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Glancing into the Applied Tool Box - Surveying Operational Sustainability Accounting Practice

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Abstract: This paper investigates which sustainability accounting tools are applied in corporate practice. Although a multitude of tools can be identified in academic literature and practitioner handbooks, comparatively little is known about which of these sustainability accounting tools are known and applied by companies. The awareness and application of such tools is considered to be inevitable to implement corporate sustainability. Drawing on a comparative survey among large German companies, this paper reveals a growing importance of integrated sustainability accounting tools as well as of specific performance management tools. Based on the survey results, this paper discusses the application of sustainability accounting tools with regard to their function to provide information for managerial decision making and corporate communication. Furthermore, it identifies gaps for future research.

I. INTRODUCTION

The extant literature describes and evaluates numerous environmental, social and sustainability accounting tools which are applicable in corporate practice (e.g. [1]-[6]). Such tools are developed and provided to tackle the sustainability-related challenges of information needs for processes of decision making and communication ([7]-[10]).

Perrini and Tencati [9] emphasise the importance of the availability of sustainability accounting tools as these tools are useful to monitor and track corporate environmental, social and economic performance. Burritt and Schaltegger's [11] literature review on sustainability accounting moreover portrays the 'critical theory perspective' of sustainability accounting (e.g. [6], [12]) compared to a 'management-oriented perspective'. In line with the second perspective they argue that "corporate sustainability accounting may become a trend if it is accepted that the current tools and methods are the first step in a methodological development process towards sustainability accounting providing useful and high quality information" ([11], p. 833). To map the field of environmental management accounting (EMA) tools, Burritt et al. [3] offer a framework which distinguishes monetary and physical environmental management dimensions according to different decision situations.

So far, however, there is only little research on which of these tools (e.g. eco-efficiency indicators, environmental reports social-cost accounting, sustainability audit) are known and applied in corporate practice (e.g. [13]-[14]), whereas the application of such tools is considered to be supportive or even inevitable to implement corporate sustainability (e.g. [8], [15]).

To overcome the gap between academic considerations and high relevance for corporate practice, this paper dis-

cusses the results of a survey depicting which environmental, social and integrated accounting tools sustainability managers are aware of and which are applied in corporate practice. We aim at analysing the companies' interpretation of sustainability accounting and identify areas for future research.

Environmental, social and sustainability accounting tools can help to create information, accountability and transparency as well as support management decisions (e.g. [9], [16]). Our analysis takes a broad view of accounting and considers methods to collect sustainability data (e.g. checklists), to create specific information (e.g. material flow costs) and to manage information with regard to strategy and performance (e.g. sustainability balanced scorecard) as well as sustainability communication (e.g. stakeholder dialogue) and reporting approaches (e.g. sustainability report).

In order to map various tools we suggest a classification referring to the 'dimension of sustainability' which is addressed and to the 'orientation' a tool takes. Whereas the first aspect incorporates the environmental, social, economic as well as the integrative dimension of sustainability accounting tools, the orientation covers whether more specific tools for internal decision making, rather broad internally oriented accounting tools or externally oriented reporting and communication tools are preferred in corporate practice.

II. RESEARCH QUESTIONS

To analyse the companies' interpretation of sustainability accounting and to identify areas for future research, the following research questions are dealt with:

- i) Which sustainability accounting tools are known and applied and how has awareness and application developed?
- ii) What kind of tools are preferred in corporate practice? Integrated sustainability management tools, which handle all dimensions of sustainability simultaneously, or isolated environmental or social management tools? Tools for internal decision support, performance measurement and management or rather externally oriented communication and reporting approaches? More specific methods or broader, more general approaches?

III. METHODOLOGY

To investigate the awareness and application of sustainability accounting tools, 42 methods which are applicable for sustainability accounting were identified on the

basis of academic literature and practitioner handbooks [1]-[2], [3]-[5], [17].

In a next step, the awareness and application of these tools were tested in two empirical surveys among the 120 largest Germany companies (by revenue) in 2006 and 2010. In 2006 42 and in 2010 31 companies participated in the project (35.0% and 25.8% response rate).

To analyse which kind of tools are preferred in corporate practice, the tools were grouped according to their ‘sustainability dimension’ and ‘orientation’.

