

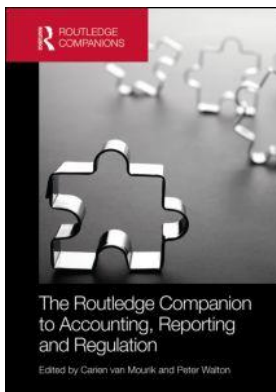
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Carien van Mourik, Peter Walton

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Charles H. Cho, Marie-Andrée Caron

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Accounting Tools for Environmental Management and Communication¹

Charles H. Cho and Marie-Andrée Caron

1. Introduction

Environmental accounting is full of models that may emanate from conceptualizations that are sometimes widely opposed, as the ‘outside-in’ models and ‘inside-out’ models (Richard, 2012; Burritt and Schaltegger, 2010). The former are often associated with environmental communication, while the latter involve the integration of the environment into the managers’ decision-making process. What is problematic beyond these distinctions is the motivation of the organizations to commit to such an approach, anticipating the impact of disclosure of their actions on stakeholders’ expectations, on regulation and on the benefits they can derive from (Gray and Laughlin, 2012). Models of environmental accounting (communication and management) can thus be distinguished by the commitment opportunities they offer to businesses.

Nonetheless, one common and fundamental definition of (social and) environmental accounting was coined about twenty-five years ago by Gray *et al.* (1987, p. ix):

the process of communicating the social and environmental effects of organizations’ economic actions to particular interest groups *within society* and to society at large. As such, it involves extending the *accountability* of organizations (particularly companies) beyond the traditional role of providing a financial account to the owners of capital, in particular shareholders. Such an extension is predicated upon the assumption that companies do have wider responsibilities than simply making money for their shareholders [emphases added].

A similar concept can be applied as well to the environmental management accounting area, which includes a more internal view of managerial tools for decision-making processes. In some sense, environmental accounting challenges traditional mainstream financial reporting for giving a narrow view of the interaction between society and organizations, which can potentially restrain the subject of accounting. The idea is provide a broader view of accounting by focusing also on non-economic and non-financial events and stakeholders to ultimately help increase the social *accountability* of businesses.

More specifically, environmental communication is defined in relatively broad terms. For example, for Berthelot *et al.* (2003) it consists of ‘the set of information items related to a company’s past, current and future environmental management activities and performance’ (ibid., p. 2). Therefore, environmental disclosure encompasses not only financial information associated with the physical environment, but also includes non-financial information disclosed to organizational stakeholders. Examples of environmental disclosure include (Patten, 2002; Cho *et al.*, 2006):

- statements or discussion of the company’s environmental policy or concern for the environment;
- discussion of the company’s pollution control facilities or processes;
- discussion of specific (non-hazardous waste-related) environmental regulations or requirements;
- statement or discussion of the company being in compliance with environmental regulations;
- disclosure of current or past years’ capital expenditures for pollution control or abatement;
- disclosure of projected future capital expenditures for pollution control or abatement;
- disclosure of current or past years’ operating costs for pollution control or abatement; and
- disclosure of projected future operating costs for pollution control or abatement.

Such disclosure is important for several reasons. First, a number of accounting standards and guidelines in terms of environmental communication or disclosure (reporting) have been issued by different regulatory bodies such as the American Institute of Certified Public Accountants (AICPA), the Securities and Exchange Commission (SEC), the Canadian Institute of Chartered Accountants (CICA) and the Association of Chartered Certified Accountants (ACCA) in the UK, but also by multi-party organizations such as the Global Reporting Initiative (GRI) and private international regulation organizations such as ISO 26000. Organizations are also under the jurisdiction of and subject to several pieces of legislation and regulation that aim at improving and protecting the environment – for example, the Nouvelles réglementations économiques (NRE) in France, the Plan général de contabilidad (PCG) in France, the SEC Regulation S-K in the US or the Operating and Financial Review (OFR) requirement in the UK. Moreover, several studies suggest that the requirements and expectations from organizational stakeholders in terms of environmental disclosure have increased (Berthelot *et al.*, 2003; Cormier *et al.*, 2004) as this type of information is used more frequently in their decision-making process.² Finally, other studies³ have revealed that the extent of environmental disclosure was, in general, directly associated with the environmental performance of organizations, but also with the regulatory context and media pressures.

