaltegger, S. Corporate Sustainability Reporting. In *Sustainability Communication. Interdisciplinary Perspectives and Theoretical Foundations*; Godemann, J., Michelsen, G., Eds.; Springer: Dordrecht, Netherlands, 2011; pp. 151–170.
63. Sharma, S.; Henriques, I. Stakeholder influences on sustainability practices in the Canadian forest products industry. *Strategic Manage. J.* **2005**, *26*, 159–180.
64. Gallo, P.J.; Christensen, L.J. Firm Size Matters: An Empirical Investigation of Organizational Size and Ownership on Sustainability-Related Behaviors. *Bus. Soc.* **2011**, *50*, 315–349.
65. Brammer, S.J.; Pavelin, S. Corporate Reputation and Social Performance: The Importance of Fit. *J. Manage. Stud.* **2006**, *43*, 435–455.
66. Darnall, N.; Henriques, I.; Sadorsky, P. Adopting Proactive Environmental Strategy: The Influence of Stakeholders and Firm Size. *J. Manage. Stud.* **2010**, *47*, 1072–1094.
67. Esrock, S.L.; Leichty, G.B. Social responsibility and corporate web pages: Self-presentation or agenda-setting? *Public Relations Review* **1998**, *24*, 305–319.
68. Shah, K.U. Corporate Environmentalism in a Small Emerging Economy: Stakeholder Perceptions and the Influence of Firm Characteristics. *Corp. Soc. Resp. Env. Ma.* **2011**, *18*, 80–90.
69. Knoepfel, I. Dow Jones Sustainability Group Index: A Global Benchmark for Corporate Sustainability. *Corporate Environmental Strategy* **2001**, *8*, 6–15
70. Fowler, S.J.; Hope, C. A Critical Review of Sustainable Business Indices and their Impact. *J. Bus. Ethics* **2007**, *76*, 243–252.
71. Consolandi, C.; Jaiswal-Dale, A.; Poggiani, E.; Vercelli, A. Global Standards and Ethical Stock Indexes: The Case of the Dow Jones Sustainability Stoxx Index. *J. Bus. Ethics* **2009**, *87*, 185–197.
72. Welt Online Die 500 größten Unternehmen in Deutschland. 2009; <http://top500.welt.de> (accessed on 13 July 2009).
73. Marsden, C. The New Corporate Citizenship of Big Business: Part of the Solution to Sustainability? *Business and Society Review* **2000**, *105*, 8–25.
74. Lewis, G.J.; Harvey, B. Perceived Environmental Uncertainty: The Extension of Miller’s Scale to the Natural Environment. *J. Manage. Stud.* **2001**, *38*, 201–233.
75. Brammer, S.J.; Pavelin, S.; Porter, L.A. Corporate Charitable Giving, Multinational Companies and Countries of Concern. *J. Manage. Stud.* **2009**, *46*, 575–596.
76. Estrin, S.; Baghdasaryan, D.; Meyer, K.E. The Impact of Institutional and Human Resource Distance on International Entry Strategies. *J. Manage. Stud.* **2009**, *46*, 1171–1196.
77. Muller, A.; Kolk, A. Extrinsic and Intrinsic Drivers of Corporate Social Performance: Evidence from Foreign and Domestic Firms in Mexico. *J. Manage. Stud.* **2010**, *47*, 1–26.

78. Carter, C.R.; Jennings, M.M. The Role of Purchasing in Corporate Social Responsibility. A Structural Equation Analysis. *J. Bus. Logist.* **2004**, *25*, 145–186.
79. Deutsche Börse 2010. <http://www.dax-indices.com/EN/index.aspx?pageID=4> (accessed 4 February 2010).
80. Backhaus, K.; Erichson, B.; Plinke, W.; Weiber, R. *Multivariate Analysemethoden. Eine anwendungsorientierte Einführung*, 11th ed.; Springer: Berlin/Heidelberg, Germany, 2011.
81. Hunting, S.A.; Tilbury, D. *Shifting towards sustainability. Six insights into successful organisational change for sustainability*; ARIES: Sydney, Australia, 2006.

© 2013 by the authors; licensee MDPI, Basel, Switzerland. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution license (<http://creativecommons.org/licenses/by/3.0/>).

V. Paper 5

Schaltegger, S.; Windolph, S. E. & Herzig, C. (2012): Applying the Known. A Longitudinal Analysis of the Knowledge and Application of Sustainability Management Tools in Large German Companies, *Society and Economy*, Vol. 34, No. 4, 549–579.

APPLYING THE KNOWN

A longitudinal analysis of the knowledge and application of sustainability management tools in large German companies*

STEFAN SCHALTEGGER¹ – SARAH ELENA WINDOLPH²
– CHRISTIAN HERZIG³

¹*Centre for Sustainability Management, Leuphana Universität Lüneburg, Germany
schaltegger@uni.leuphana.de*

²*Centre for Sustainability Management, Leuphana Universität Lüneburg, Germany
windolph@uni.leuphana.de*

³*International Centre for Corporate Social Responsibility (ICCSR),
Nottingham University Business School
christian.herzig@nottingham.ac.uk*

The operationalisation of sustainability on the corporate level is recognised to be a management task and implies the choice and application of management tools. Although researchers have proposed a large number of sustainability management tools in the literature, little is known about their acceptance and implementation. This paper extends the existing literature on the dissemination of tools. It discusses which sustainability management tools are known and applied in practice, and conducts a longitudinal analysis based on three empirical surveys among large German companies carried out in 2002, 2006 and 2010. One important result is that the knowledge and the application of sustainability management tools are positively related. Furthermore, the application of sustainability management tools has increased throughout the period of the surveys. A main conclusion drawn from the empirical results is that increased knowledge, for example through the promotion of approaches and professional education, may be a driver of more frequent application and the dissemination of sustainability management tools, and may foster sustainable development.

Keywords: Corporate social responsibility, corporate sustainability, implementation, management system, sustainability management, tools

JEL-codes: M10, M14, D80

* We are grateful for the financial support of PwC while collecting part of the data analysed in this paper. The authors would like to thank the German Federal Ministry for the Environment, the Federation of German Industries, and Econsense, Forum for Sustainable Development of German Business, for funding a project which also provided data analysed in this paper. Many thanks to Roger Burritt, Dorli Harms, Jacob Hörisch and Joanne Tingey-Holyoak who contributed with very valuable comments to this paper.

1. INTRODUCTION

For the last two decades sustainability management and related concepts like corporate social responsibility (CSR) or responsiveness to stakeholders have received increasing attention in management literature and in corporate practice (Banerjee 2001; Brammer – Pavelin 2006; Brammer et al. 2009; Dunphy et al. 2007; Scherer – Palazzo 2011). The operationalisation of corporate sustainability is considered to be an important management task (Epstein 2008; Shrivastava 1995) with the aim of integrating social and environmental issues into business management practices in the company (see also Shrivastava – Hart 1995). This integration does not only require a strategic approach to sustainability (Husted – de Jesus Salazar 2006; McWilliams et al. 2006) but also the successful application of concrete measures (similar to Boiral 2006; Brammer – Millington 2004; WBCSD 2002). It implies various decisions such as the assignment of responsibilities in the organization, the design of planning and control processes and the choice and application of strategic and operational management tools and standards (e.g. Schaltegger 2011). Furthermore, the operationalisation of corporate sustainability requires the acquisition of new knowledge as well as the handling of new practices (Boiral 2002; Lockett et al. 2006). In response to this, various researchers have proposed a large number of sustainability management tools (e.g. Biebeler et al. 2005; Darnall et al. 2010; Epstein 2008; Hahn – Scheermesser 2006; Tencati et al. 2004; for an overview of tools see also European Commission 2004; Schaltegger et al. 2002). These tools address different aspects of sustainability. For example, environmental management standards and systems like ISO 14001 have gained importance for many companies (e.g. Banerjee 2001; Jiang – Bansal 2003; Schaefer 2007). They serve to integrate environmental issues into conventional business and provide companies with guidelines, actions and processes to increase environmental performance. Social responsibility and social issues are in the limelight of social management standards like SA 8000 (Lockett et al. 2006) and audits on working conditions (Scherer – Palazzo 2011). Furthermore, integrative tools and systems aim at linking environmental, social and economic aspects of management, such as e.g. standards for the management of stakeholder relations (like AA 1000) (Lockett et al. 2006), sustainability management systems (Schaefer 2007) or sustainability reporting (Herzig – Schaltegger 2011).

However, management approaches which have been proposed in literature may not necessarily always be useful in corporate practice, as for example pointed out by Ackermann and Eden (2011) with regard to the management of stakeholder relations. Similarly, Husted and Allen (2007: 607) call to provide corporate practitioners with “better tools” for corporate social responsibility (CSR) management and assessment and Scherer and Palazzo see a “need for empirical research con-

cerning the right tools and processes for managing social and environmental issues along supply chains” (2011: 920).

A closer examination of the literature on sustainability management reveals that management research has until today largely neglected the analysis of the implementation of the manifold sustainability management tools in practice and how it has developed over time. Longitudinal analyses rather deal with single management tools or systems like ISO 14001 (Schaefer 2007) or charitable giving (Brammer – Millington 2004). Most other longitudinal studies in environmental and sustainability management have so far focused on the development and the determinants of environmental businesses or corporate sustainability in general (e.g. Bansal 2005; Holt 2010; Lee – Rhee 2007), the definition of corporate sustainability and related concepts (e.g. Montiel 2008), single case studies (e.g. Tregidga – Milne 2006) or special interest topics like the development of social and environmental reporting (e.g. Herzig – Godemann 2010; Kolk 2010).

Given this research gap, this paper explores the knowledge and the application of a broad set of sustainability management tools. It presents the findings from a longitudinal study of large German companies covering three points in time: 2002, 2006 and 2010. The development of both knowledge and application of sustainability management approaches is analysed as well as the relationship between knowledge and application and its development over time. The paper also sheds light on whether knowledge may be a driver of the application of sustainability management tools.

Our research has also been motivated by institutional and management fashion theories (Abrahamson 1996; DiMaggio – Powell 1983) and related publications dealing with the “institutionalization”, “spread” or “dissemination” of management tools in general (Nicolai et al. 2010) or environmental and sustainability management tools in particular (Banerjee 2001; Schaefer 2007). The existing research explains the broad dissemination of a sustainability management tool or concept as a result of a management fashion and a bandwagon effect (Banerjee 2001; Nicolai et al. 2010; Schaefer 2007).

