Chapter 1

SUSTAINABILITY ACCOUNTING AND REPORTING: DEVELOPMENT, LINKAGES AND REFLECTION

An Introduction

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Abstract: Companies are key contributors to economic, environmental and social well-being. Corporate activities pervade the present and are likely to be critical in the future, so that corporate sustainability is necessary for long-term sustainable development of the economy and society. In this context, sustainability accounting and reporting which serve the collection, analysis and communication of corporate sustainability information become crucial triggers for management towards corporate sustainability. If corporate sustainability is seen as being the result of management attempts to address sustainability challenges, then it makes sense to discuss and define sustainability accounting and reporting on the basis of the challenges embedded in the sustainability triangle and addressed by cornerstone publications. This chapter concludes with a discussion of the link between accounting and reporting and the question of whether reporting is, or should be, driven by accounting, or conversely whether accounting is or should be driven by reporting.

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1. CORPORATE SUSTAINABILITY – THE BASIS OF SUSTAINABILITY ACCOUNTING AND REPORTING

1.1 What is Understood by Corporate Sustainability?

Companies are key contributors to economic, environmental and social well-being. Corporate activities pervade the present and are likely to be critical in the future, so that corporate sustainability is necessary for long-term sustainable development of the economy and society.

From a pragmatic point of view, *corporate sustainability* can be viewed as the result of management attempts to tackle challenges posed by the need for corporations to move towards the goal of sustainability (Dyllick and Hockerts 2002, Schaltegger and Burritt 2005). However, it remains unclear when a company can be considered to have reached the state of being sustainable. Sustainable development of a corporation requires the initiation and establishement of organisational development and organisational learning processes. If this view is taken to its extreme, corporate sustainability cannot reflect a given state to which management may strive, but will always have to be a moving target for organisational development. Nevertheless, for reasons of clarity it is helpful for a company which is striving towards corporate sustainability to distinguish between the target state of corporate sustainability and the process of sustainable development. The term corporate sustainable development is therefore used here to mean the processes which are implemented in order to reduce negative impacts and to increase the positive effects of corporations towards attaining a sustainable economy, environment and society, whilst corporate sustainability represents the desired outcome of such processes (Schaltegger and Burritt 2005, see also Dyllick and Hockerts 2002). In corporate practice, the focus is usually on the processes rather than on the end state, representing in essence an incremental process of continual development towards sustainability.

The distinction between corporate sustainability and corporate sustainable development is to some extent also reflected in environmental standard ISO 14031's distinction between operational performance indicators (OPIs, which map performance and outputs) and management performance indicators (MPIs, which map the route that management is taking to improve its future OPIs).

Given the broad and ambitious goal of sustainable development in general, corporate sustainability is a challenging concept which is in need of operationalisation. In this context, information about sustainability impacts and sustainability performance can help managers to incorporate deliberative, sustainable thinking into their decision-making, planning, implementation

and control activities. This is the sharp end of the debate about corporate sustainability. As a consequence, sustainability accounting and reporting – which serve the collection, analysis and communication of corporate sustainability information – become crucial tools for management in moving towards corporate sustainability.

1.2 Historical Development of Sustainability Accounting and Reporting

The concept of *sustainability accounting* has emerged over a period of years from both philosophical accounting discussions (e.g. Bebbington 2001, Bebbington and Gray 2001, Gray and Bebbington 2000) and developments in accounting (e.g. Forum for the Future 2005, Schaltegger and Wagner 2006a, Schaltegger and Wagner 2006b, see also Schaltegger and Burritt 2006).

First, it needs to be recognised that accounting has long been presented in a conventional way for use by both management and external parties.

Financial reporting is based on accounting information which is gathered within organisations and then prepared for presentation to external parties through disclosure in external reports. The information which is disclosed revolves around a number of statements which are related to the organisation's financial activities. In particular the statement of financial position, or balance sheet, shows the financial position of the organisation at a particular date; and the statement of financial performance, or income statement, provides information about the financial inflows and outflows of the organisation in a specified period. Both are based on accruals-based accounting information which is designed to reflect the financial impact of transactions on the assets, liabilities and equity of a company as they occur. Separate information about cash movements in a period is reflected in a cash flow statement, which also reconciles the initial and closing cash balances. Over the years specific rules have been adopted by professional accountancy bodies and regulators on how specific transactions should be accounted for in order to maintain the credibility of financial statements and the organisation in the eyes of external readers.

A second type of accounting, *cost accounting*, was initially closely related to financial accounting in that it provided information about inventory values for inclusion in the annual financial reports (Wells 1978). Cost accounting was then adapted from its initial financial accounting purpose in order to assist with management control, to emphasise performance reporting based on financial representations of the expected and actual performance of both organisations, and of parts of organisations such as divisions or

departments, and their comparison to provide the basis for management action based on the differences reported.

Since this early adaptation of financial accounting for management control, *management accounting* has developed separately to focus on generating information for management planning, control and decision-making (Horngren et al. 2005:10). In recent years the *strategic importance of management accounting information* has been emphasised (Morse et al. 2003, Ratnatunga et al. 1993). Adoption of a strategic approach means that strategic management accounting places stress on the ways in which organisations match their resources to the needs of the market place, particularly to competitive pressures, in order to achieve defined organisational objectives.

This has raised the question of *corporate (environmental and sustainability) performance measurement and management* which as an integrative approach tries to link strategic management, management accounting, and reporting, in order to organize the flow of information between its justification, creation and communication (e.g. Schaltegger and Wagner 2006a, 2006b). In this view, the term 'reporting' is not limited only to external reporting as it is in financial reporting but rather encompasses the whole information communication process, internally as well as with external stakeholders.

The term *sustainability reporting* is usually used to refer to the publication of external reports, as either printed brochures or electronic versions on the internet. However, one main effect of sustainability reporting is the involvement of management and employees in setting sustainability goals for the corporation, collecting data, and creating and communicating sustainability information. The design of external sustainability reporting should therefore consider its interplay with internal communication and reporting processes.

The significance of these historical developments is that sustainability accounting and reporting could be developed in different ways: first, based on an entirely new system of accounting; and, second, as a development of conventional financial, cost, or management accounting. The former is appealing because if sustainability accounting is developed *de novo* it allows a complete reappraisal of the relative significance of social, environmental and economic considerations and their interactions in corporate accounting systems, for management and external parties (see Houldin's (2001:3) comment in relation to the development of new environmental accounting systems). The latter is closer to practice since piecemeal modifications to existing accounting require less dramatic change.

Changes to conventional accounting have taken the form of: *environmental accounting and reporting* as the foundation for external environmental reporting, with a major emphasis on environmental impacts and extended performance expressed in physical and qualitative terms (Schaltegger and

Burritt 2000); and *triple bottom line reporting* which introduces separate economic, social and environmental statements for organisations (Gray and Milne 2002). Environmental management accounting (EMA) and environmental reporting constitute in any case an important part of sustainability accounting and reporting.

However, each of these accounting and reporting systems suffers from association with conventional accounting and its well known defects. Firstly, the conventions behind financial reporting can be criticised as having a narrow corporate perspective on the boundary of activities (the entity concept): '…accounting typically adopts a set of implicit assumptions about the primacy and desirability of the conventional business agenda…' (Gray and Bebbington 2000). Maunders and Burritt (1991:12) also draw attention to the defects of accruals, consistency and prudence conventions in terms of their use to evaluate corporate activities which have ecological impacts.

