

The Challenge of *Environmental Accounting*

INTRODUCTION

The period 1971 – 1980 heralded the beginning of environmental accounting in the guise of 'social responsibility accounting'. Social responsibility accounting sought to establish the degree of responsibility that companies should have towards stakeholders other than the firm's shareholders.

Part of this responsibility concerned the interaction between the firm and the ecological environment. This reflected a preoccupation with the environment evident among academics at that time. For example, in 1972 The Club of Rome Report offered a doomsday scenario where unrestrained economic growth had placed natural resources under severe pressure (Meadows et al, 1972). In particular oil, the lifeblood of Western capitalism, was predicted to run out by the end of the century.

During the period 1981 – 1990 the emphasis in the accounting literature shifted from 'social responsibility accounting' to 'environmental accounting', reflecting the strong interest in the latter. Research became more analytical in approach and the

philosophical debate began to focus more on what kind of environmental information it was appropriate for companies to disclose.

THIS ARTICLE EXAMINES THE NATURE OF ENVIRONMENTAL ACCOUNTING AND DESCRIBES HOW COMPANIES ARE RESPONDING TO PRESSURES TO KEEP ACCOUNTING RECORDS OF THE IMPACT THAT THEIR PRODUCTIVE PROCESSES HAVE ON THE ENVIRONMENT

From 1990 to date the emphasis on environmental accounting continues unabated and engages the interest of both academic and practising accountants. The latter have found their interest stimulated by government legislation. For example, some countries like Denmark and the Netherlands require companies to produce a 'green account' or 'environmental report'. The UK government expects FTSE companies to comply with ISO 14000 by 2005.

This article examines the nature of environmental accounting and describes how companies are responding to pressures to keep accounting records of the impact that their productive processes have on the environment.

Whilst the article is generally concerned with Public Limited Companies (PLCs) that are by law required to publish accounts, it should be remembered that most organizations have an environmental impact of some kind.

I am indebted to M R Mathews whose excellent paper contributed to much of the material in this section

ENVIRONMENTAL ACCOUNTING AT COMPANY LEVEL

The accounts of PLCs are subject to the scrutiny of an external audit, a process that will result in the examination of the accuracy of the accounts and verify that proper accounting procedures have been applied in order to protect shareholders' interests. The published annual accounts include a Profit and Loss Account, a Balance Sheet and a Cash Flow Statement. These statements are concerned with what is easily measured in money terms.

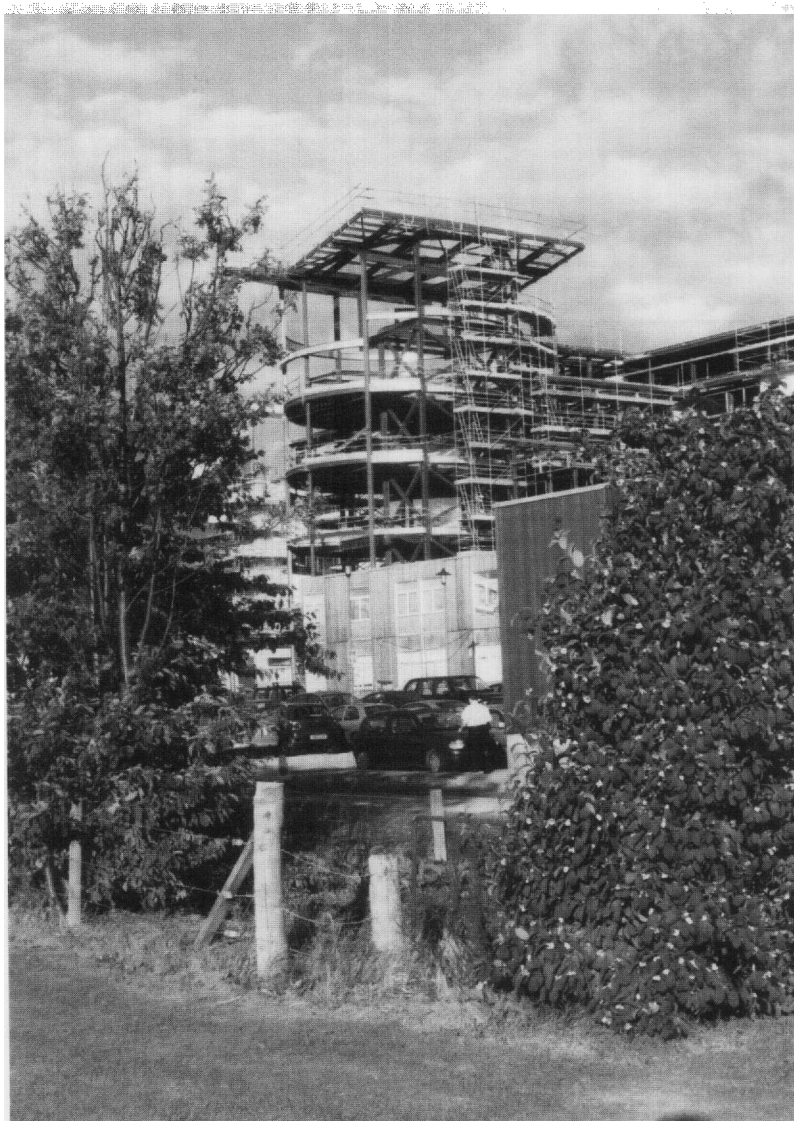
However, many companies now include in their corporate reports and accounts additional information that describes the impact that their activities have on the environment. This