This article takes a closer look at a leading factor of institutionalization in organizations which may drive the dissemination of a sustainability management tool in an industry or country. Whereas the existing literature refers to the *adoption* of management tools, this paper investigates the role of *knowledge* which can be seen as a precondition for application. Only if a sustainability management tool is known, can it be adopted and applied.

The idea to investigate the role of knowledge is based on an observation by Nicolai et al. (2010). While “turning into a management fashion these concepts become an object of the broader discourse that is shaped by the public business press and management bestsellers” (Nicolai et al. 2010: 165). Such management

fashion setters, situated outside the organizations which actually apply the tools, are often important drivers of the dissemination of tools and influencers of corporate decisions (Nicolai et al. 2010; Schaefer 2007). Thus, this paper highlights that the spread of tools is lead by communication and knowledge about a certain tool. Industry-, country- or world-wide dissemination and institutionalization are thus influenced by tool specific knowledge which leads adoption and application of the tool. The application may be accompanied by an adaption of the tool to the specific situation or requirements of the company. Dissemination, however, does not work (as effectively) without a related discourse spreading knowledge about these tools. The knowledge of a tool can be seen as a prerequisite and key driver of its application – and thus for its dissemination and possibly its institutionalization.

Accordingly, this paper conducts an empirical analysis of the knowledge and application of sustainability management tools with the example of large German companies. The findings allow for the deduction of measures which could support further dissemination and application of management tools.

The paper is structured as follows. After an introduction to sustainability management tools and a short description of their role for the realisation of corporate sustainability, the methodological approach of the longitudinal study is explained. The empirical results are presented, analysed and finally discussed in the concluding section.

2. TOOLS FOR SUSTAINABILITY MANAGEMENT

The implementation of corporate strategies and operational goals requires the support of management tools. The choice and application of these management tools is without doubt a core task for business managers. It is thus not astonishing that management literature and practitioner-orientated management books suggest a wide range of different approaches (e.g. Nagel et al. 2010; Rigby – Bilodeau 2007) and that the emergence and decline of management concepts (Nicolai et al., 2010) and innovations of management systems (Crossan – Apaydin 2010; Damanpour et al. 2009) is discussed vigorously. This is similar with the sustainability management literature even though the number of publications is relatively low compared to conventional management publications. Relevant work has been published by Epstein (2008) discussing the concept of corporate sustainability and related tools, as well as by the European Commission (2004) and Tencati et al. (2004) who analyse CSR standards, initiatives and instruments. Biebeler et al. (2005) discuss the characteristics of several such instruments with the help of case studies. Furthermore BMU and BDI (2002) compile and Hahn and Scheermesser (2006) analyse different environmental and social management tools in the con-

text of German companies, whereas Henriques and Sadorsky (2010) discuss tools of proactive environmental strategies. Sustainability related activities in an SME context have been dealt with by Bos-Brouwers (2010). Additionally, several practical introductions can be found, e.g. by Thompson (2002) on environmental management tools.

The multitude of publications reveals that tools of sustainability management have been proposed for all corporate functions and include environmental, social and integrated sustainability management approaches. They can be differentiated into more quantitatively orientated, ‘hard’ approaches (such as environmental accounting, indicators, etc.) and more qualitative, ‘soft’ approaches (such as employee volunteering, sustainability quality circles, etc.). Prevalent (environmental, social or sustainability) tools address:

- physically tangible issues such as material and energy flows (e.g. Herzig et al. 2012; Jasch 2009; von Weizsäcker et al. 2009);
- performance measurement and management such as life cycle assessment (LCA), sustainability indicators, sustainability balanced scorecard, benchmarking, etc. (e.g. Herzig et al. 2012; Möller – Schaltegger 2005; Schaltegger 2011; Springett 2003);
- supply chains (e.g. Carter – Rogers 2008; Scherer – Palazzo 2011; Seuring – Müller 2008);
- innovations such as eco-design, quality circles, etc. (e.g. Bos-Brouwers 2010; Foster – Green 2000);
- communication and reporting such as stakeholder dialogues, sustainability report, etc. (e.g. Ackermann – Eden 2011; Herzig – Schaltegger 2011; Scherer – Palazzo 2011; WBCSD 2002);
- management systems such as EMAS, ISO 14001, SA 8000, etc. (e.g. Darnall et al. 2008; Jiang – Bansal 2003; Lockett et al. 2006; Müller et al. 2009; Schaefer 2007);
- organizational learning and adaptation (e.g. Dunphy et al. 2007; Gond et al. 2012; Jennings – Seaman 1994; Lockett et al. 2006; Müller – Siebenhüner 2007);
- staff involvement such as training, incentive systems, corporate culture, etc. (e.g. Daily – Huang 2001).

The extensive literature dealing with the multitude of sustainability management approaches shows that a wide range of sustainability management tools exist and can be tried out, applied, further developed or established for routine use in a company. It can, however, be expected that companies make a choice and only implement those sustainability management tools which they consider to be practical and (most) beneficial because resources, especially time, personnel and

money, are limited. The choice and application of particular sustainability management tools thus reflect companies' priorities with regard to sustainability and constitute implementation patterns of emergent sustainability strategies in practice (for a general discussion of strategy patterns see e.g. Mintzberg 1978 and Mintzberg et al. 1998; in relation to sustainability strategy see Gond et al. 2012). Additionally, in conventional as well as in sustainability management, the spread of management tools is also affected by the choices of other companies. Management concepts are more likely to be applied when they are widely accepted and a significant number of other companies have adopted them (bandwagon effect) (Nicolai et al. 2010; Schaefer 2007).

However, referring to contingency theory (e.g. Lawrence – Lorsch 1967; Woodward 1981) the choice of sustainability management tools may not be based on full information and the application in corporate practice may thus be bounded rational (March – Simon 1958). Contingencies may include a lack of information on which tools of sustainability management exist and how useful they are. Thus one reason why some tools are not applied may be that they are not known. This is why several research questions seem important to be addressed in order to analyse the implementation of sustainability management tools in practice.

3. RESEARCH QUESTIONS AND METHODOLOGICAL APPROACH

Dealing with the implementation of sustainability tools in corporate practice this paper investigates the following questions:

- Which tools of corporate sustainability management are known and which are applied in large German companies?
- How have the knowledge and application of sustainability management tools developed over time?
- What is the relationship between the application of sustainability management tools and the companies' knowledge of these tools?
- How has this relationship developed over time?

The research questions will be answered through a longitudinal study comprising three surveys which were carried out among large German companies in 2002, 2006 and 2010. The longitudinal analysis includes the following steps:

- The *knowledge* and *application* of sustainability management tools in each survey and the *development* of knowledge and application over time indicate whether operational knowledge in corporate sustainability management is increasing and whether tools are being increasingly accepted.

- The *difference between knowledge and application* (knowledge-application gap), the *relative application* of sustainability management tools (application in relation to knowledge) and the *development* of these two indicators over time demonstrate the (perceived) practicality of existing tools of sustainability management. Furthermore they show how fast the knowledge of sustainability management approaches is transferred into action, i.e. the application of the tools.
- Furthermore, the discussion of *knowledge as a possible driver of application* comprises the analyses of four categories of tools. Firstly, knowledge can only be interpreted as a driver if the application increases with the knowledge. A first possible measure of whether knowledge precedes application is thus to investigate whether the application of *increasingly known tools* also increases over time. A second measure will be the development of the application of tools which have *already been well-known* for a while. As the transformation of knowledge into application needs time, the difference between knowledge and application cannot be eliminated at once but it should get smaller over time for these tools – for which no (substantial) knowledge increase over time can be expected. Thirdly and fourthly, to complete this analysis, the development of the application of tools which are *decreasingly known* over time or *have been less well-known* in all three surveys is discussed. If the application of these tools does not increase as clearly as the application of more well-known tools, or if the application even decreases, this could indicate that knowledge is a driver of application.

3.1 Sample

In every of the three survey years the 120 largest German companies by sales (according to major German newspapers *Frankfurter Allgemeine Zeitung* 2002 and 2006; *Welt online* 2009, adjusted for subsidiary companies) were asked to fill in a questionnaire. The sustainability managers or other persons in charge of sustainability issues were contacted by phone and asked to fill in the questionnaire sent to them by e-mail or mail, where necessary involving those in the company who could support them. The respondents were mostly sustainability, EHS-, CSR- or sustainability managers or, to a lower extent, associated with public relations or communications. Further sample characteristics can be found in *Table 1*. The database, due to the high albeit decreasing response rate, is sufficient for statistical analyses. The data were analysed with PASW Statistics 18.

Table 1. Characteristics of the survey samples (2002, 2006 and 2010)

Sample characteristics	2002	2006	2010
Sample size (response rate)	44 (36.7%)	42 (35.0%)	31 (25.8%)
Average sales (in million Euro)	20,629	21,173	24,701
Average number of employees	86,207	82,090	88,651
Number of sustainability tools queried	52	78	79

Source: based on *Frankfurter Allgemeine Zeitung* (2002; 2006); *Welt online* (2009).

The longitudinal study focuses on large German companies for three reasons: firstly, large companies are publicly exposed which may drive them to engage with sustainability more strongly than small and medium-sized enterprises (Brammer – Pavelin 2006; Darnall et al. 2010). Secondly, they can be expected to have the resources to try out and implement sustainability tools on a large scale (Esrock – Leichty 1998; Marsden 2000). Thirdly, the narrow focus on Germany eliminates decisive influences related to contingencies, e.g. in case that some corporate sustainability management activities or tools may be regulated or promoted more in one country than in another (Brammer et al. 2009; Muller – Kolk 2010).

3.2 Content of the survey

The basic requirement for a certain tool of sustainability management to be applied in corporate practice is that it is known. This is why the respondents representing the 120 largest companies in Germany were firstly asked which sustainability management approaches they know. This was done on the basis of a list of tools provided in the questionnaire and drawn from a review of contemporary sustainability management literature (for an overview of tools see e.g. Schaltegger et al. 2002; European Commission 2004). The paper thus follows a deductive approach to explore the knowledge and application of the relevant ‘pool’ of sustainability management tools. To capture the contemporarily relevant pool of tools, the range of tools considered in the questionnaires was extended by newly developed, primarily integrative tools (such as sustainability management system or sustainability accounting) leading to an increase in number of tools from 52 to 79 between the three surveys (see *Table 1* and *Table A1* in the *Appendix* for an overview of the queried tools). The managers also had the option to add tools which were not listed.

