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**THE ROLE OF MANAGEMENT
ACCOUNTING WITHIN
THE DEVELOPMENT OF
ENVIRONMENTAL
MANAGEMENT SYSTEMS**

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the requirement for the degree
of Doctor of Philosophy

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Abstract

This thesis describes the role played by management accounting in environmental management initiatives within UK manufacturing operations. According to many authors, management accounting has the potential to contribute towards the generation and management of environmental information by modifying, developing and extending its practices and techniques towards an 'environment-related' form of accounting. However, there is little existing evidence of the widespread involvement of management accounting within UK environmental management.

UK manufacturing organizations are generating internal information flows specifically targeted towards dealing with 'environmental'-induced uncertainty, and are also developing environmental management systems (EMS) to reduce their impact on the natural environment. Empirical research to date indicates that such 'environmental' information differs in its generation, uses and level of integration with traditional management information systems, such as management accounting. This thesis adds to this existing knowledge by contributing case study evidence of the role of management accounting within environmental management at three manufacturing sites in the UK.

In order to explore the role of management accounting within corporate 'greening', the thesis describes the processes by which environmental ('green') issues permeate organizational boundaries and either become part of, or excluded from, organizational action and consciousness. Within this, the primary focus is to describe how 'green' issues may be rendered 'visible' and 'invisible' by existing management information and accounting systems.

The thesis uses a 'middle-range' thinking research paradigm, and critically reviews a diverse range of theoretical and empirical literature in order to construct a number of 'skeletal' theoretical models that describe how organizational 'greening' change arises from specific interactions within social and organizational contexts. Management accounting systems are specifically located within these models, and further 'skeletal' theoretical generalisations are provided for describing the types and uses of environmental information within the firm.

The aim of the 'skeletal' models of corporate greening and environmental information is to provide a general framework within which the study can be completed. Whilst a number of general hypotheses are developed from the models, the models require empirical data to give them meaning. To provide this, evidence is collected from three case studies of manufacturing operations in UK locations, together with supplemental empirical evidence from a range of sources. The findings from the empirical data is that management accountants and accounting are not involved in the generation of environmental information, envisage no compelling need to use environment-related accounting and are happy to allow environmental managers to control the EMS. However, management accountants do appear to be knowledgeable about the environmental impacts of the organization, and have an 'awareness' of how environmental costs and impacts can affect the efficiency of business operations.

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Chapter 1: Introduction

The thesis is an investigation into the role played by management accounting and accountants in the growth of environmental management initiatives within UK manufacturing operations. This chapter serves to outline the main elements of the thesis and highlight the critical issues and approaches to the work. It introduces the background for the study and why both management accounting and the environment seemed such a fertile and interesting area for a doctoral thesis.

1.0 Environmental Imperatives & Accounting: Establishing The Research Objectives

According to authors across subject areas, Western manufacturing organizations must change in response to the perceived crisis in the Earth's natural environment. No longer can organizations ignore the environmental and social impact that their operations cause, especially since certain natural resources are becoming exhausted. Actors within society, such as governments, customers and the general public are all believed to be becoming 'greener' in attitude, and less tolerant of environmental 'ills' caused by manufacturing organizations (see for example, *inter alia*, Pearce *et al*, 1989; Elkins, 1986; Wokutch & Spencer, 1987; Elkington & Hailes, 1989; Dobson, 1990, 1991; Vandermerwe & Oliff, 1990; Walley & Whitehead, 1994; Olander & Thøgersen, 1995; Spiller, 2000). Organizations are urged to act in response to such social demands, through for example, increasing government legislation and regulation on environmental issues (French, 1979; Hannigan, 1997; Gray, 1990, 1992; Cairncross, 1991; Howes *et al*, 1997; Short, 2004).

One of the main methods by which many UK manufacturing firms are actually changing in response to environmental imperatives is through the implementation and development of new environmental management systems (EMS) (Letmathe & Doost, 2000; Steger, 2000; Burritt, 2004). The British Standards Institution (BSI) (1996a, p. 5) define EMS as:

‘the part of the overall management system that includes organizational structure, planning activities, responsibilities, practices, procedures, processes, and resources for developing, implementing, achieving reviewing and maintaining the environmental policy’.

These systems are aimed at ensuring that the environmental aspects of operations are managed in line with organizational environmental policy and objectives. In an effort to make their systems appear more legitimate to external parties, UK organizations are

increasingly having them formally certified as complying with the BSI's implementation of the International Organization for Standardization's (ISO) ISO 14000 programme of standards on EMS (BSI, 1996a, 2004). In this series of standards, ISO 14001 '*Environmental Management Systems: Specification with guidance for use*' specifies the requirements for an EMS. These include the need to: define an environmental policy; identify the environmental aspects of activities; establish environmental objectives and targets; provide structures and assign specific management authority for the EMS; provide adequate training and awareness on environmental impacts; provide specific guidance, documentation and procedures on dealing with environmental issues; monitor and measure compliance with legislation and targets; and periodically review and audit the EMS.

Despite attempts at developing an accredited universal approach to environmental management, individual organizational systems still seem to differ greatly in terms of their specification, operation, organizational power and meaning (Gray *et al.*, 1995; Wycherley, 1997; Steger, 2000). As part of many UK organizational environmental management innovations, organizations are being urged to adopt, and many are actually adopting, a whole range of 'new' environmental measurement systems and techniques, which are often described in the literature as 'environmental accounting' or 'environmental management accounting' techniques. What remains relatively unanswered at present is just who controls the introduction and operation of such measurement techniques, and how they function, or not, alongside an organization's existing management accounting function. It is this interesting juncture in the organizational 'greening' change process that this thesis specifically focuses upon.

The thesis models the process of organizational change in UK manufacturing in response to environmental pressures, and within this specifically locates the impact of, and on, management accounting practice and management accountants. Management accounting is a powerful voice within many firms, but has not been free from criticisms about its defective practice. One new area of criticism surrounds the alleged limitations of management accounting theory and practice for the management and control of environmental issues and impacts. In response to such criticisms and associated 'worrying' about management accounting, both the environmental and accounting

literature are now replete with prescriptions of how management accounting practice and associated techniques should be modified, developed and extended towards an 'environment-related' form of accounting. However, there is a lack of empirical evidence about how management accounting and accountants are presently involved in the development of corporate environmental management (see Burritt, 2004).

The purpose of this thesis is to describe the role(s) of management accounting within the development of environmental management within UK manufacturing operations. In order to do this, the research explores management accounting within the whole process of organizational 'greening', a process that is shaped by interactions and demands within social and organizational contexts. Thus, in order to study the specific role of management accounting in environmental management, the thesis must also explore why UK firms become 'greener' in the attitude towards the environment. The overarching research question addressed by the study is:

What role(s) do management accountants and management accounting play in the development and use of environmental initiatives within UK manufacturing organizations?

In order to answer this, a more fundamental research question also has to be asked:

Why do Western manufacturing organizations decide to manage their impact on the natural environment?

It is these two related research questions that this thesis explores in detail.

Before the structure and approach of the thesis is described in more detail, it is important to provide some background on the way that 'worries' and critiques about management accounting practice are neither original nor specific to environmental issues. Accusations of failure to deal with environmental issues are simply the most recent in a long list of critiques (for a review of such critiques see Roslender, 1996). Management accounting seems to have survived such challenges before, and will continue to do so because it is much more than just a technical-rational system. Rather than simply following the path of what it should ultimately be, management accounting can instead become what it is not (see Hopwood, 1987). Management accounting is embedded in organizational systems and structures, shaping them and being shaped by them in turn. It simply does not operate in technical isolation, and proposals for its development or reform should appreciate this

fact. Whilst management accounting *techniques* may or may not change, the organizational *functioning* and significance of management accounting may be altered by, or even influence, corporate EMS. This realisation is key to any investigation of the role or non-role of management accounting in the development of corporate EMS.