information frequently takes the form of details about the firm's emissions into air, or waste to water, or details of fuel and materials used. Some reports are more detailed than others and may be descriptive or include quantitative data produced from environmental performance indicators.

**FINANCIAL
ENVIRONMENTAL
ACCOUNTING AND
MANAGEMENT
ENVIRONMENTAL
ACCOUNTING**

Company accountants are concerned with environmental accounts from the point of view of both financial and management accounting. In the first case, accountants are interested in providing information for shareholders and stakeholders outside the company in the form of financial statements that give reliable and accurate information about the company's financial position. Financial accountants place monetary values on those aspects of the company's performance that affect the environment, with the aim of improving the accuracy of their financial statements and providing useful information about the firm's environmental and economic performance.

In particular, they identify costs that impact on the firm's profits. These may be the costs of complying with the law (compliance costs), or perhaps waste disposal costs. As environmental legislation is



Goodbye, green fields. Economic activity affects natural capital

strengthened and becomes more intense, companies will be required to take a cleaner approach to production.

Clearly, waste products are a major source of pollution. Whilst production without waste is impossible, waste products incur costs that impact on profits. Waste is also an inefficient use of resources and may be seen as an environmental cost. The environmentally responsible firm

will seek to reduce waste wherever it can by introducing improved and more cost effective processing methods.

In addition, waste creates the problem of disposal. Disposal costs place further pressures on a company's profits, but in addition they create a social cost by putting pressure on disposal sites. Financial accountants will try to capture these costs and include them in their financial

statements, because financial environmental accounting is about trying to provide an accounting record of these costs and their impact on profit.

On the other hand, management accountants prepare information for internal use and are concerned with measuring and analysing performance. The information they produce is used to develop business objectives and formulate strategy, which in turn is translated into operating plans and budgets (Sizer J 1989, 1-10). Once budgets are in place, they can be used to monitor and control expenditure.

The process assigns costs to products and services, thus providing the necessary information for accurate pricing decisions. As a result, management accountants view environmental accounting from a different perspective than financial accountants. For example, whereas a financial accountant may be interested in tracking energy emissions and material waste disposal costs because of the impact they have on profits, management accountants are interested in these costs because they must be monitored and controlled. Either way, such costs are a part of environmental accounting. The data collected can be used to identify the impact that the

drivers of these costs have on the environment and enable avoiding action to be taken.