Secondly, the managers were asked which of the known tools are at least partially applied in their company to support corporate sustainable development. The results of the surveys will be presented and discussed in the following.

4. EMPIRICAL RESULTS AND ANALYSIS

This section presents the findings on the knowledge and application of sustainability management tools using longitudinal data gathered at three points in time, in 2002, 2006 and 2010. The findings are presented in three steps. The next section shows how knowledge is related to the application of sustainability management tools, distinguishing between absolute and relative application. Secondly, the dynamics in the application of tools are presented. Again, this analysis is carried out for the absolute and relative application. Thirdly and finally, an in-depth analysis is conducted of whether knowledge can be a driver for the application of sustainability management tools.

4.1. Knowledge and application of sustainability management tools

More knowledge relates to more frequent application. Figures 1, 2 and 3 provide an overview of the percentage of companies which i) know and ii) (know and) apply a certain sustainability management tool in 2002, 2006 and 2010. The difference between knowledge and application (i.e. the knowledge–application gap) is shown by the area between the two curves. The tools are ordered according to their degree of knowledge among managers: on left the least known, on right the most known tools.

A first observation is that all kinds of combination of knowledge and application rates exist: some tools like quality management systems which include environmental and social issues have been known by almost all companies (between 95.2% and 100.0%) and frequently applied (between 92.9% and 95.5%) in all three surveys. Other well-known tools such as eco labels (known by 61.3% to 95.5%, applied by 28.6% to 41.9%) are, however, not applied as often. This means that the difference between knowledge and application is relatively large. In contrast, some less well-known tools such as early detection (known by 42.9% to 61.3%, applied by 31.0% to 41.9%) are applied relatively often in comparison to their degree of knowledge, i.e. the difference between knowledge and application is comparatively small. A last group of tools is neither well-known nor often applied such as eco-compass (known by 25.8% to 34.1%, applied by 0.0% to 2.4%).

The general relationship between knowledge and application of sustainability management tools is nevertheless characterized by a very strong positive correlation on highly significant levels. *Table 2* offers further details on the knowledge and application of sustainability management tools and their relationship (when comparing the data of 2002, 2006 and 2010 it has to be considered that the number of tools which were queried varies over time).