Secondly, monetary measurement in financial accounting has been criticized since it is based on different types of measures – historical, current, replacement, net present value – which in financial accounting are then added together as though they are similar, but do not in practice produce useful, comparable information (Chambers 1966). An overemphasis on monetary measurement in relation to the ecological impacts of an organization can mislead, as physical and qualitative environmental information may be critical when assessing whether ecological damage is irreversible, or carrying capacity is being exceeded through corporate activities (Schaltegger and Burritt 2000:77). Hence, conventional accounting is heavily criticized for failing to facilitate an understanding of corporate environmental impacts. Such criticism has led to calls for the additional disclosure of environmental and social performance and their balancing with economic performance (Epstein 1996, Figge et al. 2002, Schaltegger and Dyllick 2002).

Environmental, triple bottom line accounting and reporting have emerged in this milieu (e.g. Elkington 1998, Forum for the Future 2005). Accountants are beginning to consider the potential of new reporting models for business (ICAEW 2003, Illingworth 2004, KPMG 2003). The business case for change is related to the cost advantages from: having an integrated reporting and communications strategy; the need to portray a balanced performance story that reports bad as well as good news; measuring and reporting social and environmental as well as financial information; and the improved confidence of boards and executives in the new reporting model and statements.

However new reporting models have also been the subject of criticism. Environmental reporting has met considerable opposition from government and business because environmental regulation is seen as imposing unnecessary costs on business (ENDS 2005). Frost and English (2002) found that arguments used in Australia against mandating environmental reporting

disclosures included the comments that: corporation law does not extend to non-financial issues; mandated disclosure would reduce the flexibility of companies to tailor their reporting to individual stakeholder needs; and unnecessary additional costs of compliance would be incurred. Gray and Milne (2002) suggest that triple bottom line reporting remains and is likely to continue to remain dominated by financial considerations, with the social and environmental being a mere add-on. They call for the quality of social and environmental reporting to be dramatically improved.

The zenith of accounting and reporting at present is *sustainability accounting and reporting* with its conceptual emphasis on accounting for eco-systems and for communities, and consideration of eco-justice, as well as more conventional issues of effectiveness and efficiency (Gray and Milne 2002). Corporate sustainability reporting is claimed by Gray and Milne (2002) to present a challenge because of the need to address the entity concept and to focus on eco-systems and their carrying capacities, thresholds and cumulative effects. They suggest that, as it is not possible to define what a sustainable organization would look like, the accounting that would be necessary to provide the basis for sustainability reporting must also be unknown. Hence, the challenge for corporate sustainability accounting and reporting to succeed has been laid down and its recent development and prospects are outlined below and in the contributions appearing in this text. A key part of this challenge is to reconsider the importance of accounting which has hitherto been understated (ICAEW 2003:72): non-financial information (i.e. environmental and social information, as well as eco-efficiency and socio-efficiency information, reflecting the links between environmental and economic issues, and between social and economic issues); forward-looking information (future orientation); and the needs of other users as well as those of investors (participatory issues with other stakeholders including societal stakeholders). However beyond these is the need to adopt the conceptual underpinnings with which a new form of accounting, sustainability accounting, must engage if it is to be successful operationally.

The next section starts by exploring the concept of corporate sustainability as the basis of any related approach to accounting and reporting. The following section defines sustainability accounting and reporting and considers the connections between them. Finally, this Introduction concludes with a broad overview of the structure of and contributions to this book.

2. STRUCTURING CORPORATE SUSTAINABILITY ACCOUNTING AND REPORTING USING THE SUSTAINABILITY TRIANGLE

If corporate sustainability is viewed as the result of management's attempts to address sustainability challenges, it makes sense to discuss sustainability accounting and reporting on the basis of the challenges embedded in the sustainability triangle (see Figure 1-1). The vision of corporate sustainability today is a broad approach relating to the contextual integration of economic, environmental and social characteristics (Schaltegger and Burritt 2005). It comes as a surprise to realise that the best known aspect of accounting for corporate sustainability is the heuristic, multi-criteria *triple bottom line perspective* which aims to integrate the economic, social and environmental aspects of business management (Elkington 1998). This differs from the preceding political and macro perspective in which the orientation towards future and present needs, as formulated in the Brundtland report, has dominated for much longer (UNWCED 1987). Figure 1-1 illustrates the sustainability triangle approach and the related core contextual challenges of corporate sustainability. This Section addresses both the triple bottom line approach and the Brundtland requirements for understanding the main corporate sustainability challenges and issues which need to be covered by sustainability accounting and reporting.

2.1 Challenges Deriving from the Sustainability Triangle

The sustainability triangle visualises the three perspectives of sustainability not just by plotting ecological, social and economic goals in a triangle but by also addressing the interrelationships between these three dimensions. The challenges to corporate sustainability relate to the economic, ecological and social considerations in the triangle and their interrelationships.

The difference between focussing on a corner or on a line between two corners of the sustainability triangle is defined by the distinction between effectiveness and efficiency. *Effectiveness* is the goal whenever management attempts to improve a single dimension of the sustainability triangle. Effectiveness – whether economic, environmental or social effectiveness – can be measured in *absolute indicators,* or figures. *Efficiency*, by contrast, describes the relation between different dimensions such as the environmental and economic dimension for eco-efficiency, or the social and economic dimension for socio-efficiency (even economic efficiency reflects the relation between different economic issues such as assets, profit, time, etc.). Efficiency is therefore measured in *relative indicators* or ratios. Efficiency indicators are

cross-indicators which incorporate two separate units of measure, unless both dimensions of an efficiency analysis are measured in monetary terms.

Economic effectiveness, i.e. achieving the best possible economic result, is the classic entrepreneurial and management task, which is also relevant in the context of sustainable development. The aim is to balance economic risk and return in corporate activities. As this is the subject of conventional business management, it is usually not specifically addressed as a task of corporate sustainability. However, this could be a mistake since economic survival is the *sine qua non* of ongoing commercial corporate activity.

Apart from the need to focus on the conventional economic management of the business, the remaining, contextual corporate sustainability challenges with which corporate sustainability management has to deal are the ecological, the social, the eco-efficiency and socio-efficiency, as well as the integration challenges (Schaltegger et al. 2003b, Schaltegger and Burritt 2005, Schaltegger et al. 2003a). To support management, sustainability accounting and reporting must provide information on the company's performance and development in relation to all corporate sustainability challenges, including the contextual, as well as further challenges.

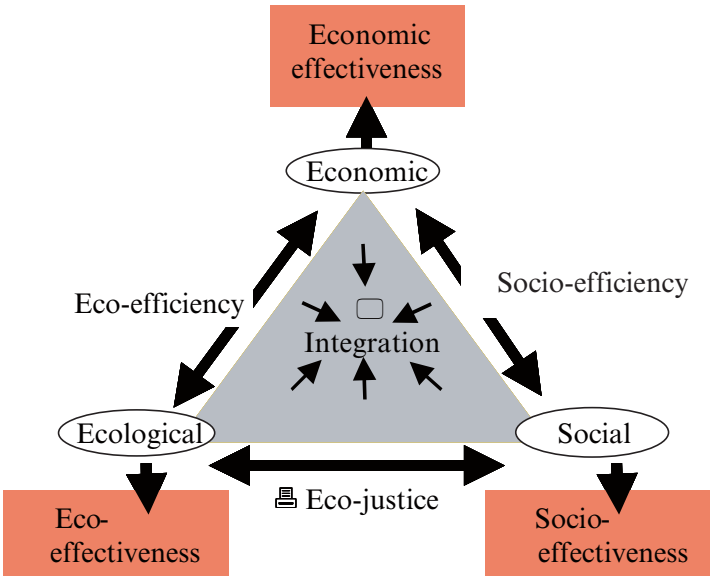

Figure 1-1. Structuring information needs for corporate sustainability challenges with the sustainability triangle (source: Schaltegger et al. 2003b, Schaltegger and Burritt 2005, Schaltegger et al. 2003a).