This introduction will now explore the above themes in more detail, and identify the way that management accounting may play a role in shaping corporate 'greening'.

1.1 Management Accounting Practice: 'Visibility' Creation within the Firm

Traditionally and historically, in most UK organizations, the management accounting function is seen to provide relevant financial and non-financial information to support managerial decision-making (Loft, 1991). Whilst the influence of management accounting varies, its information is a powerful voice within the organization, and has been observed to influence not only decision-making, but also the strategy, culture, management, group perceptions and other functional systems within organizations (see Hopwood, 1987; Dent, 1990). Furthermore, the role and influence of management accounting does not stop at the boundaries of the organization. Management accounting can also become entwined with the discourses and problems apparent within wider society, and the operation of its systems can serve to legitimise corporate actions to external societal groups controlling the access to resources.

A powerful aspect of management accounting is its ability to render the outcome of organizational events, transactions or actions either 'visible' or 'invisible' within both organizations and wider society (Ansari & Euske, 1987; Hopwood, 1987; Hines, 1988). What is made 'invisible' by management accounting is often viewed as unimportant, and what is made 'visible' is focused upon within decision-making. The 'visibility' so created by management accounting can only be understood by examining the precise organizational processes, context and culture that are used to interpret and make sense of it. Furthermore, it is impossible to assess whether the 'visibility' created by an organization's management accounting system is appropriate without reference to the specific context, or contexts, in which such systems have emerged and operate (Burchell *et al.*, 1980; Hopwood, 1972; Brownell, 1987; Ansari & Euske, 1987; Bhimani, 1994;

Roberts, 1990). Thus, the role and function of management accounting can be organizationally specific, with identical systems of management accounting operating differently in different firms.

Thus, the ultimate organizational role of management accounting originates from its technical ability, as well as through the organizational systems and processes surrounding it (see Burchell *et al*, 1985; Hopwood, 1987; Laughlin, 1995). Only by understanding these two aspects, alongside the way that they are influenced by the social context, can a researcher adequately explore the roles played by management accounting within the growth of corporate environmental management. As a result, the researcher must gain contextual insight in order to understand the way that management accounting systems operate, current problems, the organizational meanings attached to accounting information systems, and, most importantly, how accounting measures are linked to organizational action and decision-making. From such a perspective, management accounting must be seen as a dialectical and social practice, and should not be characterised as a simple technology. Seen from this perspective, management accounting's role in environmental management extends beyond the figures that it provides, and includes the way that it shapes discussions and dialogue about 'green issues' within the firm. This approach to studying the role of accounting is used throughout the thesis and its empirical work.

1.2 Criticisms of Management Accounting: Importance of the 'Invisible'

The 'embedded' nature of management accounting should be recognised in any critique of the craft, as it suggests that there are situationally appropriate modes of accounting. Management accounting is embedded in an organization, and its functioning can influence, as well as be influenced by, other organizational systems. However, this idea, and the ability of accounting to alter organizational 'visibility' are sadly neglected in many of the critiques of management accounting in the technical-rational/professional literature (see Bhimani, 1994). Most of the "worrying" (Hopwood, 1985a, p.228) over management accounting has merely focused on its technical limitations, implicitly viewing it as an organizationally isolated and rational process whose only function is to provide information for 'efficient' decision-making (see for example Bennett & James,

1994a). The goal of such critiques is to identify deficiencies in accounting information systems and suggest how technical management accounting innovations can universally improve decision-making. From this perspective, ‘management by the numbers’ (management at a distance by senior management using management accounting numbers) is the dominant view. The aim of management accounting becomes simply to map numbers into the ‘answers’ that managers blindly follow, regardless of individual situation and context.

Management accounting is not a simple technology that maps numbers into answers, but one where numbers become the basis for discussions concerning what the answers should be (Roberts & Scapens, 1985; Hopwood, 1987; Miller & O’Leary, 1987; Boland, 1993). Accounting information is often used as a basis for management dialogue, rather than simply acting as an ‘answer machine’ (Earl & Hopwood, 1980; Burchell *et al.*, 1980). Rather than being *the voice*, accounting can be seen as just one voice in a multi-disciplinary dialogue concerning organizational actions. More, the accounting function does not necessarily ever supply the *dominant* source of information for organizational decision-making, as production and sales information becomes strategically more important (Simons, 1987, 1990, 1994; Roberts, 1990). Technical systems of management accounting do not operate in a vacuum, and their deficiencies can be overcome either through the actions of organizational managers or through the information provided by other organizational information systems (see Boland, 1993). However, technical-prescriptive critiques of management accounting are still prevalent, especially regarding the alleged failure of management accounting to provide information on corporate environmental costs and impacts (see for example Bennett & James, 1994a, Burritt & Schaltegger, 2001; Environmental Management Accounting Research and Information Centre (EMARIC), 2004).

Management accounting has been subjected to frequent calls, from both academics and practitioners, for either its ‘revolution’ or ‘evolution’ in the face of increased market competition and the development of new production technologies (for a review see Bromwich & Bhimani, 1989, 1994). The technical-rational ‘worrying’ (Hopwood, 1985a, p.1) about UK management accounting practice has built into a large body of literature, stressing that management accounting frequently ‘lags’ behind other technical advances in

organizational and economic activity (Kaplan, 1986; Johnson & Kaplan, 1987; Dunk, 1989, Johnson, 1994):

'If the accounting system is not representative of actual operations, and not useful in understanding or controlling these operations, it has little other justification for existence.' (Kaplan, *op cit*, p.194)

Calls for the reform of management accounting generally focus on the way that technical systems of management accounting can render important aspects of organizational performance 'invisible' for the purposes of decision-making. For example, as competition in many product markets became driven by issues other than product cost, it was believed that key performance measurements, such as product quality and customer satisfaction levels, were not being 'captured' by existing management accounting reports (see Johnson and Kaplan, 1987). Neither did management accounting seem to provide information relevant for supporting the strategic direction of the firm (Simmonds, 1981; Bromwich, 1990, Lord, 1996). It was also thought that management accounting needed to change in order to make certain strategic, competitive and operational issues more 'visible' to management (see Hopwood, 1987). Manufacturing and its markets evolved rapidly and management accounting was required to change in order to stop 'lagging behind' (Johnson & Kaplan 1987; Johnson, 1992). The 'modern' management accountant was urged to take a more 'balanced' view to information provision, including the collection of both financial and non-financial information across a whole range of strategically critical areas (see Kaplan & Norton, 1992).

The result of this wave of technical-rational critiques of management accounting, is an immense body of both literature and consultants suggesting alternative techniques and methods for obtaining the data and information that the management of U.K manufacturing organizations apparently previously lacked. Ultimately, the solution to UK 'worries' about management accounting was for firms to undertake new investments and innovations in further systems of technical accounting in order to overcome the limitations of existing management accounting. However, little attention was paid to the questioning of whether management accounting was the cause and not the cure for many organizational problems. Little attention was also focused on the way that the existing deficiencies in management accounting practice could be, and were, solved by organizational managers using non-accounting solutions and information. Most importantly, however, the suitability of applying any newly developed management

accounting 'solutions' techniques to all firms, regardless of organizational context, was never seriously called into question and analysed.

Although the problem of environmental issues was not mentioned explicitly in these early technical-rational calls for reform in management accounting practice, they can be said, at least to some degree, to be implicitly included within them. Certain environmental costs, such as the costs of energy and waste disposal are no different to any other types of cost or issue that management accounting should measure. Such environmental costs can, and *should*, be routinely measured by accountants as part of 'efficient' management (see Chesters & Hill 1998). However, if this is the case, why then is the literature full of examples of firms reporting cost savings in both energy and waste which was revealed through the operation of a newly introduced EMS, rather than their management accounting system?