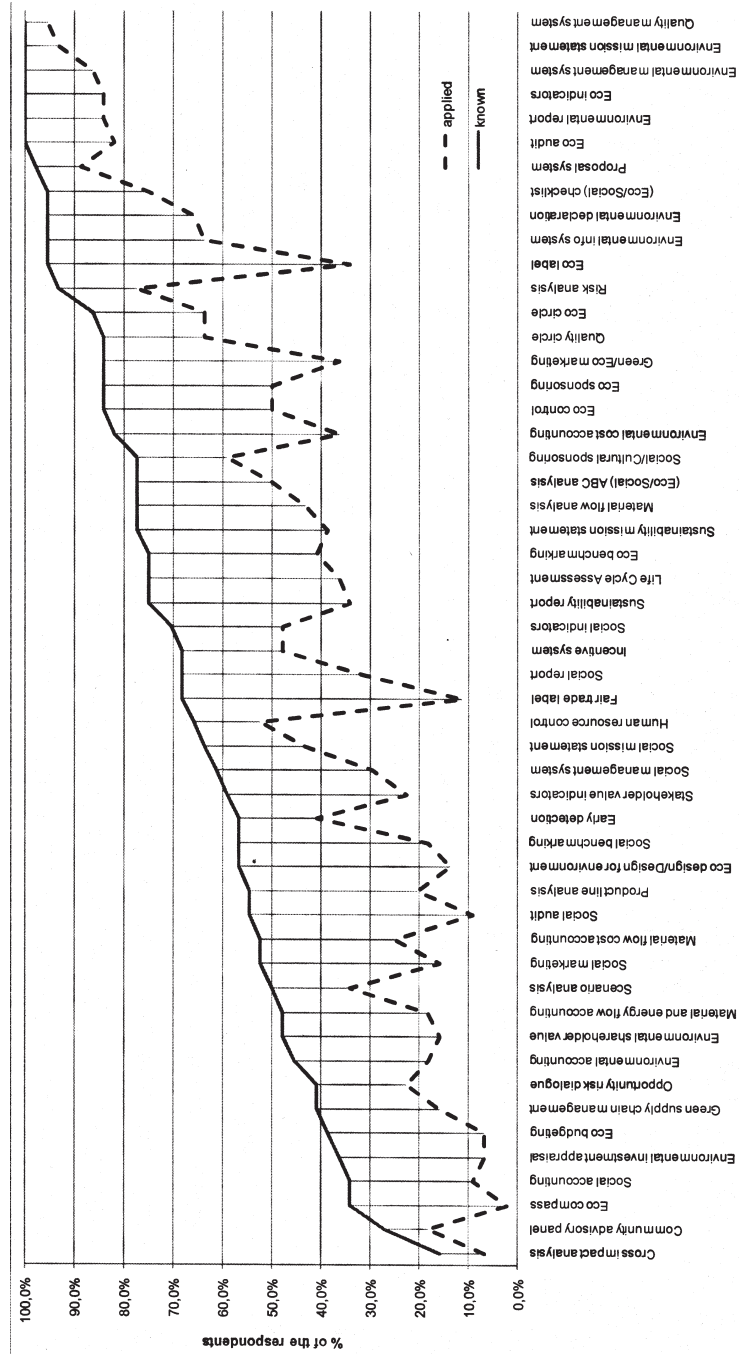


Figure 1. Knowledge and application of sustainability management tools in 2002

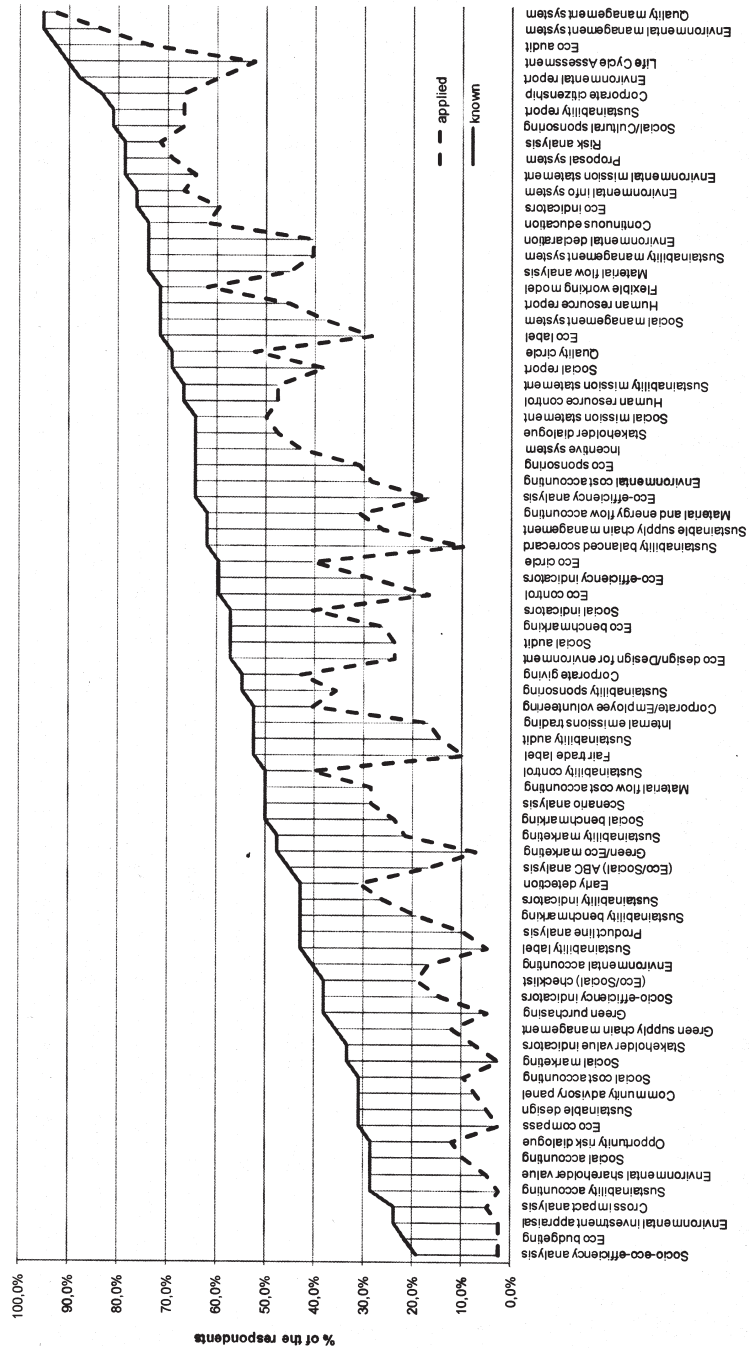


Figure 2. Knowledge and application of sustainability management tools in 2006

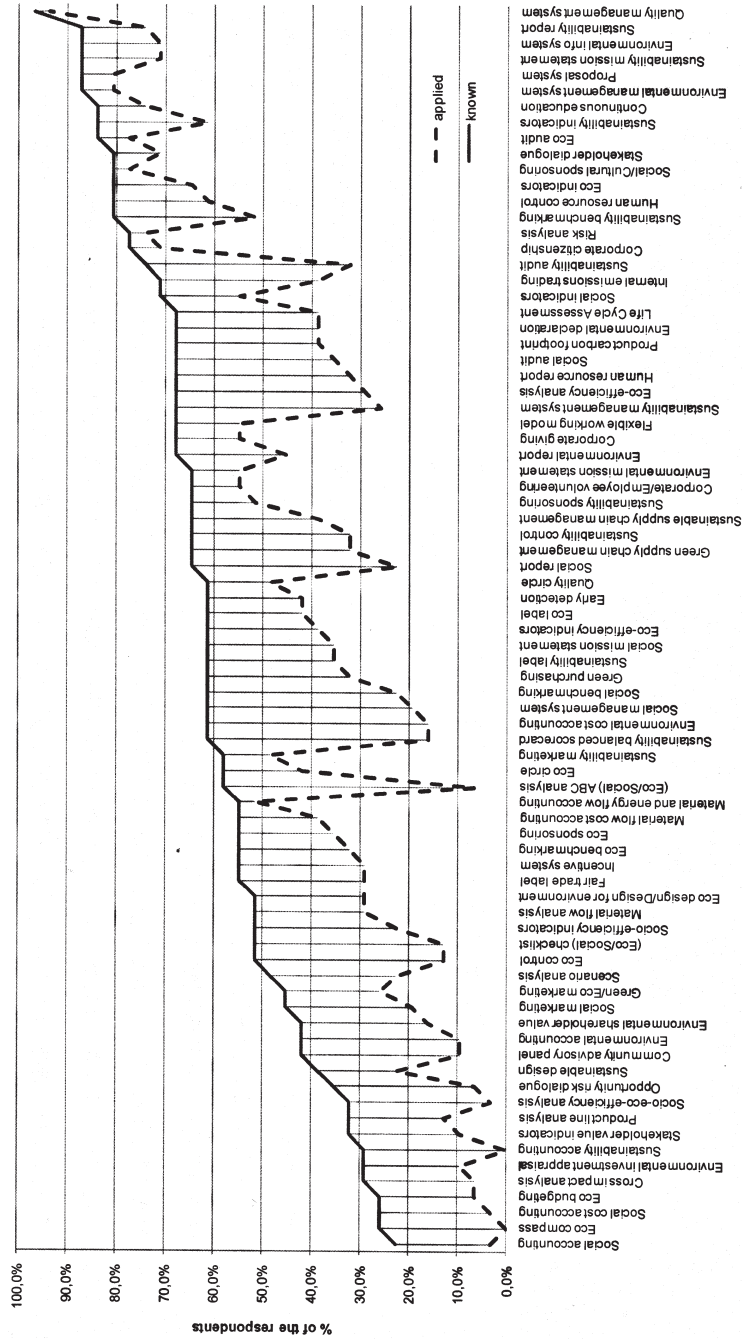


Figure 3. Knowledge and application of sustainability management tools in 2010

Table 2. Knowledge and application of sustainability management tools

Knowledge and application of sustainability management tools	2002 (52 tools)	2006 (78 tools)	2010 (79 tools)
Average knowledge	68.8%	56.2%	60.1%
Average application	41.1%	31.8%	36.9%
Average knowledge–application gap	27.8%	24.4%	23.2%
Average ratio application/knowledge	54.8%	50.1%	55.8%
Correlation of knowledge with application (Pearson)	0.88**	0.89**	0.89**

**p < 0.01

The positive relationship between knowledge and application indicates that approaches which are known more are absolutely applied more often in corporate practice. The relative application is to be further examined next.

More knowledge relates to more relative application. In order to further examine the difference between knowledge and application (i.e. the knowledge–application gap) on the one hand and the relative application (application in relation to knowledge) on the other hand, the sustainability management tools are divided into three categories:

- well-known tools: known by more than 66% of the respondents (e.g. sustainability reporting or environmental management systems);
- moderately known tools: known by more than 33% but not more than 66% (e.g. environmental accounting or social marketing);
- less well-known tools: known by not more than 33% (e.g. cross impact analysis).

Table 3 displays the knowledge–application gaps (k–a gaps) and the ratio between application and knowledge (ratio a/k) for *well-known* tools, *moderately known* tools and *less well-known* tools for the years 2002, 2006 and 2010. The table shows that the absolute number of well-known tools has been rather constant in all three years, whereas the relative number has decreased due to the increased number of relevant tools. The majority of tools were moderately known in 2006 and 2010.

The comparative analysis also shows that the average knowledge–application gap is smaller for tools that are well-known than for less well-known and especially for moderately known tools in 2006 and 2010. For 2002, when only 52 tools were queried, this relationship is not that clear, but it has to be considered that the category of less well-known tools only contains two tools in 2002 so that these particular figures are not conclusive.

Table 3. Application of well-known, moderately and less well-known tools

	Tools ^a	No. of tools (%)	Average k-a gap	Variance of k-a gap	Average ratio a/k	Variance of ratio a/k
2002 (52 tools)	Well-known	29 (55.8%)	28.1%	2.0	65.6%	3.7
	Moderately known	21 (40.4%)	29.0%	0.8	39.9%	3.9
	Less well-known	2 (3.8%)	9.1%	0.0	54.8%	2.8
2006 (78 tools)	Well-known	25 (32.1%)	20.3%	1.1	73.3%	2.2
	Moderately known	41 (52.6%)	27.6%	1.1	44.9%	4.4
	Less well-known	12 (15.4%)	21.8%	0.2	19.2%	1.2
2010 (79 tools)	Well-known	29 (36.7%)	19.4%	1.5	73.5%	3.3
	Moderately known	40 (50.6%)	26.0%	1.2	52.2%	4.3
	Less well-known	10 (12.7%)	22.9%	0.1	18.7%	1.9

^a well-known: $x > 66\%$, moderately known: by $33\% < x \leq 66\%$, less well-known: $x \leq 33\%$

Additionally, examining the 2006 and 2010 data, the average ratio between application and knowledge is higher the more the tools are known (the numbers for less well-known tools in 2002 are not considered in this context). These results imply a positive relationship of knowledge and the ratio between application and knowledge, which is emphasized by their significant correlation: in 2002 the correlation of knowledge with the ratio between application and knowledge was 0.67 and in 2006 and 2010 it was 0.77 (on a significance level of 0.01). Thus, well-known tools are not only applied more often in absolute terms (application) but also in relative terms (application in relationship to knowledge).

These facts imply that the perceived practicality of these tools is high. Furthermore, the results may indicate a causal relationship between knowledge and application. Generally, the relationship between knowledge and application may exert effects in two directions. Firstly, knowledge is a required first step preceding the application of a tool. However, the direction may also be the other way round: once a tool has been introduced and applied in a company other companies may learn about the existence of the approach, especially if there is uncertainty about how to deal with the issues addressed by the approach (see DiMaggio – Powell 1983 for a discussion of mimetic and, more generally, institutional isomorphism, as well as Child – Tsai 2005 and Schaefer 2007 for a discussion of isomorphism in the context of environmental and sustainability management). With some exceptions this second situation may be of little relevance in the context of this paper as

the respondents to the questionnaire were those in charge of sustainability management in their companies. These people are by profession well informed about sustainability management tools and are usually key actors of sustainability implementation.

In the following the dynamics in the development of knowledge and application of sustainability management tools over time are investigated. Furthermore, in order to analyse whether knowledge may be a driver of application, four categories of tools are analysed: increasingly and already well-known as well as decreasingly and less well-known tools.

4.2. Dynamics in the application of sustainability management tools

Increasing application over time. When comparing the results of the three surveys over time it becomes apparent that the average knowledge and the average application have increased between 2006 and 2010, when a similar number of tools were queried (see *Table 2*). This relationship cannot be confirmed when the 2006 data is compared with the data from 2002. However, it has to be considered that in 2002 fewer tools were included in the questionnaire. In order to compare the difference of knowledge and application and the relative application of tools over time in more detail, firstly the knowledge–application gap and secondly the ratio between application and knowledge are analysed in the following. The development of these two indicators shows whether the knowledge of sustainability management approaches is transferred into action, i.e. the application of tools. This analysis may thus reflect the (perceived) practicality of sustainability management tools.

Increasing relative application over time. The gap between knowing and applying a sustainability management tool is shown by the striped area in *Figures 1, 2 and 3* for the surveys of 2002, 2006 and 2010. A comparison of the knowledge–application gap shows that the average gap between knowledge and application has decreased between the surveys, particularly between 2002 and 2006, but also between 2006 and 2010 (see *Table 2*). Also, the size of the largest gap has been decreasing: whereas the largest gap was 61.4% in 2002, it went down to 52.4% in 2006 and to 51.4% in 2010. This is particularly true for well-known tools (known by more than 66% of the respondents in all three surveys): their average knowledge–application gap has strongly decreased (see *Table 3*).

This means that, on average, known sustainability management approaches are nowadays applied more often than they were in the past. Especially the well-known tools of sustainability management have apparently proven to be beneficial in corporate practice and, because of this (perceived) high practicality, are ap-

plied more often. Methodical knowledge is transferred to a larger extent into action.

This observation is also supported by the development of the ratio between application and knowledge of sustainability management tools (i.e. how many of those who know a tool apply it?). *Figure 4* clearly shows that the relative application (ratio of application and knowledge) of sustainability management tools has increased between 2006 and 2010. The curve for 2002 is not included in *Figure 4*, because substantially fewer tools were queried in 2002 which restricts the comparability of the ratio. However, *Table 2* shows that the average ratio between application and knowledge was higher in 2010 than in 2002 – although the absolute number of relevant tools increased throughout this time. This demonstrates that the application of sustainability management tools has increased even in relative terms and may reflect enhanced innovation and organisational learning in the context of sustainability.

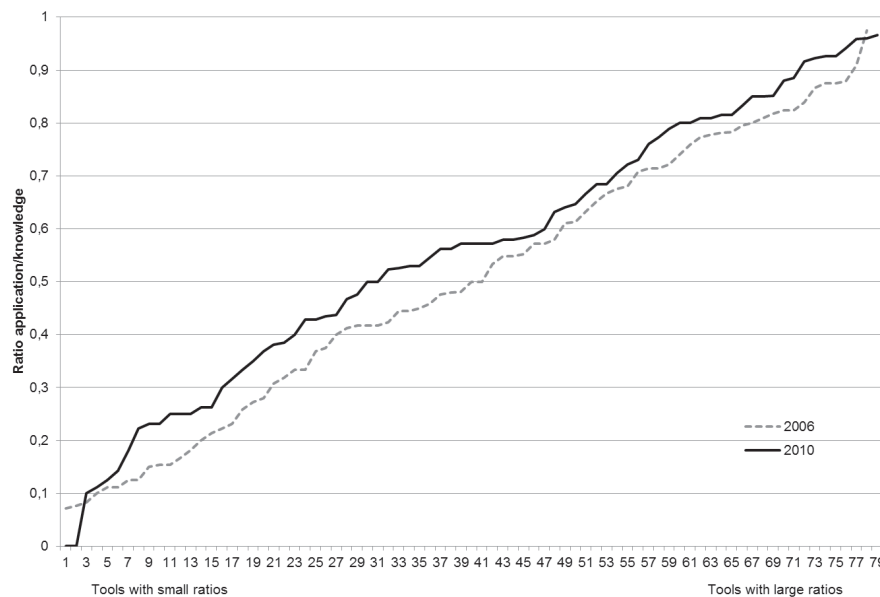


Figure 4. Ratio between application and knowledge of sustainability management tools in 2006 and 2010

Note: ordered according to size of ratio: left smallest, right largest ratio

To analyse whether knowledge may be a driver of application, a more in-depth analysis of the relationship between knowledge and application of sustainability management tools is carried out in the next section.