However, in spite of these developments and findings, organizations communicate very little and provide insufficient and inadequate disclosures to their stakeholders at large for the ultimate objective to increase their social accountability. Based on this observation, we identify three broad orientations underlying the formal accounting tools and we examine in which ways managers, professional certified/chartered accountants and legislators would be able to make this communication more systematic, more prevalent and more accurate.

We will first look at the different drivers of communicating environmental information, also known as ‘environmental disclosure’. We will then get into the different rationales, positions and tools for environmental management and communication tools, which are grouped in three positions:

- complying with laws and regulations;
- improving competitiveness; and
- reducing the negative impacts on the environment.

Finally, we will discuss the challenges and present some suggestions to the three stakeholder groups: managers, accountants and legislators.⁴

2. Drivers of environmental communication

Despite the existence of accounting standards, guidelines and even regulations in terms of environmental communication or disclosure, organizations often ignore or circumvent these frameworks, and do not disclose enough or adequately the information (Cho and Patten, 2008; Delbard, 2008; Chauvey, *et al.*, 2012; Larrinaga *et al.*, 2002). The information disclosed varies widely in terms of quantity and quality, primarily due to the voluntary nature of some of the disclosure frameworks but also to organizations' various motivations to disclose this type of information. Buhr (2007) suggests the following motives:

- moral or ethical considerations (sense of duty);
- quest for competitive advantage;
- desire to contribute to the development of voluntary disclosure frameworks (e.g. global reporting initiative);
- seeking to exert some influence on regulation;
- peer and industry pressure;
- organizational performance;
- image management (public relations management, participation in reporting awards);
- social pressures; investors' anticipated reaction; and
- current regulations in place.

Among these, image management in response to social pressures is often mentioned. As such, following negative environmental impacts (e.g. an oil spill), Patten (1992) documented a significant increase in the quantity and content of environmental information disclosed, not only from the affected organization but also from the industry to which the organization belongs in order to create an industry-wide effect. Therefore, disclosure of environmental information can be perceived as a legitimating or greenwashing tool, allowing organizations to obtain, maintain or repair an organization's reputation (Ashforth and Gibbs, 1990; O'Donovan, 2002). In fact, results from a recent study (Cho *et al.*, 2012b) take this reasoning further by showing a significant *negative* association between environmental performance and both membership in the Dow Jones Sustainability Index (DJSI) and reputation scores – the argument being that worse performing firms provide more extensive levels of disclosure and there is *positive* relation between environmental disclosure and both environmental reputation measures and DJSI membership. Hence, voluntary environmental disclosure appears to mediate the effect of poor environmental performance on environmental reputation, and membership in the DJSI (thus environmental reputation) appears to be driven more by what firms say than what they do.

Other studies suggest that some organizations produce this type of disclosure to alter the norms, values and beliefs of their stakeholders (Dowling and Pfeffer, 1975; Lindbolm, 1993), in other words as strategies to 'manage impressions' (Cho *et al.*, 2010; Neu *et al.*, 1998). Finally, some researchers documented that environmental information disclosed in sustainability reports primarily exhibits the 'business case' for sustainability as the organization is more concerned about the sustainability of its (business) performance by gaining competitive advantage (Caron and Turcotte, 2009).

Despite the availability of resources, which are sometimes granted, such superficiality of organizational environmental communication leads us to consider another approach to this issue. While it is important to communicate the efforts and achievements in terms of the environment, the primary goal remains the concrete improvement of performance. As such, the organization must undertake and carry out long-term investments in this area. These investments are commonly referred to as environmental capital expenditures, which are capital expenditures explicitly devoted to pollution control, prevention and abatement (SEC, 2008). Such investments can represent the result of the organization's position with respect to environmental issues (i.e. its desired results or intrinsic motivations).⁵ More specifically, they can be seen as the result of environmental management decisions owing to their relevance for regulatory (Johnston, 2005; SEC, 2008), strategic (Buisse and Verbeke, 2003) and financial (Johnston and Rock, 2005; Johnston *et al.*, 2008) purposes. We noted earlier that these could be many, but only a few studies have examined the adequacy of how management tools and communication systems are used as well as the motivation of organizations' environmental management and communication. The range of environmental management and communication tools suggest that the organization has numerous choices. However, these tools in fact underlie different positions with respect to the environment and do not provide the same opportunities and constraints in terms of communication and management. As they are often divided between two broad categories of environmental accounting (outside-in and inside-out), we address them here from their potential in terms of commitment to the organization in order to clearly highlight their utilization and activation context.