It now seems that existing worries within society about how to ensure economic 'efficiency' have been extended to include new worries about how best to also secure 'environmental efficiency'. Just as use of management accounting was seen as ensuring economic 'efficiency' within firms (Miller, 1991), its use might well be seen as the solution to worries over 'environmental efficiency'. Are environmental issues just the latest 'worry' that management accounting is being asked to cope with? What is clear is that the appropriate method of ensuring environmental efficiency within the firm is an opinion being constructed within *both* society and the organization. It remains to be seen exactly how this opinion will develop over time. What is clear is that the current environmental management literature is full of calls to develop new forms of technical-rational systems of accounting and measurement in order to obtain an 'environmentally efficient and sustainable' firm. Once more in the literature, it seems that the main solution to the general problem of environmental management is for the firm to invest in new technical systems of performance measurement, with little regard to the ways such systems actually function within the unique context of the firm.

1.3 The 'Management-Measurement' Dimension of Environmentalism

Within the UK, it is common to hear the following industrial gestalt espoused by both UK management and certain groups of academics:

“What gets measured gets managed”

This colloquialism, and similar versions of it, can be frequently encountered in discussions of, and work into, both management accounting and environmental management (Johnson & Kaplan, 1987; Johnson, 1992; Bennett & James 1994a, 1994b; James, 1994; Epstein, 1994, 1995). As described earlier, during periods of ‘perceived’ crisis and change (Miller & O’Leary 1990; Miller, 1991), such concerns are voiced with greater urgency. This idea will be developed later, but the interrelated dimensions of both management and measurement are well illustrated in the growth of environmentalism (see Gray, 1990; Pearce, 1992, 1993a, 1993b; Porter, 1991a). As will be shown in the literature reviews within this thesis, modern corporate management has been heavily criticised for ignoring the environmental and social aspects of economic decisions (see for example Coase, 1960; French, 1979; Gray 1990). Environmentalists condemn modern management for not adequately ‘measuring’ the environmental impact of business decisions (Pearce & Turner, 1990), even though there may be weak or even conflicting evidence about the real consequences of such impacts on society (see for example Wildavsky, 1988, 1989, 1994). This perceived lack of ‘appropriate’ measurement of environmental issues is deemed to implicitly lead to them being inadequately recognised, considered and appreciated by management within organizational decision-making systems. However, criticisms of inappropriate performance measurement existed long before ‘worries’ about environmental management issues first appeared. Criticisms of performance measurement techniques have constantly dogged more conventional management accounting practice for many years, as highlighted by Otley (1997, p.44):

‘Sometimes we only measure what is easy to measure (often hidden under the term ‘performance indicators’). Sometimes we focus on the relatively unimportant and neglect the critical success factors. Sometimes we confine ourselves to considering only financial performance measures rather than a wider range’.

Research has shown that what gets formally measured within organizations gets management attention, and what is not tends to be ignored (see Ridgway, 1956; Hopwood, 1972; Markus and Pfeffer, 1983). However, what is different in terms of

environmental issues is that management accounting, because of its very nature, is claimed to have deliberately ignored them, as it largely treats environmental resources as ‘invisible’ free resources that have little or no real cost to the organization (Sherman *et al.*, 1997). Effectively, much of current management accounting practice renders the environmental dimension of a firm’s operations ‘invisible’. This damning perspective on management accounting has been outlined by Puxty (1986), Cooper (1992), and Gray (1993) *inter alia*, claiming that management accounting will always inaccurately measure environmental issues, even if environmental management innovations are introduced within organizations. Seen in such a light, management accounting is the main cause of current environmental problems and definitely not the cure. For Puxty (1986), Cooper (1992), Gray (1993) *inter alia*, management accounting can never cope effectively with environmental imperatives. Worse, if it is applied to manage environmental issues it may professionally ‘capture’ them, and cause them to be viewed in an inappropriate and less meaningful way (see Gorz, 1988; Power, 1991, 1994 & 1997).

However, such views on the danger of environmental ‘capture’ stand in direct contrast to a growing body of ‘practitioner’ literature, which calls for the development of new forms of environmental management accounting and performance measurement techniques (see for example Lickiss, 1991; Odum, 1996; Bennett & James, 1998a, 1998b). For such ‘practitioner’ authors, only with the advent and development of these new technical management accounting systems can environmental issues ever be managed effectively within companies. Some form of environmental performance measurement is thought to be essential, but are management accounting techniques part of the answer?

1.4 Management Accounting: Rendering Environmental issues ‘invisible’

“You can’t truly manage something that is inappropriately measured” (actual quote from Environmental Manager 1 in the Copyco case study, see chapter 8).

This quote illustrates the consensus view on the best approach to the management of environmental imperatives. The majority of authors agree that environmental impacts need to be monitored and measured in some way before they can be effectively managed in organizations. Despite this, however, there is no consensus on the appropriate techniques and measures with which to obtain the required environmental information.

Certain authors have argued that existing management accounting techniques can be used to manage corporate environmental impacts (see Brooks *et al.*, 1993, Krueze and Newell, 1994; Marsden, 1996). Other authors have stressed the need to supplement existing management accounting techniques, by developing new measurement techniques more suited to environmental issues (see Macve, 1995a, 1995b). Yet other authors implicitly, and explicitly, ignore the potential of management accounting completely, and discuss the need to develop new and completely isolated forms of environmental performance measurement techniques (see for example BSI, 2004; Bennett & James, 1998a; Burritt, 2004). Finally, one group of accounting and economic writers hold the view that management accounting itself was, and still is, the actual cause, and not the potential cure, for environmental degradation. By providing ‘visibility’ through its various measurement techniques, management accounting is held to be causing environmental problems, and it is inappropriate for accounting tools to be used to manage environmental issues (Hines, 1991; Gray, 1992; Gray *et al.*, 1995). For example, by rendering certain organizational issues such as manufacturing profit and standard cost ‘visible’, management accounting also makes other issues, such as the social cost of pollution, ‘invisible’ (Hines, 1988). However, such criticisms are not just laid at the door of management accounting, as they are also aimed at neo-classical economics and much of existing government legislation.

Despite certain criticisms of applying current management accounting to environmental management, there is an ever-growing body of literature that argues that some type of ‘environmental accounting’ is the solution (Ditz *et al.*, 1995; US Environmental Protection Agency (EPA), 1995a; Bennett & James, 1994a, 1994b; Burritt, 2004). Unfortunately, within the literature, ‘environmental accounting’ as a concept is a relatively ill-defined and widely used concept. The term is used to describe many different techniques and practices, including those already practised as part of conventional management accounting. Within the normative and practitioner literature on environmental accounting, it is believed that forms of environment-related accounting will render the environment ‘visible’ in all areas of organizational cost and operational decision-making. For certain authors, these developments would benefit the organization as well as the environment, and be a ‘win-win’ situation (Porter, 1991a; Bennett & James, 1997, Burritt *et al.*, 2001).

In contrast, other authors see environmental accounting as only serving to minimise the costs of complying with minimum permitted levels of environmental protection (Depree & Jude, 1995; Hamner & Stinson, 1995).

Although there is now an established literature which both describes, and often prescribes, technical forms of environmental accounting techniques and systems, what remains unexplored is exactly how such techniques become embedded within the firm, and, just as importantly, the degree of ‘fit’ they have with an organization’s existing management accounting function. Little attention is paid to such important contextual issues, and the types of organizational forces involved. More importantly, the extent to which *existing* organizational management accounting does, or does not need to change when organizations respond to ‘green’ issues and pressures also remains terribly underdeveloped. There is currently very little empirical evidence to suggest that existing systems of management accounting information and control actually *need* to change in response to environmental issues. As mainstream management accounting research has shown, there are many instances when management accounting change is not a pre-requisite for, or even part of, certain types of organizational change (Hopwood, 1987, 1990; Simons, 1987, 1990, 1994; Roberts, 1991; Kloot, 1997). Furthermore, evidence suggests that similar companies having to cope with similarly changing markets and production technologies often do so by using different accounting solutions (Porter, 1980, 1985; Kaplan & Norton, 1992; Bromwich & Bhimani, 1991, 1994). If such evidence applies to the study of environmental issues, it suggests that management accounting change would not always occur, and when it did, it may take different forms in different organizations.