4.3. Knowledge as a driver of application

In the following, four categories of tools will be analysed in more detail in order to discuss whether knowledge may be a driver of application. The comparison of the results of these four analyses is carried out using the indicators 'application', 'knowledge–application gap' and 'ratio between application and knowledge of tools'.

Increasingly known tools. Increasingly known tools show a positive knowledge increase between two points in time. In total, 26 tools were increasingly well-known in the period between 2006 and 2010 (see *Table A2* in the *Appendix*). Most sustainability management approaches with increasing knowledge are fairly new tools with an integrated sustainability orientation (e.g. sustainability report, sustainability indicators, etc.) as opposed to those with environmental or social foci only. As most of these integrative approaches were considered in the survey in 2006 for the first time the analysis can only be made for the surveys of 2006 and 2010.

The analysis reveals that with increasing knowledge the application of these tools has increased, too (see also *Table A2*). The average knowledge grew from 49.0% in 2006 to 63.8% in 2010, and the average application grew from 23.9% in 2006 to 40.2% in 2010. This is an average increase of 14.8% in knowledge which went along with an average increase of 16.3% in application. The increase in knowledge and the increase in application are positively related: they show a correlation of 0.72 (on a significance level of 0.01).

The average knowledge–application gap of these tools, however, has only slightly decreased by 1.5% from 25.1% to 23.6%. That is because the knowledge–application gaps of these tools have developed differently: some have decreased whereas others have increased. On the contrary, the average ratio between application and knowledge has clearly grown by 15.0% from 42.9% in 2006 to 57.9% in 2010.

Already well-known tools. A second measure to investigate whether knowledge may be a driver of application is the development of the application of approaches which have already been well-known for a while (known by more than 66% of the respondents in all three surveys). *Table A3* in the *Appendix* shows the results of the analysis of these thirteen tools. Whereas the application of these tools has developed differently, the knowledge–application gaps have decreased between 2002 and 2010 for all but one of these tools. The average gap has also decreased by 9.2% (from 22.4% in 2002 to 17.2% in 2006 and 13.2% in 2010).

Analogously, the ratio between application and knowledge has increased for all but one of the approaches. The average ratio has increased by 8.7% (from 74.0% in 2002 to 78.9% in 2006 to 82.7% in 2010). This displays that the majority

of already well-known or ‘established’ approaches has been increasingly applied which supports the proposition introduced earlier that it takes some time until (suitable) knowledge is transferred into application (time lag) and the gap ‘closes’.

Decreasingly known tools. Another analysis is based on tools with continuously decreasing knowledge between 2002, 2006 and 2010. A list of these 20 tools can be found in *Table A4* in the *Appendix*. Possible explanations for the decrease of knowledge may include the unsuccessful application of older tools which are not communicated anymore in professional education and company-internal training or the emergence of new sustainability management tools replacing earlier developed tools (e.g. sustainability report instead of environmental report).

The analysis shows that for all but one tool the application has decreased together with the decrease in knowledge between 2002 and 2010 (with an average decrease of 23.7% in knowledge and of 15.0% in application). The knowledge–application gaps of these tools have, however, developed differently: whereas for several tools the difference between application and knowledge has decreased, it has also increased in some cases, resulting in an average decrease of 8.8%. Likewise, the ratio between application and knowledge has developed inconsistently with a slight average decrease of 2.2%.

Less well-known tools. Finally, those tools were analysed which are less well-known in corporate practice, meaning they have been known by less than 50.0% of the respondents in all three surveys (only those tools queried in all three surveys were included). Those 9 tools belonging to this category are listed in *Table A5* in the *Appendix*. The majority of these tools have not only experienced a decrease in knowledge (with a slight average decrease of 3.0% between 2002 and 2010) but also in application (with an average decrease of 4.3%). Furthermore, the average knowledge–application gaps of these tools have slightly increased by 1.4% whereas the average ratio between application and knowledge has decreased by 12.3%.

Although the number of cases analysed here is relatively small and individual tools have developed differently, the overall results indicate that with less knowledge the application of sustainability management tools also decreases. This, again, supports the proposition that knowledge may be a driver of application.

5. DISCUSSION AND CONCLUSIONS

Sustainable development of companies does not only require the formulation of sustainability strategies but also the successful implementation of concrete measures, such as the application of sustainability management tools (similar to

Boiral 2006; Brammer – Millington 2004; Husted – de Jesus Salazar 2006; McWilliams et al. 2006; WBCSD 2002). Whilst there is an extent body of literature on sustainability management approaches, little is known about the knowledge and dissemination of the various tools in corporate practice. This paper conducted a longitudinal analysis based on data from three surveys to investigate which sustainability management tools are known and applied in large German companies and how the relationship of knowledge and application has developed since 2002.

The analysis shows that both the average knowledge and the average application of management tools have increased between 2006 and 2010. This relationship is not confirmed for the survey in 2002, but it has to be kept in mind that the number of tools queried was much smaller in 2002. Nonetheless, the relative application, that is the application in relation to the knowledge of a tool, is positively correlated with knowledge, and has continuously increased throughout the surveys – although a large number of new, integrative approaches were introduced over time. This result indicates a learning effect and that the integration of sustainability is progressing in corporate practice.

Overall, the analysis of various categories of tools confirms the positive correlation of knowledge with application to be valid not only for the aggregated data but also for various parts of them. *Table 4* gives an overview of these results.

Table 4. Results of the analysis of various categories of tools

Longitudinal analysis of...	Results		
	Application	Knowledge–application gap	Application/knowledge
increasingly known tools	increased	inconsistent, decreased slightly on average	increased
already well-known tools	inconsistent	decreased	increased
decreasingly well-known tools	decreased	inconsistent, decreased on average	inconsistent, decreased slightly on average
less well-known tools	decreased	inconsistent, increased slightly on average	inconsistent, decreased on average

The analyses of various categories of tools show that tools which are increasingly well-known over time are applied more often today than in the past. Their application has not only increased in absolute but also in relative terms. The perceived practicality of these tools can thus be considered high. It will be interesting to observe whether these tools will become even more popular in the years to come.

Furthermore, those tools which have been well-known in all of the three surveys show an increase in their relative application. This result indicates that a time lag exists between knowledge and application and that this gap is slowly closing for tools which supposedly are considered highly practical. It can be expected that these tools will further disseminate among companies in the future.

Crosschecking these results with those tools that are decreasingly known or have been less-known in all three surveys confirms the positive relationship between knowledge and application. Similarly to their knowledge, the application of these tools is low or decreasing over time.

The findings on the dynamics in the relationship between knowledge and application of sustainability management tools may help enhancing the operationalisation of sustainability management. The study is based on a unique set of data collected over a period of eight years characterised by significant developments in different areas of sustainability management such as the emergence of sustainability reporting and accounting (Herzig – Schaltegger 2011; Schaltegger – Burritt 2010). However, additional analyses in the years to come may provide further insights into the development of corporate sustainability management. Additionally, it has to be considered that the survey results, like survey results in general, may be subject to social desirability (Banerjee 2001; Fernandes – Randall 1992). To minimize this effect, the data were collected in an anonymised way.

This paper showed that the knowledge about a sustainability management tool is an important influential factor for its application and dissemination. Notwithstanding the limitations of this research and although the data do not allow substantiated final statements about causality, the results support the argument that the dissemination of a management tool requires related tool-specific knowledge. Thus, knowledge about a tool is not only a prerequisite for adoption but also appears to be a driver of its application and dissemination.

The longitudinal analysis of large German companies revealed that well-known and increasingly known sustainability management tools are applied more often, and tools with less or decreasing knowledge are applied less or show a very inconsistent development of application. This may imply that the perceived practicality of these tools is low and that further methodical development is needed for the management of related issues. It may, however, also reflect isomorphistic tendencies that discussions about a certain tool and increased knowledge support its application.

Furthermore, this result supports the conclusion that the application of sustainability management tools – and thus the contribution of companies to sustainable development – may be increased through the promotion of existing and new approaches.

Further research could analyse additional possible influence factors, such as company size or the time period between when a tool has been proposed in literature and when it was applied in companies. An interesting observation is the time it takes until the knowledge-application gap closes: even for established tools the knowledge-application gap does not close at once, but decreases slowly. This indicates that a time lag has to be considered in the transformation of knowledge into action and in applying the known.