3. Rationales, positions and tools for environmental management and communication

In the absence of norms or standards, organizations have considerable flexibility when it comes to management and environmental communication. They are able:

- to merely comply with laws and regulations;
- to aim at improving their competitiveness; or
- to attempt to reduce the negative impacts of their activities on the environment; and
- in all three cases, to be accountable for their actions.

These three forms of commitment emanate from recently developed typologies related to the position of organizations towards social and environmental responsibility (Acquier, 2008; Caron and Charbonneau, 2008).⁶ Some environmental management and communication tools allow organizations to achieve these three forms of commitment, as shown in [Table 26.1](#).

Before committing on the deployment of one or more of these tools, an organization must establish beforehand what type of engagement it wants to make in terms of management and communication in order to avoid undertaking a 'technical' process that could be too ambitious (in terms of cost, time, resources); that is, one that would not match management's will or that could be inconsistent with its traditional management practices. For example, an organization should not engage in a very complex evaluation of its intangible assets if managers merely want to stick to compliance. Instead, it should further the control of the three 'e's' (effectiveness, efficiency, and economy) to integrate it into an eco-control system if managers wish to adopt a step for a voluntary reduction of its negative impacts on the environment without knowing beforehand the effect on its competitiveness. In other words, there are adequate communication and management tools at each level of commitment toward the environment.

Table 26.1 Positions of organizations towards environmental management and communication

<i>Positions of organizations</i>	<i>Management and communication tools</i>
Complying with laws and regulations	Allocation of environmental costs. Hierarchical cost analysis. Activity-based costing
Improving competitiveness	Profitability analysis of investment projects. Assessment of intangible assets. Control of the three “e” (effectiveness, efficiency and economy)
Reducing the negative impacts on the environment	Life cycle analysis. Full environmental cost accounting. Environmental performance indicators. Eco-control. Performance in terms of sustainable development

3.1 Comply with laws and regulations

For the organization, compliance with the law is a position that usually does not require any fundamental changes in its management systems. This is essentially about complying with specific regulations⁷ (conforming to social rights, product safety, etc.), including regulations on environmental communication and disclosure as discussed above. For relatively common cases of low or non-compliance with certain types of regulation, Bebbington *et al.* (2012) suggest that this phenomenon could potentially be due to a lack of normativity – the degree to which actors see rules as binding. Their argument is centred on the idea that formal regulation on its own would not be enough to create a norm and normativity can also change over time.⁸

Nonetheless, the organization’s exemplarity in complying allows for some preventive measures against media crises and a deteriorating image, even if this does not constitute a source of strategic differentiation (Acquier, 2008). The adjustments made by managers appear necessary and legitimate, and tools are available to achieve them and measure their impact on the organization.

The disclosure of hidden costs as management and communication tools can help managers with the adjustments to make, given the applicable regulations and stakeholders’ expectations (see Figure 26.1 for examples of internal and external environmental costs). Among the five ‘cost analysis’ tools suggested by the Society of Management Accountants of Canada (SCMC, 1999a), some are about complying with regulations while two of them are focused on reducing the negative effects on the environment. The distinction between these two levels of management and communication is based on the emphasis put on external costs also known as ‘social costs’ (full cost accounting, FCA). Life cycle analysis and full environmental cost accounting aim for a comprehensive identification of both internal and external costs. We will return to this issue later.

The allocation of environmental costs involves two steps: the identification of hidden costs associated with internal environmental costs and the allocation of these costs (often referred to as overhead) to affected products and activities and managers in charge. This tool leads managers to review the profitability of ‘polluting’ products, but also to empower their subordinates to get them to review the activities of the organization in order to prevent these costs (IFAC, 1998). When the allocation of environmental costs is linked to the compensation system (or other financial incentives), we are talking about eco-control, which is often used as a mechanism to reduce the negative effects on the environment as we shall see further. The hierarchical cost analysis of and activity-based costing are simply techniques to allocate more accurately environmental costs (e.g. by identifying cost drivers) and temporal costs (level 0: usual costs; level