Another aspect of the management accountant's role is assessing the life cycle of products and identifying where environmental improvements may be made to reduce their environmental impact at every stage of life. For example, the construction of a car may be based on a design that will make

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it easy to separate component parts for re-cycling when it reaches the end of its life and is scrapped. This may then be turned into a life-cycle costing exercise where monetary values are assigned to the consequences of these in terms of cost (Bennett M & James P 1998b, 30-60).

In addition, management accountants must consider the environmental impact of their capital investment strategy. Where a choice is possible between alternative machines, the decision should not be based solely on NPV or IRR criteria, but be guided by the impact the

chosen machine will have on the environment throughout its life-cycle.

EXTERNALITIES

Although most economists stress the benefits derived from the free operation of markets, they are also aware that markets can fail. One aspect of market failure is the production of negative externalities. These are the costs that firms generate that

are not included in the production costs of the product or service that is offered, and subsequently not reflected in the price charged. In other words, they do not appear on the firm's income statement.

An example of such an externality is the pollutants that a factory discharges into a river.

If the river is used for water sports such as swimming and canoeing, the swimmers and canoers will lose the benefit of carrying out their activities in clean water and thus bear the brunt of the pollution. It would be possible to cost this loss of amenity and include it in the firm's accounts. Theory suggests that if this were done it would result in more informed decision-making because the true costs of production would be known and reflected in pricing policies. Environmental accounting is in part about finding ways of costing externalities.

**ENVIRONMENTAL
AUDITING**

We have seen that the environmental costs that firms face comprise those costs that make an impact on the firm's profits together with costs that impact on society – what economists call negative externalities. Public interest in environmentalism has increased the pressure on firms to examine carefully the impact that their business activities have on the environment and to carry out what is now known as an environmental audit of such activities.

Included in this audit will be the measurement of emissions into the air, land and water, but it will generally include much more. For example, the impact that the firm's activities have on the local community will be considered, as well as the perception the public has of such activities. An examination of the legal constraints facing the company will be included, together with a detailed examination of the local landscape and ecology (based on CBI definition cited in Gray & Bebbington 2001).

The public's positive perception of a firm is paramount if it is to retain its competitive edge. A progressive approach to environmental issues legitimates the firm's

activities (Gray R, Kouhy R and Lavers S, 1995). Part of this legitimacy is established by taking care of the landscape and local ecology where it operates. In other words, the firm must be seen to be taking care of what has been called natural capital.

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**ARTIFICIAL AND
NATURAL CAPITAL**

Rob Gray and his team, who write extensively on environmental accounting, believe that it is critical for firms to undertake an environmental audit and subsequently account for their environmental performance, because their activity uses two kinds of capital: man-made or artificial capital; and natural capital (Gray & Bebbington 2001, 306-307).

The first kind of capital includes buildings, plant and machinery, motor vehicles fixtures and fittings, roads, and possibly human knowledge. They appear on the balance sheet as assets and are paid for out of shareholders funds,

retained profits and long-term loans. These capital items are manufactured by engineering and building firms drawing upon human knowledge and skills.

The second kind of capital, natural capital, is not manufactured but is provided by the environment. Gray

suggests that there are two kinds: critical natural capital, which includes those aspects of the ecosystem that are essential to maintain human life, and without which humankind could not exist; and other natural capital which may be sustainable, renewable and in some cases, although there is debate about

this, substitutable (Hussen, 2000).

The cost of using artificial capital is recorded in the profit and loss account as depreciation. The use of the second kind of capital has gone unrecorded in the past. This is because accounting is about measuring a firm's activities in terms of money and consequently accountants account only for things that have a price. Because natural capital does not have a price attached, the use of natural capital is not unaccounted for.

Gray argues that it is essential that accountants find some way of capturing in financial terms the use of natural capital in order to achieve sustainability. Sustainability means leaving



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future generations with a similar amount of natural capital as that available to the current generation.