REFERENCES

- Abrahamson, E. (1996): Management Fashion. *Academy of Management Review* 21: 254–85.
- Ackermann, F. – Eden, C. (2011): Strategic Management of Stakeholders: Theory and Practice. *Long Range Planning* 44: 179–196.
- Banerjee, S. B. (2001): Managerial Perceptions of Corporate Environmentalism: Interpretations from Industry and Implications for Organizations. *Journal of Management Studies* 38: 489–513.
- Bansal, P. (2005): Evolving Sustainably: A Longitudinal Study of Corporate Sustainable Development. *Strategic Management Journal* 26: 197–218.
- Biebler, H. – Mahammadzadeh, M. – Selke, J.-W. (2005): Corporate Instruments for Sustainable Management: Characteristics and Thematic Priorities. *International Journal of Environment and Sustainable Development* 4: 425–434.
- BMU and BDI (eds) (2002): *Sustainability Management in Business Enterprises. Concepts and Instruments for Sustainable Organisation Development*. Berlin/Lüneburg: BMU/Centre for Sustainability Management.
- Boiral, O. (2002): Tacit Knowledge and Environmental Management. *Long Range Planning* 35: 291–317.
- Boiral, O. (2006): Global Warming: Should Companies Adopt a Proactive Strategy? *Long Range Planning* 39: 315–330.
- Bos-Brouwers, H. E. (2010): Corporate Sustainability and Innovation in SMEs: Evidence of Themes and Activities in Practice. *Business Strategy and the Environment* 19: 417–435.
- Brammer, S. J. – Millington, A. (2004): The Development of Corporate Charitable Contributions in the UK: A Stakeholder Analysis. *Journal of Management Studies* 41: 1411–1434.
- Brammer, S. J. – Pavelin, S. (2006): Corporate Reputation and Social Performance: The Importance of Fit. *Journal of Management Studies* 43: 435–455.
- Brammer, S. J. – Pavelin, S. – Porter, L. A. (2009): Corporate Charitable Giving, Multinational Companies and Countries of Concern. *Journal of Management Studies* 46: 575–596.
- Carter, C. R. – Rogers, D. S. (2008): A Framework of Sustainable Supply Chain Management. Moving toward New Theory. *International Journal of Physical Distribution & Logistics Management* 38: 360–387.
- Child, J. – Tsai, T. (2005): The Dynamic Between Firms' Environmental Strategies and Institutional Constraints in Emerging Economies: Evidence from China and Taiwan. *Journal of Management Studies* 42: 95–125.
- Crossan, M. M. – Apaydin, M. (2010): A Multi-Dimensional Framework of Organizational Innovation: A Systematic Review of the Literature. *Journal of Management Studies* 47: 1154–1191.
- Daily, B. F. – Huang, S. (2001): Achieving Sustainability through Attention to Human Resource Factors in Environmental Management. *International Journal of Operations & Production Management* 21: 1539–1552.

- Damanpour, F. – Walker, R. M. – Avellaneda, C. N. (2009): Combinative Effects of Innovation Types and Organizational Performance: A Longitudinal Study of Service Organizations. *Journal of Management Studies* 46: 650–675.
- Darnall, N. – Henriques, I. – Sadorsky, P. (2010): Adopting Proactive Environmental Strategy: The Influence of Stakeholders and Firm Size. *Journal of Management Studies* 47: 1072–1094.
- Darnall, N. – Jolley, G. J. – Handfield, R. (2008): Environmental Management Systems and Green Supply Chain Management: Complements for Sustainability? *Business Strategy and the Environment* 17: 30–45.
- DiMaggio, P. J. – Powell, W. W. (1983): The Iron Cage Revisited. Institutional Isomorphism and Collective Rationality in Organisational Fields. *American Sociological Review* 48: 147–160.
- Dunphy, D. – Griffiths, A. – Benn, S. (2007): *Organizational Change for Corporate Sustainability*. London: Routledge.
- Epstein, M. (2008): *Making Sustainability Work. Best Practices in Managing and Measuring Corporate Social, Environmental and Economic Impacts*. Sheffield: Greenleaf.
- Esrock, S. L. – Leichty, G. B. (1998): Social Responsibility and Corporate Web Pages: Self-presentation or Agenda-setting? *Public Relations Review* 24: 305–319.
- European Commission (2004): *ABC of the Main Instruments of Corporate Social Responsibility*. Brussels: European Commission.
- Fernandes, M. F. – Randall, D. M. (1992): The Nature of Social Desirability Response Effects in Ethics Research. *Business Ethics Quarterly* 2: 183–205.
- Foster, C. – Green, K. (2000): Greening the Innovation Process. *Business Strategy and the Environment* 9: 287–303.
- Frankfurter Allgemeine Zeitung (2002): Die 100 größten Unternehmen. *Frankfurter Allgemeine Zeitung* 08.07.2002, pp. 19–22.
- Frankfurter Allgemeine Zeitung (2006): Die hundert größten Unternehmen, *Frankfurter Allgemeine Zeitung* 04.07.2006, pp. 17–21.
- Gond, J.-P. – Grubnic, S. – Herzig, C. – Moon, J. (2012): Configuring Management Control Systems: Theorising the Integration of Strategy and Sustainability. *Management Accounting Research* 23: 205–223.
- Hahn, T. – Scheermesser, M. (2006): Approaches to Corporate Sustainability among German Companies. *Corporate Social Responsibility and Environmental Management* 13: 150–165.
- Henriques, I. – Sadorsky, P. (2000): Can Environmental Sustainability Be Used to Manage Energy Price Risk? *Energy Economics* 32(5): 1131–1138.
- Herzig, C. – Godemann, J. (2010): Internet-supported Sustainability Reporting: Developments in Germany. *Management Research Review* 33: 1064–1082.
- Herzig, C. – Schaltegger, S. (2011): Corporate Sustainability Reporting. In: Godemann, J. – Michelsen, G. (eds): *Sustainability Communication: Interdisciplinary Perspectives and Theoretical Foundations*. Springer, pp. 151–169.
- Herzig, C. – Viere, T. – Schaltegger, S. – Burritt, R. L. (2012): *Environmental Management Accounting. Case Studies of South East-Asian Companies*. Oxon: Routledge.
- Holt, D. (2010): Where Are They Now? Tracking the Longitudinal Evolution of Environmental Businesses from the 1990s. *Business Strategy and the Environment* 20: 238–250.
- Husted, B. W. – Allen, D. B. (2007): Strategic Corporate Social Responsibility and Value Creation among Large Firms. Lessons from the Spanish Experience. *Long Range Planning* 40: 594–610.
- Husted, B. W. – de Jesus Salazar, J. (2006): Taking Friedman Seriously: Maximizing Profits and Social Performance. *Journal of Management Studies* 43: 75–91.
- Jasch, C. (2009): *Material Flow Cost Accounting*. Dordrecht: Springer.

- Jennings, D. – Seaman, S. (1994): High and Low Levels of Organizational Adaptation. An Empirical Analysis of Strategy, Structure, and Performance. *Strategic Management Journal* 15: 459–475.
- Jiang, R. J. – Bansal, P. (2003): Seeing the Need for ISO 14001. *Journal of Management Studies* 40: 1048–1067.
- Kolk, A. (2010): Trajectories of Sustainability Reporting by MNCs. *Journal of World Business* 45: 367–374.
- Lawrence, P. R. – Lorsch, J. W. (1967): *Organization and Environment: Managing Differentiation and Integration*. Boston: Harvard University.
- Lee, S. Y. – Rhee, S.-K. (2007): The Change in Corporate Environmental Strategies: A Longitudinal Empirical Study. *Management Decision* 45:196–216.
- Lockett, A. – Moon, J. – Visser, W. (2006): Corporate Social Responsibility in Management Research: Focus, Nature, Salience and Sources of Influence. *Journal of Management Studies* 43: 15–136.
- March, J. G. – Simon, H. A. (1958): *Organizations*. New York: Wiley.
- Marsden, C. (2000): The New Corporate Citizenship of Big Business: Part of the Solution to Sustainability? *Business and Society Review* 105: 8–25.
- McWilliams, A. – Siegel, D. S. – Wright, P. M. (2006): Corporate Social Responsibility: Strategic Implications. *Journal of Management Studies* 43: 2–18.
- Mintzberg, H. (1978): Patterns in Strategy Formation. *Management Science* 24: 934–948.
- Mintzberg, H. – Ahlstrand, B. – Lampel, J. (1998): *Strategy Safari. A Guided Tour Through the Wilds of Strategic Management*. New York: The Free Press.
- Möller, A. – Schaltegger, S. (2005): The Sustainability Balanced Scorecard as a Framework for Eco-Efficiency Analysis *Journal of Industrial Ecology* 9(4):73–83.
- Montiel, I. (2008): Corporate Social Responsibility and Corporate Sustainability: Separate Pasts, Common Futures. *Organization Environment* 21: 245–269.
- Müller, M. – Siebenhüner, B. (2007): Policy Instruments for Sustainability-oriented Organizational Learning. *Business Strategy and the Environment* 16: 232–245.
- Müller, M. – Gomes dos Santos, V. – Seuring, S. (2009): The Contribution of Environmental and Social Standards. Towards Ensuring Legitimacy in Supply Chain Governance. *Journal of Business Ethics* 89: 509–523.
- Muller, A. – Kolk, A. (2010): Extrinsic and Intrinsic Drivers of Corporate Social Performance: Evidence from Foreign and Domestic Firms in Mexico. *Journal of Management Studies* 47: 1–26.
- Nagel, K. – Faix, W. G. – Schulten, A. – Keck, G. – Sailer, J. (2010): *General Management – Tools*. Transfer Documentation Report (TDR). Stuttgart: Steinbeis-Edition.
- Nicolai, A. T. – Schulz, A.-C. – Thomas, T. W. (2010): What Wall Street Wants – Exploring the Role of Security Analysts in the Evolution and Spread of Management Concepts. *Journal of Management Studies* 47: 163–189.
- Rigby, D. – Bilodeau, B. (2007): Bain’s Global 2007 Management Tools and Trends Survey. *Strategy & Leadership* 35: 9–16.
- Schaefer, A. (2007): Contrasting Institutional and Performance Accounts of Environmental Management Systems: Three Case Studies in the UK Water & Sewerage Industry. *Journal of Management Studies* 44: 507–535.
- Schaltegger, S. (2011): Sustainability as a Driver for Corporate Economic Success. Consequences for the Development of Sustainability Management Control. *Society and Economy* 33(1): 15–28.
- Schaltegger, S. – Burritt, R. (2010): Sustainability Accounting for Companies. Catchphrase or Decision Support for Business Leaders? *Journal of World Business* 45(4): 375–384.