The *ecological challenge* is to increase the ecological effectiveness, or eco-effectiveness (① in Figure 1-1), of business activities. *Eco-effectiveness* describes how well environmental impacts have been reduced. All human activities influence the ecosystem, with some influences having irreversible effects and being considered of major relevance to the survival and existence of an intact natural environment. The central environmental problems include the greenhouse effect, the destruction of the ozone layer, acidification and over-nitrification of soil and water, declining biodiversity, photochemical smog, toxicological burdens harmful to humans and the environment, desertification, etc. (see e.g. Heijungs et al. 1992). The excessive overall environmental burdens in many areas such as CO_2 emissions therefore confront businesses with the challenge of making substantial reductions in the absolute scale of the environmental impacts of their production processes, products, investments, etc. (e.g. Braungart and McDonough 2002). To provide information to tackle the corporate ecological challenge is why physical environmental management accounting approaches (also called PEMA, see Burritt et al. 2002a, 2002b) such as product life cycle assessment (LCA), with what are effectively aggregate indicators of eco-effectiveness, have been developed. Because of difficulties in arriving at a commonly accepted integrative measure of environmental impact added, eco-effectiveness is usually expressed in terms of specific indicators such as CO_2 emissions or CO_2 equivalents (e.g. Heijungs et al. 1992), business ecological footprints (Wackernagel and Rees 1996), or simply the total quantity of materials mass involved in a product life cycle (e.g. Schmidt-Bleek 1994). The criterion for assessing how successfully a company is meeting the ecological challenge is ecological effectiveness (also known as eco-effectiveness or environmental effectiveness). *Ecological effectiveness* measures the absolute environmental performance (e.g. tonnes of CO_2 emissions reduced in the last period) and is a general description of the extent to which the targeted objective of minimizing environmental impacts has actually been achieved.

The *social challenge* of corporate sustainability is to increase the company's social effectiveness, or *socio-effectiveness* (② in Figure 1-1). The social challenge related to corporate sustainability is to ensure the existence and success of the enterprise whilst at the same time taking account of the diversity of social, cultural and individual social demands. This is related to safeguarding the social acceptance of the enterprise and the legitimation of its business activities. When dealing with a great variety of social factors such as inter-regional and inter-temporal equality of rights, fairness, equity of needs and performance, it has to be borne in mind that these can never be completely satisfied, as human desires may be unlimited. Management is therefore challenged to set priorities in a dialogue or multi-logue with

principal stakeholders. From an information management perspective, social indicators and the reporting of various aspects of social performance, usually only loosely linked if at all, dominate the current approach. It has to be acknowledged that it is conceptually difficult to define what social performance really means because there are no such clear generally accepted absolutes as there are for the environmental and economic dimensions, such as the reduction of environmental impacts or the creation of wealth - even the most basic social goal, the right to life, is challenged in those countries which continue to use the death penalty. Compliance with cultural norms is not clearly defined and may be disputed when norms conflict between different countries, such as the role and rights of women. We have to keep in mind that social expectations vary substantially between different cultural contexts, which in turn complicates any approach of accounting and reporting for socio-effectiveness. Nevertheless, accounting and reporting research is thus challenged to develop more comprehensive approaches which allow accounting for socio-effectiveness as the criterion that indicates how successful a company has been in reducing the absolute level of its negative social impacts relative to expectations, and the extent to which it gives rise to valuable positive social impacts and benefits.

The *economic challenge to environmental and social management* aims to improve *eco-efficiency* (③ in Figure 1-1) and *socio-efficiency* (④ in Figure 1-1). Whereas the traditional economic challenge consists of creating corporate and shareholder value and increasing the company's profitability, the economic sustainability challenge is concerned with undertaking effective environmental management and social management as economically as possible. Because profit-orientated businesses operating in a competitive setting are established and run primarily for economic purposes, environmental protection and social commitment are always confronted with the challenge of either increasing value, making a contribution to profitability, or at least minimizing costs. However, not-for-profit organisations also face limited budgets and are therefore challenged by economic considerations. The so-called 'business case of sustainability' is therefore not limited only to companies with shareholders but is of fundamental importance generally (e.g. Schaltegger and Wagner 2006b, Steger 2005, similarly Dyllick and Hockerts 2003).

The traditional criterion for achieving economic success is efficiency, which is a relative measure of performance. The economic interpretation of efficiency is based on monetary performance data and is normally expressed as profitability indicators such as return on investment, return on equity, value added, etc. In the context of corporate sustainable development, the monetary efficiency interpretation is supplemented by ecological and social aspects. In addition to economic efficiency, two types of efficiency are of

special importance: eco-efficiency as economic-ecological efficiency, and socio-efficiency as economic-social efficiency.

Eco-efficiency is defined as the ratio of an economic (monetary) measure to a physical (ecological) measure (Schaltegger and Sturm 1990:279ff., Schmidheiny and BCSD 1992). It can be defined as the ratio of value added to environmental impact added per unit, where environmental impact added is equivalent to the sum of all environmental impacts which are generated directly or indirectly by a product or activity. Examples of eco-efficiency measures are value added (in $ or Euro) per tonne of emitted CO_2, the contribution margin of a product (in $ or Euro) relative to its contribution to greenhouse effect (in CO_2 equivalents), etc. Various publications provide examples of possible target ratio improvements between economic and environmental performance (e.g. "factor four" by von Weizsäcker et al. 1997 and "factor ten" by Schmidt-Bleek 1994) and case collections of companies applying and promoting eco-efficiency (e.g. Hawken et al. 1999, Schmidt-Bleek 1994, von Weizsäcker et al. 1997). Accounting for eco-efficiency (e.g. Schaltegger 1998) is at the heart of EMA which provides physical as well as monetary data using various accounting methods, and which deals with integrative eco-efficiency indicators. However, apart from the Environmental Shareholder Value concept (Schaltegger and Figge 1997), most current approaches to environmental accounting do not provide the necessary information to answer crucial questions such as: how does the consideration or non-consideration of specific environmental and social issues influence the economic performance of the business?

Similarly to eco-efficiency, *socio-efficiency* (also known as 'societal efficiency') can be defined as the ratio of value added to social impact added, where social impact added represents the sum of all negative social impacts originating from a company, product, process or activity. Examples of socio-efficiency yardsticks are value added (in $ or Euro) relative to the number of staff accidents, or value added (in $ or Euro) relative to the number of days lost through absence due to employee illness. In the same way that socio-effectiveness may also be defined by the positive social effects or the social value created by a company (and not only by the reduction of its negative social impacts), socio-efficiency can also be expressed in terms of social and economic value created. Given the difficulties of defining and measuring socio-effectiveness, and because of the existing weak methodological basis of accounting for social effectiveness, it is not surprising that accounting for socio-efficiency is still in its infancy.