So, despite certain literature urging the ‘greening’ of management accounting, it is equally plausible that a potential for management accounting change may arise only once environmental management becomes an established function within the firm. As Hopwood (1989, p.40) identifies, accounting change often arises as much from its organizational functioning as it does from ‘technical-rational’ advances in the craft:

‘No imperatives accompany the organizational form and functioning of accounting. No missions or plans are built into its mode of operation. Rather both the practices themselves and the manners in which they are used and function are more positively created in the context of particular interactions and configurations of use’.

Thus, the meaning and significance attached to similar accountings in different organizations can vary appreciably. Different organizational contexts provide the basis by which seemingly technically similar systems of accounting can have different organizational uses, consequences and could even influence future change to follow a certain path. Similarly, the functioning of new EMS may be influenced by, and even influence the established organizational context. If either management accounting or EMS change, it must be seen as much more than a simple case of altering a technical system of control and measurement. Such changes may have repercussions and reverberations throughout the organization and also to each other. These two systems do not operate in technical isolation from each other, and the manner in which they are embedded in the organization will determine how they are used and viewed by organizational participants.

It is these issues that the thesis focuses on. Critiques of both management accounting and environmental management are prevalent in the literature, but they do little to enhance our understanding of either unless they are grounded in the context in which they operate.

Seemingly technical problems of both accounting and environmental management arise within specific organizational contexts. There is now a long tradition of management accounting research that explores the dialectical, political, organizational and social functioning of accounting, and much of it highlights how accounting is embedded in organizational systems and social culture. Accounting can influence and be influenced by many different factors and circumstances, but it can also remain resilient to changes taking place elsewhere in either the organization or wider society. Thus accounting problems can be created by non-accounting factors, and they could be, if not solved, at least reformulated by the same means. For example, management accounting has had a long-standing problem dealing with quality issues emerging from the greater use of advanced manufacturing technologies. The perceived solution was to make greater use of non-accounting, non-financial measures of performance, such as measuring the number of defects in each batch produced. Similarly, environmental issues could create problems and tensions for a 'management by numbers' style of accounting, and non-accounting information systems could be used to solve them, in the form of EMS. This assertion seems to be partially supported (at least empirically) by the current growth in the use of EMS within UK firms. Currently, such systems are generally set up and operated in

apparent isolation from the management accounting function (Gray *et al*, 1995; Hill, 1995; Wycherley, 1997).

Despite theoretical calls for their involvement in 'greening', the literature highlights a continued absence of management accounting and accountants from organizational attempts to manage 'green' issues. Perhaps contiguous with this, corporate responses to green pressures largely involve the use of non-accounting expertise and systems. However, this outcome may also be influenced by the limited importance currently being placed on environmental management within many firms.

If organizational strategy places greater importance on achieving economic rather than environmental efficiency, management accounting does not have to routinely measure environmental performance. In this situation, EMS may only be adopted in order to make the organization appear legitimate to external social actors. Effectively, the environmental management system may be either totally 'decoupled' or only 'loosely coupled' to both organization actions and the management accounting system (see Weick, 1976; Meyer and Rowan, 1977; Berry *et al*, 1985). A 'decoupled' system exists solely to make the company appear 'environmentally' legitimate to outside parties, but is not used in organizational actions or alongside management accounting systems. The problem with a totally decoupled system is that it is not sustainable in the long run, as external social parties may eventually discover its true purpose (Pfeffer & Salancik, 1974; Dowling & Pfeffer, 1975). In contrast, 'loosely coupled' EMS act as a buffer to organizational actions, aiming to manage environmental issues without distorting established modes of strategy, management and action. If the management accounting system is 'loosely coupled' to EMS, environmental issues may be ignored in certain types of decisions-making situations. The 'loose coupling' between environmental management and management accounting effectively buffers the economic decision-making of the firm, relegating environmental issues to a marginal and secondary concern. As a result, management accounting does not have to worry about the routine day-to-day management of environmental issues, and can just proceed with its operations as it did before 'green' issues were a concern. It is only when there is some sort of environmental 'crisis' that the management accounting function needs to refer directly with the environmental management unit, seeking its help as a specialised consultant. This scenario may not be

typical of the vast majority of UK manufacturing firms, but it does highlight how notions of legitimacy and loose coupling in systems are very important concepts for this thesis. They will be returned to in later chapters.

The frequent use of 'non-accounting' methods to tackle organizational greening can be clearly seen in the location and control of EMS within the organizational structure of the majority of UK manufacturers. As the empirical evidence contained in both this thesis and the literature shows, environmental management is treated as either an extension of existing health and safety functions or quality management systems, and is not part of the management accounting function. Furthermore, environmental management information is generated with little direct input from management accountants, and, at best, is used in an ad-hoc manner by accountants within decision-making.

Thus, it may not be the management accounting function that renders 'green' issues and problems 'visible' within the organizational. Such visibilities could be created elsewhere in the organization, and through the use of new non-accounting systems and structures. Something that is seen as largely a technical problem of inappropriate measurement, i.e. the control of environmental 'efficiency', may be solved using a mixture of both organizational, and technical solutions. The case studies conducted in this thesis clearly show that environmental management is conducted with an apparent lack of management accounting input. Management accounting information systems are seen to coexist alongside environmental management information systems, often in a 'loosely-coupled' or even totally de-coupled manner. However, 'loose coupling' as a concept has rarely been applied in empirical work on environmental management (see Strannegard, 2000), even though its use may indicate the attitude of many organizations towards environmental management. Thus, environmental issues seem to be at the 'fringe' of management attention and only need to be focused on when, or if, the issue is potentially damaging for the firm.

Although the former paragraph is far from positive for environmentalists, another issue might be. Research has shown that the implementation of new management information systems may lead to unintended, as well as intended organizational consequences (Burchell *et al*, 1980; Hopwood, 1980, 1985a, 1987; Earl & Hopwood, 1980; Foster &

Ward 1994). The introduction of EMS and new types of environmental information may lead to such unintended consequences, and may challenge the importance of existing management information systems within organizational decision making. As a result, the environmental information generated by EMS may conflict with the recommendations of the organizationally established accounting systems. It may also serve to question the ultimate rationale of existing management accounting data, and reveal an alternative 'visibility' of organizational operations. Effectively, environmental management can become a competing form of management information, with appropriate consequences for organizational actions and participants. Similarly, the actual role for management accounting within the provision of environmental information arises from interactions between specific functional relationships within the firm:

'Accounting has been treated as if it were a functionally autonomous sphere of practice, and consequently there has been a corresponding neglect of the relationships between accounting and other functional areas within organizations – e.g. marketing, production and personnel.' (Roberts & Scapens, 1985, p.444)

The current role of management accounting in the provision and 'control' of EMS remains unclear, but it seems unlikely that it will be completely divorced from such activities.