The dimension of sustainability encompasses the environmental, social, economic and integrative perspectives of sustainability accounting tools. This categorisation is based on the focus of the tool (social, environmental or economic). Although theoretically not necessary the focus of the tools relates in all analysed practical cases with different units of measurement (e.g. Euro, kg etc.) which the tools use. We identified 5 economically oriented tools with monetary units of economic measurement, 11 environmentally oriented tools with physical environmental measures, 7 socially oriented tools with physical social measures, 12 integrated and 7 partially integrated tools with mixed units of measurement such as Euros per kilogramme (for examples of tools see Table 1).

TABLE 1: TOOLS GROUPED BY DIMENSION OF SUSTAINABILITY

Dimension of sustainability addressed	Examples of tools
Economic (Euro)	Environmental investment appraisal; Environmental shareholder value; Material flow cost accounting; Social cost accounting
Environmental (e.g. kg ; m ³)	Product carbon footprint; Environmental info system; Life Cycle Assessment
Social (count)	Social audit; Human resource (HR) report; Social indicators
Integrated (multiple units of measurement, e.g. Euro/kg)	Sustainability control; Sustainability balanced scorecard; Stakeholder dialogue

With regard to the ‘orientation’ we distinguish three groups of tools to identify whether more specific internal sustainability accounting tools (instruments), broader internal tools (systems and concepts) or more externally oriented reporting and communication tools are applied in corporate practice. Based on this classification 22 specific accounting tools for internal decision making support, 15 broad internally oriented accounting tools and 6 tools which support external reporting and communication have been identified (for examples of tools see Table 2).

TABLE 2: TOOLS GROUPED BY ORIENTATION

‘Orientation’	Examples of tools
<i>Specific</i> sustainability accounting tools for internally decision supporting (instruments)	Environmental investment appraisal; Material and energy flow accounting; Eco Budgeting
<i>Broad</i> internally oriented tools (systems and concepts)	Environmental info system ; Sustainability audit Sustainability balanced scorecard
<i>Externally oriented</i> reporting and communication tools	Sustainability report; Stakeholder dialogue; Risk-benefit dialogue

IV. RESULTS

Firstly, the analysis reveals that numerous tools exist of which practitioners are aware of and that the awareness of these tools is still rising. In 2006, 25 sustainability accounting tools were known by at least 50% of the participants, in 2010 this was the case for 32 tools (cf. Figure 1). Simultaneously, the average rate of awareness rose from 53.9% to 58.4%. Furthermore, the number of sustainability accounting tools which were applied increased as well (7 tools applied in the majority of companies in 2006, compared to 12 tools in 2010).

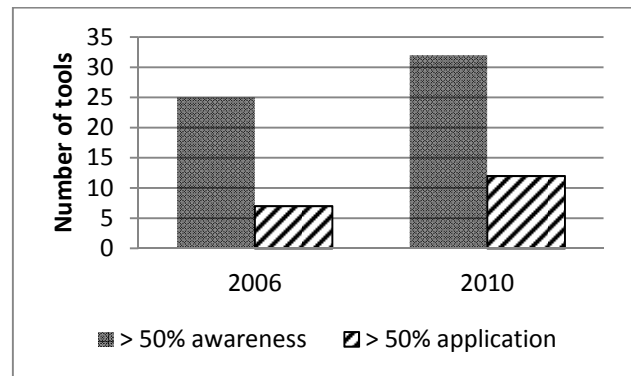


FIGURE 1: CHANGES IN THE NUMBER OF TOOLS WHICH ARE KNOWN BY AT LEAST 50% OF THE PARTICIPATING COMPANIES

Secondly, the overall application increase of tools (+3.6%) is mainly visible as an increase of integrated tools (+10.3%) whereas the application of accounting tools which focus on one dimension of sustainability only (e.g. costs only, environment only, or social only) is more or less constant and in some cases even decreasing. The decreasing application for some tools which solely focus on environmental or social aspects, may be explained by a replacement of these tools (e.g. environmental, social and HR reports) by more integrated tools (e.g. sustainability report) (cf. Figure 2).