The *integration challenges* (⑤ in Figure 1-1) are the *contextual integration challenge* which is about bringing together the first three challenges, and the *methodological integration challenge*, which focuses on integrating environmental and social management into conventional economically-orientated business management. The three challenges of sustainability

management as described above can be met by systematic efforts to act in an eco- and socio-effective as well as in an eco- and socio-efficient manner. However, the biggest challenge of corporate sustainability management – and thus also sustainability accounting and reporting – is the integration challenge. This challenge is to combine and simultaneously satisfy the objectives described above. Contextual integration of the three characteristics (economic, ecological and social) in the sustainability triangle requires the simultaneous accounting for and improvement of the four challenges of ecological effectiveness, social effectiveness, eco-efficiency and socio-efficiency. Both the contextual and the methodological challenge also require acceptance of a philosophy that engages with conventional business management whilst lifting the veil on these challenges.

2.2 Brundtland and Further Challenges for Corporate Sustainability

As well as the four contextual issues outlined in the previous section, corporate sustainability embraces further considerations of which the most prominent are dealing with time, participation, methodological integration into core business methods and processes, and adoption of a mind set that engages with sustainability orientated information. Creating and providing relevant information concerning these challenges is also part of sustainability accounting and reporting.

2.2.1 Orientation towards the Future and Stakeholder Participation

Orientation towards the future has always been a core business management issue, which in management accounting is reflected in tools such as investment appraisal and budgeting and the assessment by financial analysts and investors of the company's economic value. With environmental management, consideration of the future impacts of emissions and other environmental impacts has been added to the set of management responsibilities. However, recognition of a broader set of *stakeholders* than only those with a financial interest in the company, and explicit consideration of *future generations* and *non-economic stakeholders,* has been addressed in the business literature only more recently (see e.g. Dyllick and Hockerts 2003, Schaltegger et al. 2003a) and still remains an open field for social accounting.

To adapt Brundtland's widely accepted definition of sustainable development, corporate sustainable development can be seen as *meeting the needs of a corporation's direct and indirect stakeholders without compromising its ability to meet the needs of future stakeholders as well* (e.g. Dyllick and

Hockerts 2002). Corporate sustainability thus includes the vision of *participation* in processes for analysing sustainability problems, for finding solutions to these problems, and in decision and implementation processes. In the light of participation, sustainability accounting and reporting may include *accounting for Corporate Social Responsibility (CSR)* which not only covers the company's CSR performance and contributions but should also support participation processes, and address the information needs and communication of the costs and benefits associated with *stakeholder relationships* (e.g. Figge and Schaltegger 2000).

As a consequence of the broad approach and its various contextual aspects, corporate sustainability is not limited only to the corporate organisation itself but directs attention towards the social embeddedness of the corporation and the influence that it has on its social environment. In the more recent marketing and *entrepreneur* literature, corporate sustainability is therefore seen as an approach that is not limited only to niche markets and market-related business activities (e.g. Schaper 2003). Instead, corporate sustainability requires the adoption of sustainability as a *high priority business goal* as well as recognition of its considerable potential *impact on mass markets and society* (Schaltegger 2002). Sustainability managers can thus be seen as actors who of necessity have to involve themselves in the development of market frameworks for internalising the external effects of business and who, through lobbying and other means, increase public awareness of the need for sustainability (e.g. Dyllick et al. 1997). The societal role of managers is thus an important aspect of sustainability management, although evidence about the extent to which significant 'morphogenic' change in corporate performance and reporting can be encouraged by stakeholder engagement remains an open question (see Deegan and Blomquist, 2005:28). In summary, corporate sustainability management, through the adoption of a more encompassing view, is seen as a *business approach* which is designed to shape the environmental, social and economic effects of a company in a way that, firstly, results in the sustainable development of the company and, secondly, provides an important contribution towards the sustainable development of the economy and society (e.g. Schaltegger et al. 2003a).

2.2.2 Methodological Integration and Conditioning Effects

The methodological integration of environmental and social accounting and reporting activities into core business processes (including conventional accounting and reporting), with other management tools, has been addressed as one aspect of the challenges of integration for corporate sustainability (e.g. Schaltegger et al. 2003b). In practice environmental and social management,

as well as environmental and sustainability accounting and reporting, are usually established in parallel with conventional management systems. This can lead to inefficient information management and business solutions where, for example, attempts to find innovative products and other sustainability orientated process-based innovations are not recognized early enough. Thus one of the core challenges for sustainability accounting and reporting is the integration of environmental and social accounting and reporting approaches into the core business management processes and systems.

A related challenge is the problem of removing the conditioning which is associated with conventional business management and accounting (Maunders and Burritt 1991:13). For example, in the face of opportunities being presented that reduce corporate environmental impacts and improve financial performance, logic dictates that action should be taken. However, as Herbohn (2005:523ff.) found, even in those circumstances where management recognises the need to incorporate positive and negative environmental impacts into conventional net profit figures, implementation and change can be constrained through: over-optimism by certain staff; staff turnover; the 'business as usual' (Bebbington and Gray 2001) constraint whereby change is marginalised through resource withdrawal and political lobbying; and the re-emergence of old attitudes, such as the view that resource management decisions cannot be reduced to financial components for decision-making and that non-market values are at best only supplementary information. Corporate sustainability management, and especially sustainability accounting and reporting, are therefore challenged to recondition the conventional business climate in an organisation by means of methodological and information change.

3. DEFINING AND LINKING SUSTAINABILITY ACCOUNTING AND REPORTING

With increasing attempts to promote corporate sustainability, management is being challenged to rethink contemporary information management systems. These currently are inadequate: at best existing systems are inefficient, at worst they lead to poor decision-making and lax accountability. Because of the growing environmental and societal impacts of corporations as well as the increasing number of reporting regulations, government pressures, international verification and accounting standards, and changing stakeholder strategies and demands, managers recognize that systematic approaches to the integration of environmental and social issues into financial and management accounting have become a necessity.

3.1 What is Sustainability Accounting and Reporting?

With the growing communication efforts being made by companies which place importance on sustainability, it is not surprising that sustainability accounting and reporting have achieved respectable – and for many, astonishingly fast – management relevance. Furthermore, this development is characterized by a broad variety of different perspectives to address relevant company sustainability issues. It will be disturbing for deep green and very ambitious actors that new approaches towards measuring, analyzing and communicating sustainability issues are mainly being developed on the basis of the history and growing body of literature on EMA and reporting. However, this development can also be interpreted as an evolutionary process founded in the environmental origins of sustainability accounting and reporting.

Under this view, the term *sustainability accounting* is used to describe new information management and accounting methods that aim to create and provide high quality information to support a corporation in its movement towards sustainability. *Sustainability reporting,* by contrast, describes new formalized means of communication which provide information about corporate sustainability.

The *linkage of both sustainability accounting and reporting* is crucial for two reasons. Firstly, accounting information which is not communicated cannot exert any influence and is thus unable to contribute towards the company's sustainable development. Secondly, reporting is needed in order to substantiate information about the actual status of, and progress towards, corporate sustainability; otherwise the information tends to be considered to be rather superficial.