1.5 Present Role of Management Accounting in Environmental Management

Within the existing literature, relatively few empirical case studies exist that specifically investigate the interface and relationship between management accounting practice and environmental management within UK organizations (see Wycherley, 1997; Frost & Wilmshurst, 2000; Wilmshurst & Frost, 2001; Burritt, 2004). Whilst such empirical studies may well be underway, their present absence from the literature is suggestive of a largely 'non-role' for management accounting. If management accountants were actively involved on a large scale, one would expect that it would be documented. Even the professional management accounting bodies have been relatively quiet as regards official pronouncements as to their stance on environmental management. For example, the Chartered Institute of Management Accountants (CIMA) only initiated their first research report on the subject in 1990 (see Burkitt, 1990), and even its rather unfortunate title, 'The Costs to Industry of Adopting Environmentally Friendly Practices', can be seen to reveal CIMA's posture towards such issues. This might be unfair, especially as the report

talked about the opportunities for cost reduction as a result of being more environmentally friendly. The next piece of research initiated by CIMA on environmental issues was not until 1997, but this at least directly addressed the role of management accounting and accountants within environmental management information systems (see CIMA, 1997). In 2002 CIMA published 'Environmental Accounting: An Introductory and Practical Guide' that provided a business case for engaging in environmental accounting (Howes, 2002). At the time of its publication, Charles Tilley, Chief Executive, CIMA, said:

'Leading companies now recognise that managing and reporting their environmental impact simply makes good business sense. Aside from the increasing pressure for greater disclosure, continuous improvement in performance and greater accountability, there are real benefits to be gained. Reducing costs, adding value, identifying risks and enhancing reputation are the positive drivers for change that we need to promote'. (Muir, 2002, p.1)

If CIMA's sponsorship and support of dedicated environmental research was not sufficient evidence of its underlying attitude towards the importance of environmental issues, one can also explore the number of environment-related articles published in *Financial Management* (previously entitled *Management Accounting*) and *Management Accounting Research*, both CIMA endorsed publications. Even though *Financial Management* frequently carried articles on energy management and accounting, it did not carry an article that specifically mentioned environmentalism until September 1990 with the publication of a paper entitled 'Management Accounting for A Cleaner World' (Gray & Gray, 1990). This article coincided with the establishment of CIMA's Environment Accounting Working Party, and also with the publication of the Chartered Association of Certified Accountant's (ACCA) influential report entitled *Greening of Accountancy: the profession after Pearce* (Gray, 1990). In addition to professional initiatives, environmental management is now studied as a minor part of CIMA's professional education syllabus. However, despite these professional pronouncements and apparent need for organizations to produce technical systems of environmental management information (see Bennett & James, 1994a, 1994b; 1998b), it seems that management accountants currently have little involvement in corporate EMS (see Epstein, 1995; Birkin, 1996; Wycherley, 1997). This is surprising, and describing why this may or may not be the case provides the rationale for this present thesis.

1.6 Overview of the Study

This chapter has outlined the research objectives and questions of the study within a discussion of the importance of the role of management accounting within environmental management. This section provides an overview of the study including details of the methodology, empirical work, findings and chapters.

1.6.1 Methodology

This study adopts a ‘middle-range’ thinking research paradigm (Laughlin, 1995). To describe the role of management accounting in the growth of environmental management systems, the thesis reviews a range of literatures in order to construct a number of ‘skeletal’ theoretical models that provide a general framework for this study. Within each of these models, management accounting is specifically located and described.

Each model will now be outlined in terms of their ‘internal’ focus on organizational context or ‘external’ orientation towards the social context. However, this thesis will argue that the internal and external contexts of the firm are interrelated and cannot ever be seen as independent from each other.

Focusing on the ‘externally focused’ models first, the primary ‘skeletal’ model is the theoretical *envelope of greening* that provides a spectrum of reasons for explaining why UK manufacturing organizations may face ‘external’ greening pressures. Related to this is a further model that describes the array of *external pressures for greening*.

There are two skeletal models that describe the ‘internal’ factors that may influence corporate ‘greening’. The model of *environmental visibility* describes the array of organizational characteristics that may influence the level of ‘external pressure’ for greening that it may face. The model of *internal catalysts and filters for greening* describes how organizational systems, structures and other characteristics can influence the way that organizations respond to environmental pressures.

Together, these four models comprise the overall *business response to the environment*, which represents how external pressures for greening occur, are influenced by organizational environmental visibility and may be filtered out or encouraged by internal

organizational characteristics. This integrated model is used as the basis for development a typology of *dominant attitudes towards the environment*. Finally, a model of the different levels of organizational *greening change* is described, along with nine *change tracks* of *greening* that illustrate the different ways that greening may occur within the firm.

Although these models are designed to be a ‘skeletal’ framework for the empirical work, six general hypotheses are developed:

Hypothesis 1: Organizational size will affect the likelihood of an organization facing demands for, and actually engaging in, environmental change.

Hypothesis 2: The type of organizational products and/or services and the processes by which they are created will affect the demands for environmental change.

Hypothesis 3: The level of adverse media attention on the organization will affect the level of demands for that firm to undertake environmental change.

Hypothesis 4: The social importance of non-environmentally related characteristics of the firm affects the external pressures for ‘greening’ upon the firm.

Hypothesis 5: Organizations can enact their own environmental ‘visibility’.

Hypothesis 6: The internal catalysts and filters for greening within the organization will differ:

- a) between organizations; and
- b) across industries.

In contrast to the more general ‘skeletal’ models of corporate greening described above, the final ‘skeletal’ models are specifically focused on the provision, processing and use of environmental information within the firms. These illustrate a matrix of ways that such information may be generated, processed and used within the organization, and also provides a model of the stages of *environmental information requirements* of firms.

As these models are ‘skeletal’ and general in nature, they require empirical data to give them meaning. Three main case studies are used to ‘flesh out’ these models, and details of these are below.

1.6.2 The Empirical Work and its Findings

The main empirical work consists of three case studies at manufacturing locations in the UK. In addition, the thesis also uses empirical evidence from a further ‘mini’ case study and interview data obtained from a variety of environmental managers. The data for each

of the main case studies was obtained from the analysis of in-depth semi-structured interviews of management accountants, environmental managers and production personnel, from 'shadowing' these individuals in action, from studying internal documents and also from investigating information that each organization released into the public domain. In each case study, views were obtained through an interview situation in order to standardise the quality of the empirical testing. Accounting managers, environmental managers, production staff and other organizational participants involved in the management of organizational environmental issues were interviewed.

From the interpretation of the case material, it became evident that the role of management accounting in environmental management was *not* following the path suggested by literature prescriptions of environment-related management accounting. Specific environmental costing of products was deemed unnecessary, with certain environmental costs, such as regulatory compliance costs, not being apportioned or allocated to products. Although the more 'conventional' environmental impacts and costs, such as waste raw materials and utilities, were being actively managed and measured by the management accountants, sole responsibility for managing the remaining part of the environmental impacts and costs was given to environmental managers and EMS.

Although an array of environmental management information was being produced, it was the EMS rather than the management accounting function that generated it. The extent to which environmental information came into contact with decision-making processes and conventional systems of management information was revealing. In many situations, environmental information appeared to be 'loosely coupled', of secondary importance, and largely subservient to more traditional sources of management information, such as management accounting, within decision-making. Looking beyond the technical operation of the information systems, the actual dialogue between the management accounting function and the environmental management function was largely on an ad-hoc and 'as needed' basis. Despite this, management accountants appeared to possess a strong knowledge and awareness of environmental management at each site.

In the case studies where the environmental management function was fully 'embedded', awareness about the environmental dimension to operations routinely influenced the day-

to-day actions of certain organizational participants, especially in the factory. Environmental information even had the potential to subtly 'challenge' the existing 'visibilities' of operations provided by conventional managerial information, such as accounting. Environmental information seemed to 'discover' operational inefficiencies that management accounting information should have already revealed and managed. In the three main case studies within this thesis, management accounting information appeared to inadequately monitor certain environment-related operational issues, such as waste. It was left to the EMS to provide the necessary managerial information on such issues, effectively challenging the validity of accounting based information. In summary, environmental management information appeared to possess the ability to 'influence' organizational actions, either at meetings or within other decision-making situations.