ENVIRONMENTAL MANAGEMENT SYSTEMS

In an attempt to address this issue, the best organizations are now moving beyond environmental auditing and developing environmental management accounting systems (EMAS) that seek to establish environmental costs at every stage of production. Management accounting systems produce data used by the senior management team for decision-making purposes. In order to control and monitor

costs they must be clearly identified, but this is not always a straightforward exercise. Neither is it cost free, and firms will tend to equate the marginal cost of identifying environmental costs with the marginal benefit derived from doing so.

Up until recently, environmental costs have simply been included as part of overhead costs. An EMAS requires that environmental costs are identified and made explicit. The arrival of Activity Based Costing systems in the 1980s has made the tracking of environmental costs easier (Kreuze J G & Newell G E, 1994). But, before environmental auditing can be undertaken and environmental

management systems can be put in place an effective, detailed set of performance indicators is required.

PERFORMANCE INDICATORS

Performance indicators measure the output resulting from an activity. For example, the effect of advertising expenditure may be discerned from the level of sales, or government spending on health care may be measured by reduced patient waiting lists. One of the performance indicators used to assess the performance of a school is the number of students obtaining grade A at GCE 'A' level. **17**



Where streams of living water flow? Environmental audits cover water pollution.

Whilst the effectiveness of such measures may be criticised they are an attempt to link activity with performance. Environmental performance indicators are used to measure an organization's impact on the environment. The International Standards Organization (ISO) provides guidance on environmental auditing and environmental performance indicators. The documents ISO 14010 – 14012 provide principles, procedures and guidance on carrying out an environmental audit whilst ISO 14031 provides guidance on the selection of environmental performance indicators.

The environmental performance indicators provide

information about the following: the environmental impact of facilities and equipment used; materials used; energy consumption; waste and emissions produced; and products produced. The list is not exhaustive, and the emphasis will vary depending on the nature of a company's business (ISO1998). That said, not all organizations have well-developed environmental auditing systems. Some are more developed than others, as Bennett and James have shown.

BENNETT AND JAMES

In 1998 Martin Bennett and Peter James used the ISO

framework to carry out a detailed survey for the ACCA of the use of environmental performance indicators used in business. Their survey, based on the Times 100 companies, revealed different approaches to environmental accounting, and differences in the degree to which the environment was taken seriously by companies (Bennett & James 1998).

The results of their research enabled them to classify the companies studied into what they called Three Generations. First Generation of companies used environmental performance indicators in a pragmatic manner in order to comply with the law and to reduce risk to the company.

They were the least involved in environmental accounting.

Second Generation companies took a broader view and were much more concerned about how their environmental performance influenced their stakeholders' view of the company and of its impact on the company's Total Quality Management (TQM) system. Pollution prevention was driven by the desire to impress environmental stakeholders and to increase the productive use of resources.

Third Generation companies had a more developed environmental accounting system and were committed to sustainable development and life cycle management. They continuously consulted stakeholders about their environmental performance. It was clear from the Bennett and James study that not all companies possessed the same degree of environmental concern and commitment.

In addition, Bennett and James highlighted inadequacies in the process of environmental reporting. In particular, their study revealed that the data produced by some companies was unreliable and that companies classified data differently, making it impossible to compare one company with another. Perhaps this was not

surprising, as they found that the effective implementation of environmental accounting procedures in companies was very difficult. The introduction of an environmental accounting system was best implemented in easy stages. Other academics have concurred with this view. (Gray and Bebbington, 2001, 96).



How might environmental accounting affect this firm?

If we are to make sensible comparisons between the environmental performance of companies then environmental accounting data must be prepared in a standard way. Whereas profit and loss accounts and balance sheets are produced in standard formats with notes giving details of how results have

been arrived at, this is (as Bennett and James found) clearly not the case with measures that identify the environmental performance of a company.

Part of the problem is the small amount of leadership and guidance from the accounting bodies and limited government support, although this may change as more companies adopt the ISO 14000 framework. Both national and local government may in future insist that firms tendering for government contracts operate within the ISO 14000 framework.