- Schaltegger, S. – Kleiber, O. – Müller, J. – Herzig, C (2002): *Sustainability Management in Business Enterprises. Concepts and Tools for a Sustainable Organisation Development*. Lüneburg/Berlin: BMU and BDI.
- Scherer, A. G. – Palazzo, G. (2011): The New Political Role of Business in a Globalized World: A Review of a New Perspective on CSR and its Implications for the Firm, Governance, and Democracy. *Journal of Management Studies* 48: 899–931.
- Seuring, S. – Müller, M. (2008): From a Literature Review to a Conceptual Framework for Sustainable Supply Chain Management. *Journal of Cleaner Production* 16: 1699–1710.
- Shrivastava, P. (1995): The Role of Corporations in Achieving Ecological Sustainability. *The Academy of Management Review* 20: 936–960.
- Shrivastava, P. – Hart, S. (1995): Creating Sustainable Corporations. *Business Strategy and the Environment* 4: 154–165.
- Springett, D. (2003): An ‘Incitement to Discourse’: Benchmarking as a Springboard to Sustainable Development. *Business Strategy and the Environment* 12: 1–11.
- Tencati, A. – Perrini, F. – Pogutz, S. (2004): New Tools to Foster Corporate Socially Responsible Behavior. *Journal of Business Ethics* 53: 173–190.
- Thompson, D. (2002): *Tools for Environmental Management: A Practical Introduction and Guide*. Gabriola Island: New Society Publishers.
- Tregidga, H. – Milne, M. J. (2006): From Sustainable Management to Sustainable Development: A Longitudinal Analysis of a Leading New Zealand Environmental Reporter. *Business Strategy and the Environment* 15: 219–241.
- Von Weizsäcker, E. U. – Hargroves, K. – Smith, M. – Desha, C. – Stasinopoulos, P. (2009): *Factor Five. Transforming the Global Economy through 80% Improvements in Resource Productivity*. London: Earthscan.
- WBCSD (2002): The Business Case for Sustainable Development: Making a Difference towards the Earth Summit 2002 and Beyond. *Corporate Environmental Strategy* 9: 226–235.
- Welt online* (2009): Die 500 größten Unternehmen in Deutschland. <http://top500.welt.de>, accessed on 29 June 2011.
- Woodward, J. (1981): *Industrial Organization: Theory and Practice*. Oxford: Oxford University Press.

APPENDIX

Table A1. Sustainability management tools queried in 2002, 2006 and 2010

Tool	2002	2006	2010	Tool (continued)	2002	2006	2010
(Eco/Social) ABC analysis	x	x	x	Material and energy flow accounting	x	x	x
(Eco/Social) checklist	x	x	x	Material flow analysis	x	x	x
Community advisory panel	x	x	x	Material flow cost accounting	x	x	x
Continuous education	-	x	x	Opportunity risk dialogue	x	x	x
Corporate citizenship	-	x	x	Product carbon footprint	-	-	-
Corporate giving	-	x	x	Product line analysis	x	x	x
Corporate/Employee volunteering	-	x	x	Proposal system	x	x	x
Cross impact analysis	x	x	x	Quality circle	x	x	x
Early detection	x	x	x	Quality management system	x	x	x
Eco audit	x	x	x	Risk analysis	x	x	x
Eco benchmarking	x	x	x	Scenario analysis	x	x	x
Eco budgeting	x	x	x	Social accounting	x	x	x
Eco circle	x	x	x	Social audit	x	x	x
Eco compass	x	x	x	Social benchmarking	x	x	x
Eco control	x	x	x	Social cost accounting	-	-	-
Eco design/Design for environment	x	x	x	Social indicators	x	x	x
Eco indicators	x	x	x	Social management system	x	x	x
Eco label	x	x	x	Social marketing	x	x	x
Eco sponsoring	x	x	x	Social mission statement	x	x	x
Eco-efficiency analysis	-	x	x	Social report	x	x	x
Eco-efficiency indicators	-	x	x	Social/Cultural sponsoring	x	x	x

Table A1 (cont.)

Tool	2002	2006	2010	Tool	2002	2006	2010
Environmental accounting	x	x	x	Socio-eco-efficiency analysis	–	x	x
Environmental cost accounting	x	x	x	Socio-efficiency indicators	–	x	x
Environmental declaration	x	x	x	Stakeholder dialogue	–	x	x
Environmental info system	x	x	x	Stakeholder value indicators	x	x	x
Environmental investment appraisal	x	x	x	Sustainability accounting	–	x	x
Environmental management system	x	x	x	Sustainability audit	–	x	x
Environmental mission statement	x	x	x	Sustainability balanced scorecard	–	x	x
Environmental report	x	x	x	Sustainability benchmarking	–	x	x
Environmental shareholder value	x	x	x	Sustainability control	–	x	x
Fair trade label	x	x	x	Sustainability indicators	–	x	x
Flexible working model	–	x	x	Sustainability label	–	x	x
Green purchasing	–	x	x	Sustainability management system	–	x	x
Green supply chain management	x	x	x	Sustainability marketing	–	x	x
Green/Eco marketing	x	x	x	Sustainability mission statement	x	x	x
Human resource control	x	x	x	Sustainability report	x	x	x
Human resource report	–	x	x	Sustainability sponsoring	–	x	x
Incentive system	x	x	x	Sustainable design	–	x	x
Internal emissions trading	–	x	x	Sustainable supply chain management	–	x	x
Life Cycle Assessment	x	x	x	Total	52	78	79

Table A2. Development of increasingly known tools between 2006 and 2010

Tool	2006					2010					between 2006 and 2010				
	known (%)	applied (%)	k-a gap (%)	applied/known (%)	known (%)	applied (%)	k-a gap (%)	applied/known (%)	known (%)	edge increase (%)	applied increase (%)	known increase (%)	applied/known increase* (%)		
Sustainability accounting	28.6	2.4	26.2	8.3	29.0	0.0	29.0	0.0	0.5	-2.4	2.8	-8.3			
Socio-eco-efficiency analysis	19.0	2.4	16.7	12.5	32.3	3.2	29.0	10.0	13.2	0.8	12.4	-2.5			
Community advisory panel	31.0	7.1	23.8	23.1	41.9	9.7	32.3	23.1	11.0	2.5	8.4	0.0			
Cross impact analysis	23.8	4.8	19.0	20.0	29.0	6.5	22.6	22.2	5.2	1.7	3.5	2.2			
Corporate giving	54.8	42.9	11.9	78.3	67.7	54.8	12.9	81.0	13.0	12.0	1.0	2.7			
Sustainability report	81.0	66.7	14.3	82.4	87.1	74.2	12.9	85.2	6.1	7.5	-1.4	2.8			
HR mgmt control	66.7	47.6	19.0	71.4	80.6	61.3	19.4	76.0	14.0	13.7	0.3	4.6			
Continuous education	73.8	61.9	11.9	83.9	83.9	74.2	9.7	88.5	10.1	12.3	-2.2	4.6			
Socio-efficiency indicators	38.1	14.3	23.8	37.5	51.6	22.6	29.0	43.8	13.5	8.3	5.2	6.3			
Corporate/Employee volunteering	52.4	40.5	11.9	77.3	64.5	54.8	9.7	85.0	12.1	14.4	-2.2	7.7			
Sustainability mission statement	66.7	47.6	19.0	71.4	87.1	71.0	16.1	81.5	20.4	23.3	-2.9	10.1			
Social audit	57.1	23.8	33.3	41.7	67.7	35.5	32.3	52.4	10.6	11.7	-1.1	10.7			
Sustainability indicators	42.9	26.2	16.7	61.1	83.9	61.3	22.6	73.1	41.0	35.1	5.9	12.0			
Stakeholder dialogue	64.3	47.6	16.7	74.1	80.6	71.0	9.7	88.0	16.4	23.3	-7.0	13.9			
Sustainability sponsoring	54.8	35.7	19.0	65.2	64.5	51.6	12.9	80.0	9.8	15.9	-6.1	14.8			
Sustainability audit	52.4	14.3	38.1	27.3	74.2	32.3	41.9	43.5	21.8	18.0	3.8	16.2			
Green supply chain mgmt	35.7	11.9	23.8	33.3	64.5	32.3	32.3	50.0	28.8	20.4	8.4	16.7			
Eco-efficiency analysis	64.3	16.7	47.6	25.9	67.7	29.0	38.7	42.9	3.5	12.4	-8.9	16.9			
Sustainable supply chain mgmt	61.9	26.2	35.7	42.3	64.5	38.7	25.8	60.0	2.6	12.5	-9.9	17.7			
Sustainability benchmarking	42.9	19.0	23.8	44.4	80.6	51.6	29.0	64.0	37.8	32.6	5.2	19.6			
Internal emissions trading	52.4	16.7	35.7	31.8	71.0	38.7	32.3	54.5	18.6	22.0	-3.5	22.7			
Sustainability mgmt control	50.0	9.5	40.5	19.0	64.5	32.3	32.3	50.0	14.5	22.8	-8.2	31.0			
Sustainability marketing	47.6	21.4	26.2	45.0	58.1	48.4	9.7	83.3	10.4	27.0	-16.5	38.3			
Green purchasing	38.1	4.8	33.3	12.5	61.3	32.3	29.0	52.6	23.2	27.5	-4.3	40.1			
Sustainable design	31.0	4.8	26.2	15.4	38.7	22.6	16.1	58.3	7.8	17.8	-10.1	42.9			
Sustainability label	42.9	4.8	38.1	11.1	61.3	35.5	25.8	57.9	18.4	30.7	-12.3	46.8			
Average	49.0	23.9	25.1	42.9	63.8	40.2	23.6	57.9	14.8	16.3	-1.5	15.0			

* ordered by 'applied/known increase'

Table A3. Development of already well-known tools (knowledge > 66.0% in 2002, 2006 and 2010)

Tool	2002				2006				2010				between 2002 and 2010			
	known (%)	applied (%)	k-a gap (%)	applied/known (%)	known (%)	applied (%)	k-a gap (%)	applied/known (%)	known (%)	applied (%)	k-a gap (%)	applied/known (%)	knowledge increase (%)	application increase (%)	k-a gap increase (%)	applied/known increase* (%)
Eco indicators	100.0	84.1	15.9	84.1	76.2	59.5	16.7	78.1	80.6	64.5	16.1	80.0	-19.4	-19.6	0.2	-4.1
Quality management system	100.0	95.5	4.5	95.5	95.2	92.9	2.4	97.5	96.8	93.5	3.2	96.7	-3.2	-1.9	-1.3	1.2
Proposal system	97.7	88.6	9.1	90.7	78.6	69.0	9.5	87.9	87.1	80.6	6.5	92.6	-10.6	-8.0	-2.6	1.9
Environmental management system	100.0	86.4	13.6	86.4	95.2	83.3	11.9	87.5	87.1	80.6	6.5	92.6	-12.9	-5.7	-7.2	6.2
Eco audit	100.0	81.8	18.2	81.8	92.9	73.8	19.0	79.5	83.9	77.4	6.5	92.3	-16.1	-4.4	-11.7	10.5
Risk analysis	93.2	77.3	15.9	82.9	78.6	71.4	7.1	90.9	77.4	74.2	3.2	95.8	-15.8	-3.1	-12.7	12.9
Environmental info system	95.5	63.6	31.8	66.7	76.2	66.7	9.5	87.5	87.1	71.0	16.1	81.5	-8.4	7.3	-15.7	14.8
Social/Cultural sponsoring	77.3	59.1	18.2	76.5	81.0	66.7	14.3	82.4	80.6	77.4	3.2	96.0	3.4	18.3	-15.0	19.5
Sustainability report	75.0	34.1	40.9	45.5	81.0	66.7	14.3	82.4	87.1	74.2	12.9	85.2	12.1	40.1	-28.0	39.7
Average	93.2	74.5	18.7	78.9	83.9	72.2	11.6	86.0	85.3	77.1	8.2	90.3	-7.9	2.6	-10.4	11.4