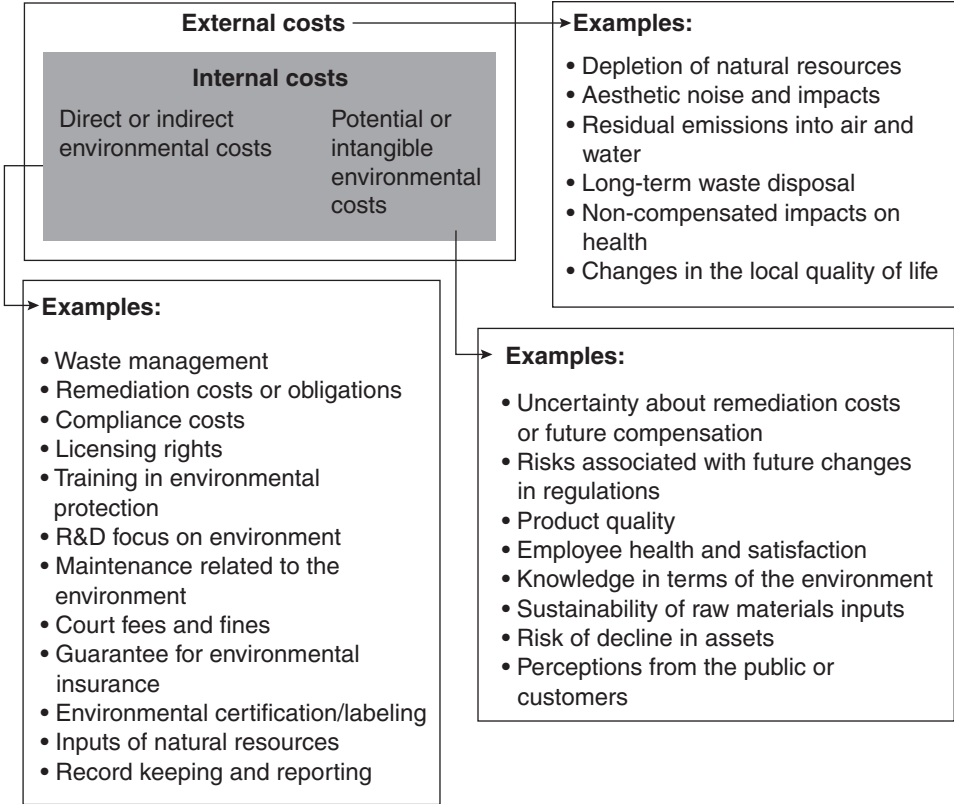


Figure 26.1 External effects considered as “external costs” and internal environmental costs

Source: SCMC (1999c)

1: hidden costs; level 2: environmental liabilities; level 3: less tangible costs), depending on the political and regulatory environment of the organization.

If compliance with regulations is essential to clean up an organization’s production activities, or even just to survive, the other two positions with regards to environmental management and communication prominently feature the unfinished nature of this form of commitment for the planet, but also for the organization itself, considering the potential to improve competitiveness, which is contained in environmental management and communication. Richard (2012) calls this type of environmental accounting ‘outside-in’ in the sense that it is not about the preservation of natural capital, but for the protection of the organization’s financial capital under the restriction of legal or contractual environmental rules and regulations.

3.2 Improve competitiveness

The issue of sustainable development is an area of environmental and social innovations, but also managerial and political (Acquier, 2008). The organization may decide to transform these innovations into opportunities to achieve competitive advantage (Porter and Reinhart, 2007; Porter and van der Linde, 1995). The win-win, or integrative logic makes it possible to believe in satisfying jointly the needs of the organization and those of the earth (as well as intra-generational

and inter-generational needs). In other words, this logic is based on the idea of a possible reconciliation between economic (financial) objectives and social and environmental objectives. It contrasts with the win-lose logic that brings out the necessity to give up satisfying some of today's needs for those of future generations (Hoffman *et al.*, 1999). The latter focuses on the tensions (conflicts, contradictions) between the economic and financial objectives of the organization and its environmental and social needs, as we will discuss in the next section on the efforts to reduce the negative impacts on the environment.