Less positively, it seems that current EMS may be limiting and defining the need for action on the environment. EMS, often introduced as an extension of existing ISO 9001 quality management systems, possess the potential to render the measurement and management of environmental issues part of the organizational 'routine', and as a result, reduce their importance within the organization. Once environmental measurement information become 'routine', management accounting may even include them within its own systems and reports, serving to further limit the notion of what 'greening' is, and how far the organization must go in order to manage such issues.

1.6.3 Structure of the thesis

This chapter has discussed the subject of the study in the context of the alleged deficiencies of modern management accounting practice. The next chapter takes this further by exploring the role of management accounting in causing and solving the apparent crisis in the natural environment. It reviews a range of environmental, economics, accounting and management literature and describes the views on environmentalism, the proposed responses to the environmental crisis and how management accounting is implicated within them.

Chapter 3 describes the way in which the study has been designed in order to meet deficiencies in the literature and answer the overarching research question. It contains a

discussion of the research paradigm and the way in which the empirical work was conducted.

Chapter 4 examines a range of literature to describe why UK manufacturing firms should consider their impact on the natural environment. From this literature, a number of existing theories are used to build a 'skeletal' theoretical 'envelope of greening' that explains why organizations become greener in attitude. From this base, a further skeletal model of the types of 'external pressures' for greening is constructed for use in interpreting the case material in chapter 8.

Chapter 5 builds on chapter 4, and discusses how interactions between the 'external' social context and the 'internal' organizational context influence the level of greening within the firm. A 'skeletal' concept of an organization's 'environmental visibility' is developed to illustrate how organizational characteristics may moderate the 'external pressures' for greening, and six general hypotheses are devised to test whether an organization can enact its 'environmental visibility'. A 'skeletal' model of the internal characteristics that may act as 'filters' or 'catalysts' to greening is developed. This model is linked to the 'external pressures' model from chapter 4 and the 'environmental visibility' model to produce an overall model of the 'business response to environmental pressures' representing the dominant attitude towards environmental issues. This model is used to provide a typology of difference attitudes towards the environment.

Chapter 6 discusses how organizations may change in response to environmental demands. A 'skeletal' model of greening change is developed, together with a range of 'tracks' that such greening may follow. Within these models, the role of EMS, environment-related accounting and conventional management accounting systems are specifically located and discussed.

Chapter 7 discusses the role of management accounting in providing environmental information on the costs and impacts of organizational operations. The literature on environmental costs and performance measurement is examined in order to discover the types of environmental information that UK firms *should* and *do* generate. This is then described in terms of the way such information is processed and used within the

organizational. Finally, a prediction is made about the different environmental information requirements of firms.

Chapter 8 presents a description of the case study empirical work. The ‘skeletal’ models developed earlier in the thesis are used to interpret the findings, and they themselves are fleshed out by the data.

Chapter 9 is the final chapter of the thesis and draws conclusions by examining the contribution and limitations of the research. The implications of the findings are discussed by reference to the research questions and ‘skeletal’ models in the study, and are considered in the context of their contribution to theory about environment-related management accounting

1.7 Conclusions

EMS appear to possess the potential to eventually reduce organizational belief in the power of traditional management accounting techniques. A possibility for a new organizational ‘visibility’ seems to be created by organizational discourse and action on ‘green’ issues. Organizational shortcomings, inefficiencies and previously ‘invisible’ failings may suddenly be shown up in many areas. Thus EMS may help to manage issues that management accounting should already be managing.

In conclusion, this thesis provides a theoretical modelling of the way that ‘green’ imperatives are managed and, ultimately, force organizational change inside UK manufacturing organizations. Within this broad remit, the main focus for the theoretical models are on exploring, predicting and explaining the current role or non-role of management accounting and management accountants within the development of organizational EMS. In later chapters, theoretical models are developed and then applied to a variety of empirical contexts in order to test their validity. Finally, the thesis suggests revisions to the models, and analyses the extent to which the theory and empirical evidence collected can offer plausible inferences about the historical and spatial context of management accounting practice with regard to ‘green’ issues. Although, as Giddens (1976) points out, this work may not grant us the understanding necessary to accurately predict the future role of management accounting in environmental initiatives, it does

provide an invaluable means by which we can understand the *processes* which may determine future accounting practices. Further, and more longitudinal, empirical work is needed to develop and extend the issues raised by this thesis.

Chapter 2: Environmentalism and Accounting

2.0 Environmentalism: A Challenge for Accounting

The introductory chapter of the thesis outlined the approach, aims and objectives of the research. It is evident that the project spans a number of interrelated yet distinct disciplines. As a result, there is an immense body of literature that may be relevant, and which needs to be reviewed in this thesis. Due to the limitations of both time and space, however, it has become necessary to introduce some selectivity into the literature reviews. This should not suggest that certain literature is deliberately ignored, but it does mean that the more 'deep green' literature on environmentalism is not reviewed in any depth (see for example, Leopold, 1949; Huxley, 1962; McLuhan, 1973; Naess, 1973, 1989; Schumacher, 1973; McRobie, 1981; Lovelock, 1982; Meadows *et al*, 1983; Trainer, 1985; Bahro, 1986; Tokar, 1987; Irvine, 1989). Although this literature helps to define the 'upper boundary' on environmentalism, and also helps to explain the presence of environmental pressure groups that attack corporate actions, it does not seek to explain the current actions of UK manufacturing organizations on environmental issues. Although it is possible to identify a small number of UK manufacturing organizations (including The Body Shop and Traidcraft) which espouse 'deep green' ideologies and goals beyond profitability, the vast majority of UK firms clearly do not share such fundamentalist ideals. In light of such evidence, the views within the 'deep green' literature should be seen as another in a developing array of 'external' social pressures on UK manufacturing organizations, rather than being an explicit guide that organizational reforms could potentially follow. As a result, a detailed review of the 'deep green' literature is not seen as essential to this thesis, and is largely excluded. Instead, the environmental literature is used selectively, in order to help explain the origin and development of certain environmental terms, views and concepts that are becoming widely used in debates on organizational environmental management. Such an approach to the literature could be questioned, but with most UK manufacturing organizations struggling to even operationalize the concept of 'environmentalism' within their business, the thought of them becoming 'deep green' in the near future is absurd.

Since this work investigates the role of accounting in the development of organizational environmental initiatives, the main literature review is focused on identifying and reviewing those established theories that may have potential in explaining why

organizations need to act on environmental issues, and on establishing what role management accounting and accountants could potentially play within such corporate changes. This main literature is spread over chapters 3-7, and is slowly introduced as each area of the investigation is developed and modelled. However, what follows in this present chapter is a focused review of some of the key themes and issues in the environmental, the economics of the environment and environmental management literatures.

This review highlights a number of fundamental issues in environmentalism, and examines how they might affect both manufacturing organizations and the practice of management accounting. It describes the development of key environmental concepts, including environmentalism, environmentalism responsibility, environmental accountability and sustainability. Such terms are frequently used within the literature, general environmental debate and also by manufacturing organizations themselves. A clear understanding of the meanings attached to such concepts is vital when studying how manufacturing companies and their management accounting function may seek to incorporate them. Within this general mission, attention is focused on the manner in which the discipline of economics has been contaminated by environmental ideas, in order to see if such developments can help to predict how management accounting might also develop. History has shown that developments in economic theory are not always followed by identical changes in management accounting (Whittington, 1977; Scapens and Arnold, 1986; Hopwood, 1992), but an examination of the environmental-induced advances in economic theory yields a potential for change within management accounting. The management of unpriced environmental resources might prove to be an area where a closer relationship between economics and accounting is finally possible. At the very least, the economics of the environment has served to provide definitions of environmental value and methods for establishing shadow prices, both of which could influence future management accounting theory and practice.