3.2 Accounting-Driven Reporting or Reporting-Driven Accounting?

If corporate sustainability communication and reporting is to be substantiated, it has to progress beyond qualitative value statements and statements of future prospects such as those provided in glossy reports, which are necessary but insufficient. The credibility of sustainability accounting information for internal and external recipients, and the associated trust and veracity which this implies, requires the visibility of specific activities as well as material improvements. Substantive corporate sustainability communication therefore requires a credible explanation of management efforts and the disclosure of corporate sustainability performance. Sustainability performance is communicated through both qualitative descriptions of activities and, as a

necessary element, quantitative measures of environmental and social impacts and achievements along with their economic relevance to business success.

As argued above, accounting and reporting are thus strongly interlinked. Furthermore, effective contributions to corporate sustainability require that sustainability accounting and reporting are embedded in a structured sustainability approach to performance management. With this in mind, sustainability performance management could be structured in two fundamentally different ways (Schaltegger and Wagner 2006a):

- Strategy and accounting-driven sustainability reporting (the "inside-out perspective")
- Reporting-driven sustainability accounting (the "outside-in perspective")

From a performance management perspective, sustainability accounting and reporting will mostly be derived from corporate and business strategy. Such an *inside-out perspective* is characterized by reporting that has been planned and achieved on the basis of corporate strategy, accounting and management performance. Based on the strategic analysis of which environmental, social and societal issues are of core relevance to the economic success of the company, information needs and key performance indicators will be deduced. A recognized approach to support the process of developing key performance indicators from the company's strategy is the Sustainability Balanced Scorecard (Figge et al. 2002, Schaltegger and Dyllick 2002). Based on these indicators, the next step is to define the requirements for the accounting methods and systems which are necessary to provide the management information which is required. From such a performance management perspective, reporting serves as the end point in the process of the communication of corporate developments based on the strategically relevant indicators which are being accounted for.

In short, with strategy and accounting-driven sustainability reporting, strategy defines the performance measurements and indicators which in turn define the accounting methods and the contents of sustainability reporting.

The *outside-in perspective* takes a different approach. From this view, sustainability accounting and performance management are driven by reporting and communication needs. The starting point is external expectations of stakeholders, guidelines and requirements about what should be reported and how. Guidelines such as the Global Reporting Initiative (GRI), as well as environmental and sustainability rankings, and rating and assessment schemes, are consulted in order to identify a set of information requirements and indicators relating to the company. Following this rationale the company's external corporate reporting information is deduced from (published) external expectations about the contents of reports. This, in turn, drives the company's development of its sustainability reporting and internal corporate

information and communication systems. Once information requirements have been defined, the accounting and information management system can be designed to create the required information. Sustainability accounting and sustainability performance management can be streamlined to serve the reporting requirements.

In short, for reporting-driven sustainability accounting, external guidelines, rating and assessment schemes define information requirements and indicators which in turn define the accounting methods and information management systems.

As with most dichotomies, both the inside-out and the outside-in approaches are related to each other. On the one hand, a good corporate strategy has to consider external stakeholder expectations and requirements and thus is not isolated from reporting requirements. On the other hand, good corporate reporting requires substantive performance results which can be demonstrated only on the basis of relevant, reliable, comparable and understandable information about corporate sustainability.

Simple adoption of guidelines and requirements which do not relate to strategically relevant key aspects of the company's performance will not be enough to create the necessary benefits for the company. Isolated improvements in performance, however, could also be hampered because any corporate sustainability strategy has to relate to its societal environment. Sustainability accounting and performance management cannot be effective without considering the societal and business environment, nor can sustainability reporting have a meaning without reliable information and performance. This means that stakeholder perceptions and requirements must be considered by corporate management if the efforts and performance improvements are to be recognized and corporate sustainability is to be improved. Thus, both the "inside-out" and "outside-in" perspectives have their strengths and weaknesses, and combining them may be most fruitful.

In any case, the management of an ambitious company which is striving for sustainability will need to consider and integrate both approaches and crosscheck on the sustainability accounting and reporting system which is best for improving corporate sustainability. Depending on the company's situation, and on whether societal expectations are relatively strong or weak, different emphases may be needed. This raises the question of how relevant sustainability accounting and reporting are in different societal environments.

3.3 Business Environment, Expectations and Sustainability Accounting and Reporting

Table 1-1 adopts and slightly modifies the well-known distinction in societal business climates between "trust me", "tell me", "show me" and "prove to

me" worlds (similar to Shell 1998) and gives an overview of the potential relevance of sustainability accounting and reporting.

Table 1-1. Changing role of sustainability accounting and reporting in different societal business environments.

Business environment	Societal expectation	Relevance of sustainability accounting	Relevance of sustainability reporting
Trust me	None	Internal efficiency improvements	Internal communication to achieve efficiency improvements
Tell me	Communicate	Information creation for highly visible and formally required issues	Sustainability as an important internal and external communication element
Show me	Communicate and illustrate	Information creation for an over-arching picture of sustainability performance	Essential communication element as part of a set of "voluntary" communication activities
Prove to me	Measure, account for, communicate and illustrate	Basis of sustainability performance management Basis to create transparency Basis for verification	Additional element in a systematic set of trust building activities (such as stakeholder dialogues and involvement)

In a world in which society trusts business managers without having any specific sustainability expectations, management will focus on environmental and social information which has been identified as being of internal organisational and direct economic relevance. Not only does the role of sustainability reporting depend on societal expectations, but stakeholder reactions also exert a substantial influence on what management considers is sufficiently important to be accounted for. The importance of social and environmental measurement, sustainability accounting, the quantity of information required, and the quality requirements of information created, all increase with changes in societal expectations:

- In a *"trust me"* world, accounting for relevant sustainability issues may happen only for a limited range of purely internal reasons, e.g. to improve the efficiency of materials use and production processes. Sustainability reporting will either not be an issue at all or will merely serve to facilitate management processes for efficiency improvements for internal communication reasons. The inside-out perspective described above will dominate sustainability performance management.
- A *"tell me"* world is characterized by the expectation that companies should communicate with society, i.e. that they inform society about their social and environmental activities. Sometimes societal representatives such as environmental or tax agencies have been entrusted by society to receive and evaluate certain corporate information. Here, the outside-in

perspective will dominate. Accounting and reporting consider those sustainability issues which are highly visible and addressed by society, or for which reporting and information requirements have been defined by society.

- A *"show me"* world requires further sustainability accounting and reporting activities. Communication is expected to be complemented by illustrative activities to support the veracity of the contents which are reported. The accounting and reporting of corporate sustainability thus becomes an essential communication element as part of a set of more-or-less voluntary communications activities. The outside-in perspective is of primary relevance, whereas the inside-out perspective adds support for performance management.
- The *"prove to me"* societal environment is the most challenging to business management. It requires substantial efforts towards and improvements in corporate sustainability, combined with the effective communication of these efforts. Sustainability performance management, accounting and reporting have to work hand in hand. Inside-out and outside-in approaches create an ongoing management circle of sustainability performance measurement and management. Furthermore, the involvement of stakeholders is necessary to create transparency and trust in the procedures as well as in those taking actions on behalf of the corporation. In order to create transparency, sustainability accounting is the essential basis for sustainability performance management and for verification of corporate performance and of reporting. Although the importance of accounting and reporting for sustainability performance management increases substantially in a "prove to me" world, its role nevertheless is supplementary to other management tools. Sustainability accounting and reporting become necessary additional elements of a systematic set of trust-building activities such as stakeholder dialogues, stakeholder involvement processes, employee volunteering, sustainability marketing and sustainable strategic management.