Making the environment a way to improve the competitiveness of an organization involves the ability to evaluate the profitability of 'green' investments or environmental benefits related to covered costs. Decisions to be made in order to improve the competitiveness are, for example, related to:

- the acquisition or the disposal of ecological facilities;
- the measures to take in order to adopt management and control systems that provide access to markets (such as suppliers of organizations that require them);
- the steps to obtain some concessions from public services or implantation authorizations from national or regional authorities (telecommunications, mining industries, etc.) (Quairel, 2008);
- the design of new products to conquer a new market (organic food, recycled paper, pollution control equipment, renewable energy market, etc.); and
- the reengineering of the organization's production systems from a waste management perspective (e.g. energy efficiency, materials management, inventory management, etc.) to eliminate wasted resources, wasted time, duplication of efforts, poor planning of production and inventory systems, malfunctioning of equipment, etc. (Girardi, 1995). Some researchers have also shown that a company could orient itself towards revenues or costs (Journeault *et al.*, 2012).

If innovation is at the heart of these initiatives, the extent of their financial benefits is based on the analysis of 'environmental' data (physical and operational) often difficult to translate into financial terms. To achieve this, accounting organizations in collaboration with political bodies and academics, have proposed a number of models. The one from Girardi (1995) is particularly comprehensive:

- help in setting objectives for reducing waste;
- link these objectives to strategies;
- link these objectives and performance measurement systems (e.g. assessment of business unit profitability);
- link these objectives with investment decisions;
- link these objectives to the budget;
- estimate pollution prevention program and current and future regulation costs;
- estimate sales program and pollution credit trading/exchange costs; and
- design a system of accountability composed of both financial and non-financial indicators.

This model aims for the integration of waste management into the organization's central accounting information system, from the following four steps:

- calculation and disclosure of hidden costs (transparency);
- allocation of costs to corresponding products, activities and managers (accountability);

- identification of indirect costs related to waste (measuring the effect on the efficiency of labour, productivity, overhead expenses investment expenditures, etc.); and
- integration of the waste management into all stages of the product life cycle.

Improving the competitiveness of an organization deployed in the spirit of a win-win logic increases the likelihood of managers adopting the concept of the environment from a successful adaptation based their own criteria, which are often economic (Caron and Turcotte, 2009). However, as the activities under this type of management and communication are not intended for all environmental practices within the organization (they are often ad hoc, limited and targeted), they may serve to cover irresponsible practices and make the mobilized tools counter-productive (Milne and Gray, 2007). In this spirit, the tools associated with the efforts to reduce the negative environmental effects appear to be more credible and to vehicle the emergence of a regulation that is both realistic and fair, including the development of voluntary organizational performance in terms of environmental matters. However, as computing profit is not always possible, this commitment may well be unrealistic. Also, it may appear extremely simplistic in relation to the actual concerns of workers, who adopt responsible practices without always bearing in mind the increase in profit. A third position is thus to consider.

3.3 *Reduce the negative impacts on the environment*

Among the environmental management and communication tools that are able to manage and communicate activities aiming at reducing the negative impacts on the environment, we find full environmental cost accounting, life cycle analysis and performance indicators, as well as eco-control, as a broader and more inclusive system but that is often outside the organization's accounting system (Burritt *et al.*, 2002; Schaltegger and Sturm, 1998). These tools are working to conceive some layouts that are able to reduce the negative impacts of organizational activities on the environment. Improving the competitiveness of the organization cannot constitute a motivation here since the profitability horizon of such layouts is often very long, if not impossible to assess or inconclusive (Magness, 2006). They rather draw their justification from the win-lose logic, in which there is an emphasis on the need give up the satisfaction of certain current needs for those of future generations.

If the environmental cost accounting (also known as quantitative financial and social costs, full cost accounting and full cost reporting system) wants an overhaul of traditional accounting practices to allocate internal and external costs – monetary and non-monetary – to products, Herbohn (2005) updated the requirements for implementation of such a tool. These requirements are: understand the societal aspects beyond the technical aspects, involving stakeholders in determining adverse effects to prioritize and extend the assessment of environmental costs to the entire product life cycle of the organization.

With the adoption of life cycle analysis, the organization is not only to comply with government regulations; it also seeks to mitigate the adverse impact of its activities on the environment through a comprehensive assessment of all the effects of its activities and its 'upstream' and 'downstream'⁹ products (SCMC, 1999a) in order to detect or create opportunities for improvement.