Over the past forty years, economics of the environment has emerged as a distinct subject and discipline, with a unique ideology towards environmental resource management and its own alternative economic valuation and measurement techniques. It remains to be seen if the discipline of accounting will fundamentally change in response to green issues, but what is clear is that concepts used in environmental economics, such as the notion of sustainability, are increasingly part of the language of environmentalism and in certain

management accounting research (see Milne, 1991, 1994; Macve, 1995b; Gray, 1990; Gray *et al*, 1993). Environmentalism seems to be an issue where newly established economic concepts and terminology are either directly adopted or used to guide environmental developments within accounting. The accounting literature is increasingly talking of the need to develop new forms and systems of 'environmental accounting' for use within national accounts (Ahmad *et al*, 1989; Rubenstein, 1994; Simon & Proops, 2000), corporate financial reporting (Ullmann, 1976; Gray, 1990; Rubenstein, 1994) and, more recently, internal management accounting (see Gray, 1990; Gray *et al*, 1993b; Bennett & James 1994a, 1998a; Burritt, 2004). Much of this literature on environmental accounting urges, both explicitly and implicitly, the use of established techniques, concepts and definitions which are borrowed from environmental economics (see Gray, 1990; Milne, 1991; Gray *et al*, 1993b; Bennett & James, 1994a). This potential influence of environmental economics on both accounting and the environmental debate will be discussed later in the chapter.

Economics of the environment has emerged as a distinct discipline much quicker than environmental accounting, and as a result seems to have effectively 'captured' many of the socially accepted ways of describing and valuing environmental resources and issues. Despite this, many of the concepts used in the economics of the environment are themselves a socially constructed and contested reality (Berger & Luckmann 1967; Hines 1988; Hannigan, 1997). Environmental economists have drawn heavily from the work of ecologists and other environmentalists (see Pearce, 1992; Spash, 1999), as will be discussed later in the chapter. Although economics of the environment emerged in the 1960s, it is but one voice amongst the many that together comprise the social movement that is environmentalism. Furthermore, even environmental economists themselves do not speak with a unified voice, and hold different views on how best to model the linkages between the economy and the natural environment. As a result of these and other tensions, key environmental concepts, such as sustainability and environmental asset values, are used differently by different authors within the green literature. This is not surprising, given the differing types of environmentalists working in the area, but recognising where such differences exist is vital to the understanding of what exactly environmentalism is and is not. Indeed, the environmental debate seems to be confused (Hannigan, *op cit.*) without a 'world view' on what environmentalism actually means or how to operationalize it.

Environmentalism certainly seems to mean different things to different people within society. There is certainly no one voice to environmentalism, and, as a result, one would not expect every organization or management accounting function to respond to it in the same manner. It is the aim of this initial literature review to establish what environmentalism and environmental management means, and what environmental economics has done to advance society's understanding of such issues. By highlighting both the nature and potential limits for the Western form of environmentalism, this review will help to describe the context that is currently surrounding developments in organizational management accounting to deal with 'green issues'.

2.1 Environmentalism: The Pressure for Action

Any exploration of the social meaning attached to environmentalism and environmental responsibility must commence with at least a brief examination of the philosophical justification of such concepts. Musings on human interactions with the natural environment have long been a prevalent theme within philosophy, and have been influential in the social construction and growth of environmentalism (see Hannigan, *op cit.*).

The concept of nature and the 'natural' has concerned many of the earliest works of philosophy still extant. Aristotle (1970), in 'The Politics', considers in what forms human existence is natural, and concludes that it is not nature, but the city, the 'polis', and the hierarchical (functional) specialisation of master/slave and man/woman/child functions within it. As a biologist, he lends many of nature's mechanisms to the polis in terms of its growth, evolution and survival, but nature (the natural environment) itself is relegated to a subservient context for the discussion of the state, polis and their organization. This line of argument was relatively unbroken until the advent of the social contractualists, Hobbes, Locke and Rousseau. The contractualists were concerned with the creation of society through a social contract, literally a covenant that all prospective members of society agreed to by signature. In order to lay the basis for this deed, it was necessary to analyse the non-social, or natural, state of mankind. The state of nature was thus developed as a non-historical philosophical construct. Because both Hobbes and Locke needed a vastly superior state of social contract, their state of nature is a worst case scenario. For Hobbes (1986), human beings are primitive savages, war is endemic due to resource scarcity "and the life of man, solitary, poore, nasty, brutish, and short". In contrast, Rousseau developed

a vastly superior state of nature peopled with noble savages disgraced by their scheming and manipulative socialised cousins.

In whatever light the state of nature was portrayed, it was characterised by solitary individuals drifting across the land, eating what 'Mother Nature' provided and existing purely on a daily subsistence basis. The importance of this construct cannot be overemphasised when considering philosophy and environmentalism, and the former provides many avenues to be considered. These philosophical ideas will be developed in more depth in chapter 4, and be used to help explain why firms must act in order to minimise their environmental impact.

Whilst some of the early philosophical writings consider the human need to be close to nature and urge a respect for the natural environment, such ideas have largely been excluded from modern mainstream thinking within either economics or business management. In fact, until relatively recently, philosophy and economics formed two separate bodies of thought on environmental matters, and thus two distinct schools of thought can be identified: the economic school and the philosophic school. The philosophic school has thus been concerned with nature for centuries, although it has only recently begun to ^{be} used as the basis for developing publicly useful debate on such matters. In contrast to the philosophic school, it is only since the 1960s that the economic school has started to fundamentally question the traditional orthodoxies of classical and neoclassical economics, and the manner in which they have tended to relegate environmentalism to the academic backwaters of irrelevance (Pearce, 1992).

As a result of increasing social and political concern regarding the natural environment, economists could no longer simply ignore such issues, as Spash (op cit., p.430) explains:

'Environmental concerns have been relatively unimportant for established economists during the past century but have in recent decades become politically (and therefore economically) relevant.'

A number of leading economic theorists have become entwined within the growing environmental movement within society (see later in the chapter for a review of such work). Greatly influenced by theories and ideas from prominent ecologists, such as Boulding's (1966) 'Spaceship Earth', these social actors have helped to challenge the dominant perception of how a modern economy should function. For many individuals within 'Western Society', it is no longer deemed acceptable for the pursuit of economic

growth to be at the expense of the natural environment, as humanity must treat the Earth's biosphere with care or be dealt with accordingly by 'Mother Earth' (Boulding, 1966; Lovelock, 1982).

These slowly increasing philosophical, scientific and social concerns about environmental degradation have lead members of the economic school to develop a range of alternative economic theories that try to provide a shadow price for natural environmental resources not priced in normal economic markets. Although these alternative environmental economic theories are far from universally accepted by all economists, they have raised the economic 'visibility' of previously unpriced natural resources and externalities. The power of economics of the environment to render natural resources economically 'visible' is crucially important, as it has propelled environmental issues into the mainstream language of economics and economic decision-making. Traditionally accepted notions of economic calculation and rationality are now becoming seen as problematic, and are criticised for being narrow and misguided in scope, as explained by Elkington & Burke (1987, p.27):

'The Greens, who espouse the 'politics of ecology', have challenged many key economic concepts, including the inevitability (and desirability) of exponential economic growth, the conventional definitions of 'wealth' and the methods used to calculate Gross National Product.'

Such criticisms of traditional economic activity are widely supported across a broad spectrum of environmental authors, illustrated by Schumacher (1973, p.42), stating:

'Since there is now increasing evidence of environmental deterioration, particularly in living nature, the entire outlook and methodology of economics is being called into question. The study of economics is too narrow and too fragmentary to lead to valid insights, unless complemented by a study of meta-economics.'

For Schumacher, the current environmental crisis stems directly from neoclassical economic analysis of projects and policies that focus exclusively on the more 'efficient' use of scarce resources. Within a free market economic system, the exclusive corporate responsibility has been to maximise profits, and, by doing so, a corporation maximises its contribution to society. However, the zero market value 'externalities' arising from any adverse environmental and social consequences are neglected in such decision-making.