It should be mentioned that corporations do not have merely a passive role in identifying their societal environment and adapting to it through their accounting, reporting and management systems. Company managers can also influence their business and societal environment and contribute to a change in the way their management is approached. It is possible for trust in the business world to result from creating transparency, involving and communicating with stakeholders in a trustworthy manner, and accounting for and revealing sustainability performance improvements on the basis of best practice measures. By voluntarily taking the actions associated with a "prove to me" world, without having been forced into this, management can contribute

towards achieving the needed attitudinal and behavioural business climate. Management can build up relationships such that it can operate its business in an environment of stakeholder trust. Central to this will be an understanding of the dynamics of institutionalising high-trust relations, in particular the understanding of embedding accounting and reporting in the intrinsic satisfactions that stakeholders gain from their social involvement with organisations (Fox 1975:72).

Covering a large variety of different issues, the topic of sustainability accounting and reporting reaches far beyond academic discussions about corporate practice. Progress with the development of trust in business as well as with internal company accounting and reporting systems is of course not linear, but will face setbacks depending on political developments, media attention, public awareness, changes in management, social, economic and environmental crises, etc. Hence, it is not surprising that accounting and reporting approaches often do not match the business environment with societal expectations.

While it should be recognized that sustainability accounting and reporting will not be a panacea for solving all problems associated with attempts to encourage sustainable actions, they play an important part because accounting information provides a common language in most communication and reporting activities, both inside the company and to external stakeholders.

4. STRUCTURE OF THE BOOK

4.1 Structure and Contributions

With its annual conferences and books, the Environmental Management Accounting Network (EMAN) contributes to the development and discussion of new approaches towards sustainability accounting and reporting. This is the fourth EMAN book of a refereed selection of the best papers which have originated from the annual EMAN conferences, with most of the papers included in this volume having been presented at the 2004 conference in Lueneburg. Whereas the focus of the previous books has been on theories and applications of EMA, the overall theme of this book is the development of sustainability accounting and sustainability reporting in its different facets and contexts, as well as in a variety of different countries. Papers dealing with EMA still constitute a large part of the book since EMA is currently the most developed subset of sustainability accounting.

The first Part of the book *(Part I)* opens with an *overview of new conceptual developments of sustainability* and *environmental accounting tools*.

In the second chapter *Stefan Schaltegger* and *Roger Burritt* provide an overview of approaches and perspectives to sustainability accounting. Their contribution reviews the literature and reflects the state of the art. Although the term 'sustainability accounting' has been used for over a decade already, its methodological development is still at an early stage. Based on the notion of corporate sustainability, the authors show how accounting could support corporate sustainable development.

David Bent describes and explains an innovative new method of social accounting which has been developed from an earlier environmental accounting method. In co-operation with a producer of alcoholic drinks, the author used a shadow costing approach to calculate the environmental and social costs of the company's activities, and thus move towards developing a monetised Triple Bottom Line and support the company in taking appropriate avoidance and restoration actions.

Juan Piñeiro Chousa and *Noelia Romero Castro* provide a "linear, cause-effect model" to assess the relationship between the environmental and social aspects of corporate sustainability and their financial ramifications. Based on an extended use of the Du Pont system of ratio analysis, the authors explain how their model provides for the financial analysis of corporate sustainability through sets of ratios that integrate *ex post* accrual accounting and *ex ante* market numbers, and monetary and physical measures, and focus on assessing sustainability impacts on corporate shareholder value.

A rapid increase in the volume of environmental impact data can easily lead to information overload for users, or a lack of understanding of the growing set of indicators available for assessing corporate environmental performance. *Timo Busch, Christa Liedtke* and *Severin Beuker* explain how to reduce this by using the concept of life cycle material intensities (Schmidt-Bleek 1993, Weizsäcker et al. 1997) through "Resource Efficiency Accounting", which combines physical and financial (or cost) data with a focus on eco-efficiency. They support their argument with a case study on the management of packaging materials by Toshiba Europe GmbH (Germany).

As well as their human consequences, occupational accidents can entail significant costs for companies, although since many of the effects of accidents can be remote from the original incident, these may be difficult to measure. However *Pall Rikhardsson* argues that if the full costs of accidents can be made more transparent, companies should be more able to develop convincing cases for taking steps to prevent their occurrence. He describes four alternative approaches that have been developed to measure these costs and identifies the principal features of each, and then develops from this a comparative analysis to guide companies in selecting the most appropriate approach for their own circumstances. *Thomas Heupel* extends into the area of sustainability management the well-established literature which criticizes

conventional management accounting for its alleged failure to adapt quickly to changes in the external business context such as changing technologies, and the importance of process-based rather than predominantly hierarchy-based management. He provides a worked example to explain how conventional standard costing can be extended into 'sustainability-oriented standard costing' which includes both human capital costs and ecological costs, both internal and external to the organization, and also argues for prognostic cost accounting. He argues that this will help to guide and motivate managers within organizations and thus support sustainability management in decentralized organizations.

Given that the business case of corporate sustainability is a core issue and a driver for sustainability accounting and reporting, *Part II* discusses approaches to *link environmental and sustainability accounting with the economic success of a company.*

Marcus Wagner investigates the influence of different corporate environmental strategy positions. He formulates a theoretical model which he tests with two empirical analyses: firstly for the European paper manufacturing industry, and secondly for a set of British and German manufacturing firms. He finds that the potential for different industries to realize a win-win relationship between environmental and economic performance differs substantially. However, a management approach which is in line with the concept of Environmental Shareholder Value, such as a pollution prevention-oriented approach, will support companies in realizing environmental-economic sustainability.

Predicting, quantifying and planning for the potential impacts of environmental pressures on business is one of the main aims of strategic EMA. *Niki Rosinski* reports his analysis of the potential financial effects on the automotive industry of likely government policies in the US, Europe and Japan to curtail carbon emissions, by examining the extent to which 10 leading global car-makers were vulnerable, based on factors such as the carbon emissions performance of their current product ranges and their abilities to introduce needed new technologies. They found that over the medium to long-term the effects of these policies were likely both to be substantial and to differ materially between different firms, which could imply a substantial impact on the competitive balance across the sector.

Benjamin Karatzoglou investigates the possibilities for making an integrated assessment of corporate economic, environmental and social performances. He observes that in Greece, corporate managers, shareholders, and financial intermediaries emphasize and base their credit and investment decisions on various accounting ratios of return, and analyzes how these traditional accounting ratios, which are extensively used by Greek companies, discourage the implementation of investment plans that aim to

improve companies' environmental performance and can therefore be inadequate and misleading for sustainable development applications. He argues that there is a need to adjust the ratios so that managers can record the positive economic impact of sustainable actions, and recommends how such an adjustment can be achieved even within traditional accounting principles. *Samuel Mongrut Montalván* and *Jesus Tong Chang* examine whether there is a link between the environmental performance of Peruvian companies, as indicated by their achievement of ISO 14001 certification, and their economic performance as indicated by stock prices. By analyzing stock price data from the Lima Stock Exchange in a series of event studies they found positive abnormal returns around the dates when ISO 14001 certifications were achieved. This could provide a powerful motivator for companies to improve their environmental management, particularly as the importance of environmental issues becomes increasingly perceived by Peruvian investors. They note that further research is also needed to ascertain the reactions of stock markets to the specific ways in which companies may seek to manage their environmental performance.