Finally, environmental performance indicators constitute the most comprehensive form of assessment of organizational environmental performance. Different approaches share the definition of these indicators, which are carried by four main organizations: the International Organization for Standardization (ISO 14000) in the United States, the Eco-Management and Audit Scheme (EMAS) in Europe, the Global Reporting Initiative (GRI) and the Organization for

Economic Cooperation and Development (OECD: key environmental indicators) in France. While the GRI indicators cover the three dimensions of sustainable development and those of ISO standards focus on the management components of the organization (management, operation, context), others are more centred around material flows of the organization (use of materials, energy consumption, output of non-products, releases of pollutants). The latest ISO 26000, described as ‘non-standard standard’ (Capron *et al.*, 2010), meanwhile focuses more on concrete actions ‘agreed’ upon with stakeholders than on indicators and results. Janicot (2007) groups these indicators into two categories: ‘outcome’ indicators and ‘process’ indicators. Stakeholders are more interested in outcome indicators while process indicators are designed to evaluate the efforts made by management to improve environmental performance at the organizational level.¹⁰ The objective of process indicators is to assess whether a coherent environmental management is in place and well controlled, but it is an internal coherence that is primarily built in an operational vision of management. The contents of key outcome indicators touch upon performance measurement in terms of materials consumption, resources, energy and services (into the organization), products, services, waste and emissions (out of the organization), as well as physical facilities and logistics (operations of the organization).

To date, eco-control is the most complete control model of these indicators. It allows measurement and control of sustainable development practices from the link between three major control mechanisms, which are sustainable development performance indicators, financial incentives (compensation plans) and sustainable development strategy (Henri and Journeault, 2010). The purpose is to improve organizational performance based on outcome indicators, in addition to process indicators. The link with strategy motivates players who are eco-evaluated to innovate in order to discover new operating ways to minimize the adverse effects of organizational activities on the environment and optimize the positive effects. Eco-control is thus a select tool to bring managers to interact at the border of a more efficient organization. Invitations from multiparty organizations to participate in the development of sustainable development indicators (consultation meetings with the GRI or ISO 26000) and exchange forums between practitioners and researchers (Caron *et al.*, 2010) constitute some great opportunities.

Tools to reduce negative effects show that this commitment has two options – a process ‘organized’ by using economic valuation models or an approach that can be described as ‘political’ which relies much more on stakeholders. These environmental accounting tools are classified as ‘inside-outside’ (Richard, 2012), aiming at preserving the natural capital; however, proponents of the first approach emphasize *weak sustainability*, while those adhering to the second tend to defend *strong sustainability*.¹¹

If the variety of these tools allows the organization to progressively engage environmental measurement and communication, some issues will need to be solved along the way.

4. Issues and limitations of environmental management and communication

The following issues may constitute some limitations for the usefulness of environmental management and communication tools presented in this article:

- The heterogeneity of these tools’ components (e.g., physical units and monetary units, products and processes, but also externalities) presents significant assessment issues.
- In addition to presenting assessment issues, externalities are not subject to generally accepted values.

- The very definition of environmental costs is problematic because several definitions exist based on the interests of stakeholders and it is sometimes difficult to distinguish the current operating costs.¹²
- Managing change may become necessary and require the presence of stakeholders who are internally influential but still tied to external respondents.
- The multidisciplinary nature of the environment requires the leaders to collaborate with experts in natural sciences, sociology, law, engineering, environmental economics, etc.
- It is sometimes difficult, or even impossible, to associate environmental disclosure with actual environmental performance when it is measured based on standards that do not meet stakeholders' expectations.
- A paradigm shift – sometimes difficult to carry out – is required to evaluate investment projects according to environmental performance indicators, particularly to take into account the recovery period, which is generally longer for this type of project.

5. Suggestions on environmental management and communication

We have seen that environmental measurement and communication involve a number of issues that can constitute some important limitations if they are not resolved in time. We show here how some of the stakeholders involved with environmental issues – that is, managers, accountants and legislators – can help make environmental control and disclosure more systematic, more frequent and accurate.

5.1 *Suggestions for managers*

A good knowledge – but also an opinion and awareness of the three organizational positions discussed above – should contribute to an imminent improvement in the environmental management and communication of an organization. For managers, the implications remain at a macro level: give high priority to environmental issues and objectives by allocating adequate resources, follow a strategic plan predicting progressive commitment (compliance with laws and regulations, improving competitiveness and reducing the negative impacts on the environment), and provide complete, reliable, relevant and transparent environmental disclosures to increase the accountability of their organization. Managers will undoubtedly have to make decisions that could be conflicting with the purely economic objectives of the organization. In this context they will be called upon to demonstrate a spirit of sacrifice and deploy a long-term vision.