* ordered by 'applied/known increase'

Table 44. Development of decreasingly known tools between 2002, 2006 and 2010

Tool	2002					2006					2010					between 2002 and 2010																		
	known (%)	applied (%)	k-a gap (%)	applied/known (%)	k-a gap (%)	known (%)	applied (%)	k-a gap (%)	applied/known (%)	k-a gap (%)	known (%)	applied (%)	k-a gap (%)	applied/known (%)	known (%)	applied (%)	k-a gap (%)	applied/known (%)	known (%)	applied (%)	k-a gap (%)	applied/known (%)	known (%)	applied (%)	k-a gap (%)	applied/known (%)	known (%)	applied (%)	k-a gap (%)	applied/known (%)				
Eco control	84.1	50.0	34.1	59.5	59.5	59.5	16.7	42.9	28.0	51.6	12.9	38.7	25.0	-32.5	-37.1	4.6	-34.5	84.1	50.0	34.1	59.5	59.5	59.5	16.7	42.9	28.0	51.6	12.9	38.7	25.0	-32.5	-37.1	4.6	-34.5
Env. cost accounting	81.8	36.4	45.5	44.4	64.3	28.6	35.7	44.4	61.3	16.1	45.2	26.3	-20.5	-20.2	-0.3	-18.1	81.8	36.4	45.5	44.4	64.3	28.6	35.7	44.4	61.3	16.1	45.2	26.3	-20.5	-20.2	-0.3	-18.1		
Env. report	100.0	84.1	15.9	84.1	88.1	59.5	28.6	67.6	67.7	45.2	22.6	66.7	66.7	-32.3	-38.9	6.7	-17.4	100.0	84.1	15.9	84.1	88.1	59.5	28.6	67.6	67.7	45.2	22.6	66.7	66.7	-32.3	-38.9	6.7	-17.4
Incentive system	68.2	47.7	20.5	70.0	64.3	42.9	21.4	66.7	54.8	29.0	25.8	52.9	52.9	-13.3	-18.7	5.4	-17.1	68.2	47.7	20.5	70.0	64.3	42.9	21.4	66.7	54.8	29.0	25.8	52.9	52.9	-13.3	-18.7	5.4	-17.1
Social accounting	34.1	9.1	25.0	26.7	28.6	9.5	19.0	33.3	22.6	3.2	19.4	14.3	-11.5	-5.9	-5.6	-12.4	34.1	9.1	25.0	26.7	28.6	9.5	19.0	33.3	22.6	3.2	19.4	14.3	-11.5	-5.9	-5.6	-12.4		
Env. declaration	95.5	65.9	29.5	69.0	73.8	40.5	33.3	54.8	67.7	38.7	29.0	57.1	57.1	-27.7	-27.2	-0.5	-11.9	95.5	65.9	29.5	69.0	73.8	40.5	33.3	54.8	67.7	38.7	29.0	57.1	57.1	-27.7	-27.2	-0.5	-11.9
Stakeholder value indicator	59.1	22.7	36.4	38.5	33.3	7.1	26.2	21.4	32.3	9.7	22.6	30.0	30.0	-26.8	-13.0	-13.8	-8.5	59.1	22.7	36.4	38.5	33.3	7.1	26.2	21.4	32.3	9.7	22.6	30.0	30.0	-26.8	-13.0	-13.8	-8.5
Env. mission statement	100.0	93.2	6.8	93.2	78.6	64.3	14.3	81.8	64.5	54.8	9.7	85.0	85.0	-35.5	-38.3	2.9	-8.2	100.0	93.2	6.8	93.2	78.6	64.3	14.3	81.8	64.5	54.8	9.7	85.0	85.0	-35.5	-38.3	2.9	-8.2
Eco compass	34.1	2.3	31.8	6.7	31.0	2.4	28.6	7.7	25.8	0.0	25.8	0.0	-8.3	-2.3	-6.0	-6.7	34.1	2.3	31.8	6.7	31.0	2.4	28.6	7.7	25.8	0.0	25.8	0.0	25.8	0.0	-8.3	-2.3	-6.0	-6.7
Eco circle	86.4	63.6	22.7	73.7	59.5	40.5	19.0	68.0	58.1	41.9	16.1	72.2	72.2	-28.3	-21.7	-6.6	-1.5	86.4	63.6	22.7	73.7	59.5	40.5	19.0	68.0	58.1	41.9	16.1	72.2	72.2	-28.3	-21.7	-6.6	-1.5
Material flow analysis	77.3	43.2	34.1	55.9	73.8	45.2	28.6	61.3	51.6	29.0	22.6	56.3	56.3	-25.7	-14.1	-11.5	0.4	77.3	43.2	34.1	55.9	73.8	45.2	28.6	61.3	51.6	29.0	22.6	56.3	56.3	-25.7	-14.1	-11.5	0.4

Table A4 (cont.)

Tool	2002				2006				2010				between 2002 and 2010			
	known (%)	applied (%)	k-a gap (%)	applied/k-a known (%)	known (%)	applied (%)	k-a gap (%)	applied/k-a known (%)	known (%)	applied (%)	k-a gap (%)	applied/k-a known (%)	known (%)	edge in-crease (%)	ap-plied/k-a known (%)	ap-plied/k-a known in-crease (%)
Product line analysis	54.5	20.5	34.1	37.5	42.9	9.5	33.3	22.2	32.3	12.9	19.4	40.0	-22.3	-7.6	-14.7	2.5
Quality circle	84.1	63.6	20.5	75.7	69.0	52.4	16.7	75.9	61.3	48.4	12.9	78.9	-22.8	-15.2	-7.6	3.3
Eco bench-marking	75.0	40.9	34.1	54.5	57.1	26.2	31.0	45.8	54.8	32.3	22.6	58.8	-20.2	-8.7	-11.5	4.3
Eco sponsoring	84.1	50.0	34.1	59.5	64.3	31.0	33.3	48.1	54.8	35.5	19.4	64.7	-29.3	-14.5	-14.7	5.2
Env. mgmt system	100.0	86.4	13.6	86.4	95.2	83.3	11.9	87.5	87.1	80.6	6.5	92.6	-12.9	-5.7	-7.2	6.2
Eco audit	100.0	81.8	18.2	81.8	92.9	73.8	19.0	79.5	83.9	77.4	6.5	92.3	-16.1	-4.4	-11.7	10.5
Risk analysis	93.2	77.3	15.9	82.9	78.6	71.4	7.1	90.9	77.4	74.2	3.2	95.8	-15.8	-3.1	-12.7	12.9
Green/Eco marketing	84.1	36.4	47.7	43.2	47.6	7.1	40.5	15.0	45.2	25.8	19.4	57.1	-38.9	-10.6	-28.4	13.9
Eco label	95.5	34.1	61.4	35.7	71.4	28.6	42.9	40.0	61.3	41.9	19.4	68.4	-34.2	7.8	-42.0	32.7
Average	79.5	50.5	29.1	58.9	63.7	37.0	26.7	52.0	55.8	35.5	20.3	56.7	-23.7	-15.0	-8.8	-2.2

Note: env. = environmental; mgmt = management.

Table A5. Development of less well-known tools (knowledge < 50.0 in 2002, 2006 and 2010) between 2002, 2006 and 2010

Tool	2002			2006			2010			between 2002 and 2010					
	known (%)	applied (%)	k-a gap (%)	known (%)	applied (%)	k-a gap (%)	known (%)	applied (%)	k-a gap (%)	known increase (%)	applied increase (%)	k-a gap increase (%)			
Environmental accounting	45.5	18.2	27.3	40.0	16.7	23.8	41.2	41.9	9.7	32.3	23.1	-3.5	-8.5	5.0	-16.9
Opportunity risk dialogue	40.9	22.7	18.2	55.6	11.9	16.7	41.7	35.5	6.5	29.0	18.2	-5.4	-16.3	10.9	-37.4
Social accounting	34.1	9.1	25.0	26.7	9.5	19.0	33.3	22.6	3.2	19.4	14.3	-11.5	-5.9	-5.6	-12.4
Eco budgeting	38.6	6.8	31.8	17.6	2.4	19.0	11.1	25.8	6.5	19.4	25.0	-12.8	-0.4	-12.5	7.4
Eco compass	34.1	2.3	31.8	6.7	2.4	28.6	7.7	25.8	0.0	25.8	0.0	-8.3	-2.3	-6.0	-6.7
Cross impact analysis	15.9	6.8	9.1	42.9	4.8	19.0	20.0	29.0	6.5	22.6	22.2	13.1	-0.4	13.5	-20.6
Community advisory panel	27.3	18.2	9.1	66.7	31.0	7.1	23.8	41.9	9.7	32.3	23.1	14.7	-8.5	23.2	-43.6
Environmental shareholder value	47.7	15.9	31.8	33.3	4.8	23.8	16.7	41.9	16.1	25.8	38.5	-5.8	0.2	-6.0	5.1
Environmental investment appraisal	36.4	6.8	29.5	18.8	2.4	21.4	10.0	29.0	9.7	19.4	33.3	-7.3	2.9	-10.2	14.6
Average	35.6	11.9	23.7	34.2	28.6	6.9	21.7	32.6	7.5	25.1	22.0	-3.0	-4.3	1.4	-12.3