The Value Added Statement is now well recognised as a possible addition to the conventional basic financial reports which supplements them by focusing on the wider implications of an organisation's activities beyond its profits or losses for investors. *Laurie Mook* extends this into an Expanded Value Added Statement which also includes estimates of the potential benefits of a company's activities for its customers, and for the environment and society, respectively. She presents a worked example of this applied to the evaluation of a new building which measures the relative benefits of a sustainable building design in terms of its overall performance over its life, in comparison with a conventional design, to help to focus attention on its full impacts.

One way in which sustainability accounting can create value for management is by providing benchmarking information and reporting this to important stakeholders. *Part III* therefore deals with the *links between accounting and sustainability reporting* and the use of accounting information for benchmarking and communication purposes.

Christian Herzig and *Stefan Schaltegger* provide an *overview* of the main goals and benefits of corporate sustainability reporting and its development in recent decades. Reporting and external corporate communication play an important role for corporate sustainability: Firstly, because corporate management is challenged to secure social acceptance by communicating externally the benefits that the company creates for society and the sustainability of its activities. Secondly, the vision of sustainable development emphasizes the participation of stakeholders, which in turn requires the reporting and communication of sustainability-relevant issues and activities to these

constituencies. Finally the chapter provides an outlook on current challenges and developments.

The Global Reporting Initiative (GRI) Guidelines have rapidly become widely recognized and accepted as the global standard on environmental, social and sustainability reporting. *Ralph Thurm* describes the Structured Feedback Process of stakeholder consultation which *GRI* followed in its review of its 2002 Guidelines to obtain feedback in order to inform their continuing development. This included requests for supplementary guidance on specific techniques and for specific sectors; clarification of certain issues with which some reporting companies had experienced problems; advice on the design and use of performance indicators; guidance on how organizations who are new to sustainability reporting can adopt an incremental approach in order to work over time towards full integrated reporting; and practical issues such as the storage and dissemination of data by GRI.

It is not surprising that innovations in environmental accounting have been forthcoming in Japan since a set of environmental accounting and reporting practices are promoted by government agencies. *Nobuyuki Miyazaki* describes one such innovation which focuses on improving *corporate ecological efficiency,* the *Japan Environmental Policy Priorities Index (JEPIX)*, which is a form of environmental accounting based on the concept of ecological bookkeeping introduced by Müller-Wenk (1978) and extended into the concept of ecoscarcity. JEPIX is a set of comparable indicators of corporate environmental impacts which can be integrated into a single master index called an Environmental Impact Point. This information has been used as a practical benchmark by the JEPIX Forum of 12 Japanese companies. This paper describes how JEPIX is used by Komatsu, a manufacturer of construction machinery, which calculates and compares two eco-efficiency rates for each plant – their environmental impact improvement rate and their environmental impact utilization efficiency rate. The paper concludes by identifying a set of problems with JEPIX which, when addressed, would lead to future improvement.

The *Green-Budget Matrix Model* is another such suggestion, made by *Yoshihiro Ito, Hiroyuki Yagi* and *Akira Omori***.** The matrix provides a means to develop plans (both short-run operational and long-run capital budgets) and actions to reduce corporate environmental emissions and improve environmental performance, especially eco-efficiency. The Matrix Model combines and extends the future orientation of "Materials and Energy Activity-Based Budgeting" (Schaltegger and Burritt 2000) with "Quality Costing for the Environment" (Hughes and Willis 1995). Its novelty lies in the addition of external environmental (failure) losses expressed in physical terms, which are not included in calculations recommended by government agencies. Practical

steps towards implementing the matrix are outlined and an application by Nitto Denko, an industrial products manufacturing company, is examined.

Environmental accounting information which is made available to the public has long been criticized for its poor quality and lack of usability for benchmarking and comparisons. *Roger Burritt* and *Chika Saka* examine the quality of mandated *Pollutant Release and Transfer Register (PRTR)* data for six international countries. After revealing the generic problems with the available PRTR data in each country, the authors test its adequacy by attempting to obtain information about the emissions of xylene by Toyota, with only limited success. The paper reveals a range of problems for usability, considers the implications for EMA and environmental reporting, and makes suggestions for further research.

Universities have significant direct environmental impacts, arising in particular from their buildings and estates. *Martin Bennett, Peter Hopkinson* and *Peter James* report on a project which used an existing central database of estates management statistics of universities in England and Wales, of which they found that practitioners were as yet making only limited use, to *benchmark performance between universities* and encourage the sharing of good practices. However they found that meaningful comparisons were difficult due to differences in both data definitions and different universities' organizational structures. The outcome was a decision to change the project design fundamentally, from attempting to make comparisons at institutional levels to smaller-scale comparisons within groups of buildings of similar type and purpose. As well as its environmental implications, this study has implications and lessons for benchmarking exercises generally.

The next three *Parts* of the book illustrate the increasing acknowledgement and dissemination of sustainability accounting and reporting as well as the computer implementation efforts made. *Part IV* provides insights into *national and regional experiences with environmental and sustainability accounting*.

Jaroslava Hyršlová and *Miroslav Hájek* provide an overview of the current situation with the introduction of environmental management systems (EMSs) in the *Czech Republic.* The paper discusses the reasons for implementation and the expected and actual benefits of EMSs in relation to the current state of implementation of environmental cost accounting by companies. The first attempts to implement EMA in the Czech Republic were driven by the single goal of protecting the environment, but this changed during the late 1990s when the tracking and evaluation of environmental costs started to dominate. The authors conclude that the introduction of environmental cost accounting is strongly related to the implementation of EMSs, and look ahead to anticipated future developments in the use of EMA by Czech companies.

China, because of its sheer size and its compelling economic growth and volume of industrial activity, will have an important part to play in the resolution of future environmental and sustainability problems. *Hua Xiao* examines the development of and prospects for environmental accounting and reporting in China, through a review of literature in Chinese journals over the period 1992-2003. This reveals a shortage of empirical work, with most of the available empirical publications being descriptive, and the dominance of normative studies. The aspect which is found to receive most attention in the literature is environmental accounting. The paucity of environmental accounting courses at educational institutions in China is noted, although the Accounting Society of China is showing a formal interest in environmental accounting research. The Chapter concludes with a set of considerations for researchers, government, educational institutions, and the accountancy profession.

Byung-Wook Lee, Seung-Tae Jung and *Jeong-Heui Kim* discuss experiences with EMA in *Korea*. Since the mid-1990s, when a wide range of stakeholders started to show their interest in corporate environmental performance and its disclosure, some leading Korean companies have started to introduce environmental accounting, and since the late 1990s the Korean government has also made efforts to encourage environmental accounting by industry in order to encourage sustainable development. The paper outlines the "Environmental Accounting Guideline" published by the Korean Ministry of Environment, and describes Korean environmental accounting software developments and corporate case studies which have been funded by the Korean Ministry of Commerce. It concludes with key issues for the successful adoption of environmental accounting by companies in both Korea and developing countries.

Christian Herzig, Tobias Viere, Roger Burritt and *Stefan Schaltegger* relate the concept of EMA to the decision-making context of successful EMA applications in small and medium-sized enterprises (SMEs) in developing and newly industrialised countries in the *South-East Asian region*. The EMA framework established by Burritt et al. (2002) is used to identify and distinguish managerial decision contexts and to choose the adequate EMA tool for the relevant management task. The proposed approach is of generic use for EMA applications and appears to be of particular importance for SMEs whose management activities are often constrained by limited monetary, time and personnel resources. The paper concludes with a discussion of the initial results from the analysis and the case studies.