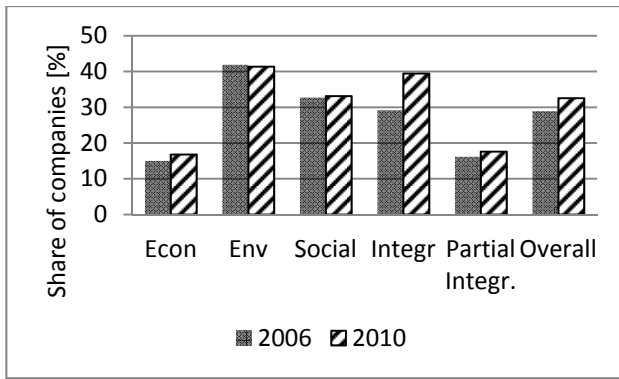


FIGURE 2: CHANGES IN THE APPLICATION OF SUSTAINABILITY ACCOUNTING TOOLS BY DIMENSION OF SUSTAINABILITY

Similar to integrated sustainability accounting tools, the application of specific performance management tools has increased since 2006 (+6.6%). Likewise, broad internally oriented accounting tools (systems and concepts) were applied more often in 2010 than in 2006 (+2.2%). This indicates a growing importance of providing support for decision making and performance management. In contrast, externally oriented reporting and communications tools were applied less in 2010 than in 2006 (-3.2%) (cf. Figure 3).

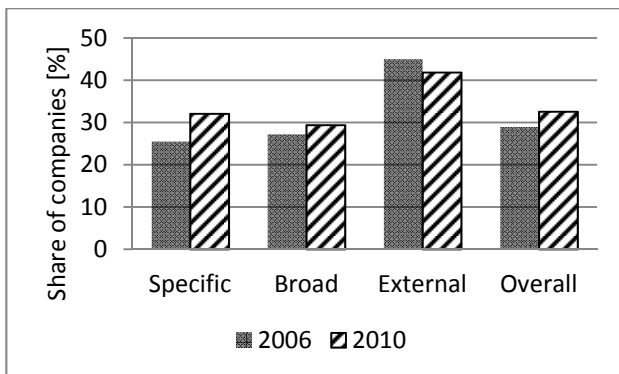


FIGURE 3: CHANGES IN THE APPLICATION OF SUSTAINABILITY ACCOUNTING TOOLS BY ORIENTATION

Summing up these findings, a trend towards integrative tools and specific performance management and sustainability accounting tools can be identified. Although the changes are not very large, this may be interpreted as a change from reporting and communication only to action, or formulated more colloquially an indication for a possible change from “talk” to “walk”.

V. DISCUSSION

Our classification of sustainability accounting tools represented on basis of the ‘dimension of sustainability’ and the ‘orientation’ is informed by the extant literature which describes a multitude of economic, environmental, social and integrated sustainability accounting tools (e.g. [2], [3]) as well as many tools that are internally (specific or broad) or externally oriented [11], [16].

Firstly, we can expect that companies will start with a limited number of sustainability accounting tools and in the process of a sustainability-oriented organizational development process will *extend the number of applied*

tools to cover more aspects of managing sustainability information. As a consequence the number of applied sustainability accounting tools can be expected to increase over time.

Secondly the composition of different kinds of sustainability accounting tools may change over time. Whereas notions like the triple bottom line [18] emphasize that three dimensions (ecological, social and economic) should be considered, much of the sustainability management literature argues that “sustainable development asks for an integrated reflection” ([9], p. 78) of these dimensions. Regarding the ‘*dimensions of sustainability*’ we can therefore conceptually distinguish two consecutive stages to achieve corporate sustainability: the *first stage where economic, environmental or social sustainability accounting tools are predominantly applied separately and independently* from each other to create information for decision support and communication [7]-[10]. In practice a considerable number of such tools support and facilitate particular sustainability efforts such as the environmental investment appraisal (e.g. [19]-[20]), ecological footprint (e.g. [15]) or social audit (e.g. [21]). These sustainability accounting tools are considered to be designed and developed to advance a company’s environmental and social performance (e.g. [9]). However, they focus predominantly on just one particular dimension of sustainability and, hence, address only parts of the above mentioned challenges.