Leaving the environmental manager to solve alone the inherent problems associated with the implementation of environmental management and communication tools bears the risk to compromise the depth and viability of the efforts that are made (Parker, 2000b). Also, if we involve all key stakeholders of the organization, we will avoid bringing too drastic or too conservative answers to these crucial questions answers. Cross-participation by key stakeholders in the divergent logics around the development of management and disclosure tools will foster the emergence of realistic regulations that are built on the basis of entrenched practices in the management practices of organizations, even if they are innovative.

5.2 *Suggestions for accountants*

Several studies have emphasized the importance of the contribution from the accounting profession in the debate surrounding the environment (Bebbington and Gray, 2001; Parker,

2000a). However, these conceptual collaborations found little support in practice from professional certified/chartered accountants of the three Canadian professional accounting designations (Chartered Accountants, Certified General Accountants or Certified Management Accountants). Researchers¹³ provided various explanations, using illustrative case scenarios, for this lack of commitment by practitioners: they occupy a passive (reactive) position, waiting for an explicit request from senior management or another part of the organization; they prefer to wait for stricter regulations that specify the requirements in terms of information; although they are interested in environmental issues, they do not see how to integrate these issues to their current responsibilities; or, they are opposed to an active contribution in environmental matters.

So far, professional literature has limited itself to illustrate the potential contribution of the professional certified/chartered accountant to environmental issues based on some lists of specific activities (see Table 26.2 for examples of these activities).

However, the vagueness, ambiguity and, in many cases, innovative feature of environmental management and communication highlights the importance of accountants' concrete experience to acquire the necessary skills (Caron *et al.*, 2006). The accounting profession, as well as the business community, needs to set up favourable conditions to enable professional certified/chartered accountants to participate in such experiments. More specifically, the accounting profession needs to provide its members adequate training in environmental matters and make sure they have an interest to acquire and apply such training.

5.3 Suggestions for legislators

It is in the interest of legislators to develop mechanisms (or, where appropriate, to improve them) that are able to monitor the various activities of organizations to ensure that regulations are enforced and, if necessary, impose sanctions against them.

The case of the Government Accountability Office (GAO) and the Securities and Exchange Commission (SEC) in the United States examined by Cho and Patten (2008) is an example of a quasi-failure due to the lack of compliance with and enforcement of environmental communication standards/regulations. This study firstly suggests that organizations that are subject

Table 26.2 Steps for integration of waste management into the organization's central accounting information system

Step	Accounting tools and methods
Step 1. Identification and disclosure (transparency) of costs associated to waste COSTS	Identification of costs associated to waste. Mapping or audit of waste costs
Step 2. Conception of an attribution structure (accountability) and of an assessment of managers' performance PEOPLE	Allocation of waste costs to cost centres
Step 3. Improvement of efficiency associated with waste PROCESS	Matrix of costs associated to waste. Waste ratio analysis. Activity-based costing
Step 4. Integration of waste reduction to all steps of product life cycle PRODUCTS	Life cycle cost analysis

Source: Adapted from Girardi (1995, p. 21).

to SEC rules on the disclosure of environmental information do not comply or comply very little with the disclosure regulations issued by the SEC, and that, although requested by federal legislators, a large governmental agency such as the GAO has not been able to determine the extent of the information gap caused by the non-compliance with disclosure standards despite conducting studies requiring significant resources. This example illustrates well the risks of a deficient legislation and shows what must be avoided at all costs. But it also highlights the very important role of the legislator in the 'efficient' deployment of a 'growing' pressure on organizations. In other words, passing laws and implementing regulations is a start but relying on a potential increase of normativity (see Bebbington *et al.*, 2012) to hope for compliance will certainly not be sufficient. As such, the most important aspect of the regulatory environment remains the strict enforcement of the regulations that are in place, including the application of sanctions and consequences for non- or low compliance.