Also, Bennett and James found that few companies attempted to measure the impact of business activity on sustainability. We have seen earlier that this means ensuring that business activities leave a similar amount of resources available to the next generation as are available to the current. This will change. Many companies are now

aware of the power of the environmental lobby and believe that environmentalism and sound business go hand-in-hand.

ENVIRONMENTAL ACCOUNTING IS GOOD BUSINESS

We have already noted that companies undertake

environmental accounting for compliance reasons, and to maintain good public relations, but it has also been suggested that 'going green' may reduce business costs. This view is expressed by Michael Porter and Claas van der Linde. They offer examples of firms that have reduced costs as a result of undertaking an environmental audit and changing their production processes, making them more environmentally friendly.

The Dutch flower industry is cited as a case in point. It was clear to Dutch flower growers that the process they used would have to change. The Dutch government was becoming tougher on the discharge of chemical fertiliser into the soil. The result of an environmental audit resulted in a change of method. Plants are no longer grown in soil but in a closed loop water-based system. As a result, growers complied with their government's current and forecast future legislation and achieved a reduction in their costs.

Similar successes were reported by 3M, where solvents were replaced by water and costs saved. As a result of being in advance of other companies in taking environmental action, 3M achieved first mover advantage in the sense that it was able to set the standards for compliance on which future legislation would be based (Porter & van der Linde, 1995).

However, other writers have disagreed with this 'win win'

approach and suggested that not all firms are in a position to achieve cost savings from the application of strict environmental manufacturing processes. Indeed, some will find the change a costly burden and those that achieve cost savings may find them short-lived as diminishing returns set in (Walley N and Whithead B (1994) .

CONCLUSION

The issue of environmental accounting is wide. Business organizations will be driven by the pressures of compliance to produce effective and efficient environmental accounting systems. This will require them to establish clear and useable performance indicators and undertake effective environmental audits.

Some will not see compliance as a threat and will seek to set standards that go beyond those required by law. Others will perhaps need some prodding from national and local government who can require the implementation of EMAS and ISO 14000 in any organizations that they deal with. The accounting professional bodies will need to agree international standards for environmental accounting and provide the infrastructure for an effective and efficient environmental reporting framework.

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REFERENCES

- Bennett M and James P (1998a) Environment Under the Spotlight: Current Practice and Future Trends in Environment-Related Performance Measurement for Business ACCA Research Report 55 Certified Accountants Educational Trust London
- Bennett M and James P (1998b) The Green Bottom Line: Environmental Accounting for Management, Current Practice and Future Trends Greenleaf Publishing
- Gray R and Bebbington J (2001) 'Accounting for the Environment', Sage Publications, London
- Gray R, Kouhy R and Lavers S (1995) 'Corporate Social and Environmental Reporting: A Review of the Literature and a Longitudinal Study of UK Disclosure', Accounting, Auditing and Accountability Journal, Vol 8 No 2 47-77
- Hussen A M (2000) The Principles of Environmental Economics: Economics, Ecology and Public Policy Routledge London and New York
- Kreuze J G and Newell G E 'ABC and Life-Cycle Costing for Environmental Expenditures' Management Accounting February 1994, 38-42
- Porter M and van der Linde C (1995) 'Green and Competitive: Ending the Stalemate', Harvard Business Review, Vol 73, No 5, Sept-Oct
- ISO 14000 Meet the whole family! 1998
- Mathews M R (1997) 'Twenty-five Years of Social and Environmental Accounting Research: Is there a Silver Jubilee to Celebrate?', Accounting, Auditing and Accountability Journal, Vol 10 No4 481-531
- Meadows D H, Meadows D L, Randers J & Behrens III W W (1972) The Limits to Growth: A report of the Club of Rome's project on the predicament of mankind Earth Island London
- Sizer J (1989) An Insight into Management Accounting Penguin Books, London
- Walley N and Whithead B (1994) 'It's Not Easy Being Green', Harvard Business Review, Vol 72, No 3, May-June
- A R T Emery Bath Spa University College