As a consequence, companies are also challenged to apply integrated sustainability accounting tools, i.e. tools that address all sustainability dimensions at the same time such as the costs as well as the environmental and social performance of products and production processes. *The second conceptual stage is thus characterized by applying more integrated sustainability accounting tools* and by integrating the information created with more specific social, environmental and economic accounting tools. Taking into account the multitude of sustainability issues and possible corporate goals as well as the associated complexity of information in sustainability accounting it can be rather difficult to apply integrated tools compared to a tool that focuses solely on one dimension of sustainability.

In line with the first expectation of a possible extension of the number of tools, our *findings* show that large German companies have *increased the number of applied sustainability accounting tools* between 2006 and 2010. Concerning the composition of tools, the findings however show that these companies apply *more integrated tools than single focused sustainability accounting tools* in both surveys.

One explanation for this development may be that these companies experience an organizational learning process which includes phases of trial and error as well as, for instance, the opportunity to imitate ([22]-[23]). Once a company has gained experiences in the application of some sustainability accounting tools – irrespectively whether these tools cover one, several or all dimensions of sustainability – the involved actors can be expected to realize deficiencies and to search for more integrated

methods. At the same time these actors may have gained some practical knowledge in sustainability accounting which can be transferred to other, possibly more challenging tools.

A second possible reason for the increased use of integrated tools may be that these companies are increasingly asked to consider all sustainability dimensions at the same time. Both, internal (e.g. management; employees) as well as external stakeholders (e.g. non-governmental organisation (NGOs), media) may more often require information which, for instance, is created in stakeholder dialogues or with a sustainability balanced scorecard (e.g. [9], [11]).

With regard to our *analysis of the 'orientation' of the applied sustainability accounting tools* we distinguish to what extent *specific* (instruments) or *broader* (systems and concepts) internal sustainability accounting tools or *externally oriented* accounting and reporting tools are applied. Whereas internal tools are directed towards supporting management in decision making and in creating internal accountability for sustainable development externally oriented sustainability accounting methods focus on creating transparency and accountability for external stakeholders to evaluate the company's environmental and social impacts. Depending on the management rationale an "inside-out" approach (from an internal logic to external communication) or an "outside-in" approach (from external reporting to internal responsibility management) may guide the organizational development over time whereas the "twin-track approach" tries to combine both development perspectives ([10], [16]). Furthermore, specific sustainability accounting instruments (e.g. eco-budgeting) are in many cases particularly useful on an operational level whilst broader sustainability performance management approaches (e.g. sustainability balanced scorecard) provide higher management with information and facilitate strategic decision making.

The simultaneous increase of the application of specific as well as broad internal tools implies for the analysed time period that sustainability accounting has been developed and implemented in large German companies mainly to support informed decision making on the operational as well as the strategic level whereas external communication has not been of an equivalent development focus.

VI. CONCLUSIONS FOR FUTURE RESEARCH

The findings and analysis suggest several areas for further research. Firstly, an in-depth analysis seems useful of why different sustainability accounting tools are applied in a company. In this context, enablers and barriers (e.g. know-how; affectedness by sustainability issues) of the use of these tools may be identified. Secondly, the results provoke the question of how the different sustainability accounting tools should be characterised in terms of, for instance, practicability, flexibility or cost effectiveness (e.g. [24]-[25]) in order to be applied. A third area for further research could investigate possible differences of the awareness and application of tools between large companies and small and medium-sized enterprises or between different countries (e.g. [9], [26]). Fourthly,

methodological gaps and whether a need for developing additional sustainability accounting tools exists may be analysed.

VII. OUTLOOK

Our empirical investigation reveals that the number of sustainability accounting tools is increasing. This documents the growing importance for large companies to collect sustainability data, create and manage specific sustainability related information as well as to communicate and report this information. The relatively larger application increases for integrative and specific internal decision support tools indicate that the integrative management of sustainability issues and management decision support have been a priority in the sustainability accounting development in corporate practice.

The relatively large changes during the time span of only four years furthermore stresses that the development of a "set toolbox of sustainability accounting methods" to be applied in corporate practice does not yet exist. Sustainability accounting and its tools are still in development.

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