Part V discusses *options, limits, strengths and weaknesses of different reporting approaches* and covers *national experiences with environmental and sustainability reporting*.

Frank Ebinger, Martha Fani Cahyandito, Roderich von Detten, and *Achim Schlüter* examine how companies can use their sustainability reports to communicate with stakeholders most effectively, through comparative case studies in two major *German* companies with several years' experience of reporting. Interviews with both managers and stakeholders of both companies showed significant differences not only in approach and target audience but also in stakeholders' opinions of the ultimate effectiveness of the reports, although in some circumstances good reports can increase the bonding felt by stakeholders with the company. Although there might be several possible explanations, one conclusion is that it may be unrealistic to expect to meet adequately the various information demands of different stakeholders with a single all-purpose report. The authors suggest that a more imaginative approach to the structure of reporting is needed, and draw several lessons to guide good reporting practice.

Ralf Isenmann and *Ki-Cheol Kim* examine options to increase *interactivity* in sustainability reporting, including mechanisms to involve key target groups and provide feedback, facilities for user control, and opportunities to select report contents and design. Currently, one-way sustainability reports in the form of 'one size fits all' hard copies, or simple electronic duplicates of these which do not add any value, hardly fulfil stakeholder expectations and reporting requirements. In spite of codes of conducts, standards, guidelines, and other recommendations, current reporting practice has significant room for improvement. The authors propose a framework and give practical examples of how a more interactive sustainability reporting approach could be realized.

Claus-Heinrich Daub and *Ylva Karlsson* present their results of a quantitative and qualitative analysis of corporate sustainability reporting in *Switzerland*. This is the second and, at the time, the most comprehensive study worldwide on reporting practices in a single country. The authors present the results of the Swiss study, including experiences drawn from interviews with managers of twenty-five companies. The paper finishes with a brief reflection on the methodology of the Swiss study independent of other empirical approaches used to date.

Markus Langer compares the contents of a number of sustainability reports published by *Austrian* companies against a sample of those published by multi-national companies (MNCs), and finds substantial differences not only between individual companies, but also systemically between Austrian companies and MNCs. Some differences may be explained simply by sector-specific issues or company-specific preferences, but it appears that legal and cultural differences also cause differences between reports, particularly in reporting on social sustainability performance. These differences reduce the inter-company comparability of reports and support the case for further

standardization, although it also appears there is in any case an opportunity for Austrian reporters to learn more from the examples of good practice offered by MNCs.

Part VI deals with new approaches on how *computer support* can facilitate *the implementation of environmental and sustainability accounting and reporting.*

In the introductory chapter to Part VI, *Andreas Möller, Martina Prox* and *Tobias Viere* deal with *methods to support EMA with computer applications.* For EMA, data collection, data processing, and data support are central features of appropriate computer applications. In this context, enterprise resource planning (ERP) systems are a prominent data source of EMA but these cannot cover all areas of EMA, which is where computer-based modelling and simulation tools come into play. These are eligible applications in future-oriented EMA but they also have their weaknesses. The paper concludes by describing a current trend in software engineering and software development: 'componentisation', which allows the strengths of the different approaches to support EMA to be combined.

Edeltraud Günther and *Susann Kaulich* offer the *EPM-Kompas* as a software approach to systematically measure, assess and improve the environmental and economic performance of SMEs in manufacturing industry. This tool supports the collection of environmental data, the choice of the most relevant master parameters, the definition of objectives for improvement, and the assessment of the effectiveness of measures implemented. The authors place particular emphasis on the special environmental assessment method which has been developed for the specific needs of SMEs.

Adeline Maijala and *Tuula Pohjola* describe *'EcoTra',* a web-based EMA tool that has been developed to assist companies in the transportation sector to measure their environmental performance and costs. EcoTra provides companies with a standardized system to help with data collection and information management and thus reduce the costs and barriers of implementing environmental management, particularly for SMEs for whom this can be relatively more difficult and costly than for larger companies. The software is being developed as part of a continuing project together with a related training system which identifies the sector's significant environmental effects and relevant legislation. EcoTra itself is specific to the transport sector, but the example of a standardized sector-specific approach offers a model that might also be adapted for other sectors to support and encourage SMEs.

The book ends with discussion by *Stefan Schaltegger* and *Marcus Wagner* of an approach which combines the inside-out and the outside-in perspectives to sustainability accounting and reporting to develop an *integrative sustainability performance measurement and management.* Sustainability performance management addresses the social, environmental and economic

performance of corporate management and highlights the links between these performance perspectives. The management of sustainability performance in all of its facets requires a management framework which firstly links environmental and social management with the corporate strategy, and secondly integrates environmental and social information with economic business information and sustainability reporting. The article proposes linking the Sustainability Balanced Scorecard as a strategic information and management approach with sustainability accounting as a supporting measurement approach, and with sustainability reporting for communication and reporting.

4.2 Creating Value Added for Further Development and Diffusion

Issues which were addressed in the introductory chapters of previous EMAN books included discussions of the value added which is created with EMA and of whether EMA can be classified as an innovation or as a managerial fad. These two questions are of course closely related: in order to be classified as an innovative management approach, EMA has to create value for corporate management. Furthermore, to create value any kind of information system must be open and able to deal with newly emerging relevant issues. With the increasing importance placed on sustainability, EMA must be further developed to incorporate all relevant aspects of corporate sustainability. In practice, the end result of creating a set of sustainability accounts is a set of new statements on the impacts of the business (Forum for the Future 2005). A set of information is provided in these statements as follows: location of impact - internal or external; type of impact - environmental, social or economic; and timing of impact. A three-stage pragmatic approach to assessing these impacts can be taken (Forum for the Future 2005):

- Stage 1, identification and confirmation of the organisation's most significant environmental impacts
- Stage 2, estimation of what a sustainable level of impacts may be, in order to determine relevant sustainability targets or the 'sustainability gap'
- Stage 3, valuation of those impacts on the basis of either what it would cost to avoid them in the first place or, if avoidance were not possible, what it would cost to restore any resulting damage (using market-based prices where possible)

To follow this procedure, a framework such as the EMA framework (Burritt et al. 2002) is necessary in order to distinguish between different decision situations. This provides a basis for choosing, from the multitude of tools available, those sustainability accounting and reporting tools which best

support managers in creating and communicating relevant information and in taking the most sustainable decisions.

Sustainability accounting and reporting are the logical and necessary further developments of EMA, but they do not replace the role of supporting environmentally and economically relevant management decisions. This is why EMAN will continue to support improvement, research and application of EMA as well as the development of sustainability accounting and reporting. As a consequence, this book provides an overview of recent methodological developments in environmental and sustainability accounting and reporting and of their increasing diffusion through corporate practices being adopted in various countries throughout the world. A special focus is given to sustainability accounting and reporting developments in European and Asian countries.

Casella Stanger et al. (2002:v) capture the contemporary situation from the business perspective, as follows: 'Sustainability accounting provides a useful tool to identify, evaluate and manage social and environmental risks, by identifying resource efficiency and cost savings, and linking improvements in social and environmental issues with financial opportunities. It also allows comparison and benchmarking of performance, and identification of best practice.' As with EMA, the further development of sustainability accounting and reporting must be accompanied by the questions: what is the value created by extending accounting for corporate environmental issues to corporate sustainability issues, and what is the value for corporate sustainability from linking accounting with reporting and from linking both with other management approaches?

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