5. Conclusion

If environmental management and communication are subject to regulations that are sometimes shy and often difficult to enforce, several management and disclosure tools are nonetheless available. These tools emanate from an extensive and more accessible literature for over thirty years, which is the result of close collaboration between professional organizations, including accountants, political bodies and the academic and scientific community. The diversity of these tools is a response to the wide variety of motivations that may lead an organization to get interested in environmental issues.

As such, some tools allow the organization to comply with laws and regulations, others to evaluate the improvement of its competitiveness, while others lead to the reduction of the negative impacts of its activities on the environment. Therefore, managers, accountants and legislators must above all ask themselves about the form of commitment to foster the environment according to the socio-political context of organizations, the availability of required resources and their experience in this area. In return, the appropriation and deployment of one of these three types of tools in management and communication practices of an organization can lead to a restatement or reformulation of its commitment. This commitment can change from a rather 'imposed' form (complying with laws and regulations) to a 'free' form, or as a starting point, be more 'interested' (improving competitiveness) or more 'altruistic' (reducing the negative impacts of activities on the environment).

The reflection presented in this article suggests the following question for future research: in which way(s) communication participates, or on the contrary harms the quality of environmental management? After more than forty years of more or less successful history, the main challenge of environmental accounting is now to link the *outside-in* with the *inside-out* (Burritt and Schaltegger, 2010) or the relevance for the stakeholder with the coherence within the organization (Janicot, 2007) in order to increase and deepen the commitment of the company. In turn, this commitment will encourage the development of accounting regulation in sustainable development.

Notes

- 1 This chapter is a translated adaptation and extension from Marie-Andrée Caron and Charles H. Cho "Positions des organisations face à la gestion et à la communication environnementales", *Revue Gestion* 34 (1), Spring, 59–67, and was reproduced, adapted, extended and translated with the authorization from *Gestion, Revue Internationale de Gestion*.

- 2 See Neu *et al.* (1998), Milne and Patten (2002), Cho *et al.* (2009).
- 3 See Cho and Patten (2007), Cho *et al.* (2012a), Deegan (2002), O'Donovan (2002), Patten (1992, 2002).
- 4 While we acknowledge that it is not very common to include managers and accountants as part of stakeholders, we do so here given their potential active involvement and implications in environmental management and communications issues.
- 5 It is important to note that some studies have shown environmental capital expenditures being disclosed to create an appearance of environmental care and legitimize past poor environmental performance rather than signalling improved future environmental performance (e.g. Cho *et al.*, 2012a, 2012b; Patten, 2002) and that even environmental governance mechanisms at the board level seem to be of more symbolic nature (vs. substantive) in terms of environmental action without a real impact on environmental investment decisions (Rodrigue *et al.*, 2012).
- 6 Acquier (2008) opposes the concept of free vs. compulsory figures, while Caron and Charbonneau (2008) show that commitment can be part of familiarity (routine), plan (objectives and accurate results) or justification (in line with public expectations).
- 7 For example, it relates to damages to the environment caused by acid rain resulting from the use of fossil fuels, health problems due to noise pollution near airports and highways, and ozone depletion due to aerosols containing chlorofluorides (CFC) (SCMC, 1999a).
- 8 More specifically, they argue that normativity 'starts with emergence of norms, characterized by the innovation of norm entrepreneurs, followed by diffusion leading to a 'tipping point' after which the norm cascades to reach a point at the end of the life cycle where norms are internalised and acquire a taken-for-granted quality' (Bebbington *et al.*, 2012: 79).
- 9 This technique involves the identification of energy and materials consumed (inputs), but also the releases into the environment (outputs), their quantification, the assessment of their impact in terms of environmental health, of human health and resource depletion, 'from cradle to cradle'.
- 10 The ISO 14000 standard defines environmental performance as measurable outcomes of the environmental management system, in connection with the organization's control of its environmental aspects on the basis of its environmental policy, its objectives and environmental targets (the objectives come from the company, internally).
- 11 The weak design of sustainable development provides a substitutability of financial, natural and social capital while the strong design prohibits the recognition of such substitution. For more details, see Herath (2005).
- 12 This example, taken from IFAC (1998: para. 31), is illustrative: 'For example, an investment may be made for operational reasons which has a positive impact on environmental performance. Is this investment to be defined as an *environmental* expenditure?' [added emphasis].
- 13 See Kuasirikun (2005), Wilmshurst and Frost (2001), Deegan *et al.* (1995).

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