According to de Jouvenel (1958, p.48), this characterises 'western man' (sic):

'He tends to count nothing as an expenditure, other than human effort; he does not seem to mind how much mineral matter he wastes and, far worse, how much living matter he destroys. He does not seem to realise at all that human life is a dependent part of an ecosystem of many different forms of life'.

There will be further discussion of the problems associated with allowing neoclassical economics to determine the fate of the natural environment later in both this chapter and

also in chapter 4 (during the discussion on why firms should respond to green pressures). Whilst the environmental problems associated with neoclassical economics are clearly documented within the literature (see Pearce & Turner, 1990), such concerns have only become socially prominent relevantly recently. As a result of this increased social 'worrying' over the preservation of natural resources, a number of alternative responses have been developed and implemented. Alternative economic models have been devised, and governments have introduced further environmental legislation. The social impact of these environmental 'responses' will be discussed below, but it must be acknowledged that all members of society do not universally support such responses.

2.1.1 Critics of Environmentalism: A Pressure for Inaction

There is a relatively small, but vocal, group of academics, business people, economists, politicians and scientists, who stress that the facts about the environmental crisis are largely unproven, and that, in reality, there is no crisis in the natural environment that cannot be overcome by a mixture of human ingenuity and the workings of the free market (Friedman, 1970; Douglas & Wildavsky, 1982; Wildavsky, 1988, 1989, 1994; Simon & Wildavsky, 1992; Dake, 1992; Hannigan, 1997). For example, Simon & Wildavsky (1992, p.41) argue that the key environmental issue of species extinction has no scientific foundation, and can be largely overcome with modern technology:

We showed that [species extinction] is utterly without scientific underpinning; indeed, it runs counter to the existing evidence and does not support the various policies suggested to deal with the purported dangers. We also pointed to recent scientific and technological advances – especially seed banks and genetic engineering- that rendered the maintenance of a particular species of plant life in its natural habitat much less crucial than would have been the case in earlier years. But the bandwagon of the species extinction issue has continued to roll with ever-increasing speed.

These environmental 'critics' reject the majority of environmental risks and dangers identified by environmentalists, ecologists and scientists:

'These [environmental] alarms are unjustified, some being entirely false, others merely vastly exaggerated (Wildavsky, 1994, p.463).'

The failure of science to provide absolute evidence of environmental problems effectively allows environmental problems to be socially created and contested, as Hannigan (1997, p.80) explains:

What particularly opens the door to the creation and contestation of environmental problems is the inability of science to give absolute proof – unequivocal evidence of safety. Instead, scientists are

reduced to offering estimates of probability which often vary widely from one to another. This lack of certainty allows claims-makers both within and outside science to assert that the situation is alarming, that the risk is too high and that society should do something about it.

Douglas & Wildavsky (1982) argue that the selection of risks for public attention is based less on the depth of scientific evidence or on the likelihood of danger but rather according to whose voice predominates in the evaluation and processing of information about hazardous issues. Thus, the public perception of environmental risk and its acceptable level are “collective constructs” (Douglas & Wildavsky, *op cit.*, p.186). No one definition of environmental risk is inherently correct; all are biased since competing claims, each arising from different cultures, “confer different meanings on situations, events, objects and especially relationships” (Dake, *op cit.*, p.27). Hence, environmental risks are socially constructed, and a number of factors may contribute to an issue being lost at the point of decision or action (Berger & Luckmann, 1967). Major external constraints such as the onset of a national economic crisis can lead to a problem being postponed, then altogether abandoned even before it reaches an individual manufacturing organization (Solesbury, 1976). Groups that are critical of environmental protection can weaken its power and meaning within general society and the theory and practice of management accounting.

Whilst the views of the environmental ‘critics’ are important in themselves, they also raise serious questions about the need for developing an environment-related form of management accounting, as Wildavsky (1994, p.463) explains:

The changes sought in accounting are also premised on factual beliefs about the vast harms done to the natural environment and life-forms of all kinds by modern technology. If these beliefs are unwarranted, the case for accounting change collapses.

And, as a result:

Should accountants change their preferred way of life, along with their accounting principles, if they discover that the globe is not warming? What is the value of a normative stance so easily undermined literally by changes in the prevailing winds? (*ibid.*, p.480)

Without an environmental crisis, there is no need for a change in management accounting. Furthermore, any form of radical alternative environmental accounting is effectively incompatible with the capitalist system, and may render ‘invisible’ some of the most important economic concerns that traditional management accounting helps to reveal. This argument is both logical and persuasive, but it suggests that accounting always becomes ‘what it should be’ (Hopwood, 1987). Management accounting is not merely a collection of isolated calculative practices and procedures, and must be seen

as operating and emerging from within specific organizational and social contexts. Just as the adoption and use of the discounted cash flow technique arose from social 'worrying' about how best to secure economic growth (Miller, 1991), a potential for increased acceptance of environmental accounting may also emerge from social 'worrying' about environmental dangers. Where environmental risks and dangers are socially constructed, so is the potential for the development and implementation of an alternative form of environment-related management accounting. One negative voice and influence within the social debate does not preclude the social constitution of a new and environmental-related form of management accounting. This discussion will be returned to in later chapters.

Whether a manufacturing organization accepts or rejects the principle of a need to protect the environment, it will still have to comply with environmental legislation (whatever its scientific validity) or face prosecution. As a result, attention will briefly turn to the role played by environmental legislation in the creation of environmentalism, and vice versa.

2.2 The Influence of the UK Legal Framework on Environmentalism and Accounting

Calls for the development of increased environmental legislation, and for greater environmental accountability and responsibility from corporations are nothing new (Pigou, 1920; Pearce, 1976; Pearce & Turner, 1990). The introduction of more onerous environmental legislation is believed by many (Lovelock, 1982; Pearce *et al*, 1989; Cropper & Oates, 1992) to be the most effective way of forcing organizations to consider their environmental 'externalities' during corporate decision-making. Typically, legislation imposes monetary penalties or fines for poor environmental performance by UK organizations. Such legislation has a relatively recent history, at least within the UK. The UK government's first real concern with green issues came in 1989 with its endorsement of the 'Pearce Report' (see Pearce *et al*, 1989). This report sought to introduce a number of new environmental concepts and concerns, such as the concepts of 'sustainable development' and 'polluter pays', at a macro-level. Following the publication of the Pearce Report was the enactment of the Environmental Protection Act 1990, which *inter alia* formally introduced the concept of the 'polluter pays' principle into statute. As a result of the Environmental Protection Act 1990, industry had to keep emissions below prescribed limits and had to adopt the most cost effective means of minimising waste during

production, according to the ‘best available technology not entailing excessive cost’ (BATNEEC) principle. Despite these seemingly ‘positive’ developments, the Government White Paper entitled “*This Common Inheritance*”, published in 1990, was seen by many as a failure to fulfil public expectations on environmental issues (see for example Pearce, 1992, 1994; Gray *et al*, 1993a). Chief amongst these criticisms was the fact that no proposals were laid down directing market forces towards environmental ends. The white paper *did* introduce a stricter commitment towards the monitoring of pollution emissions, reducing industrial waste and reducing energy inefficiency.

In contrast to the relatively slow progress of UK environmental legislation, the European Union (EU) is seen as a more imposing environmental regulator, both in enforcing existing laws, and in seeking to introduce new and subsequently stronger legislation. The EU has issued a number of powerful directives and actions plans on the environment, including the directive requiring environmental impact assessments (EIA) for all major projects (see Department of the Environment (DoE), 1989), and the 1992 Fifth Action Plan on Sustainability (see CEC, 1993b). Thus, UK manufacturing organizations have to monitor and comply with two different sources of regulation. It is beyond the scope of this thesis to provide an in-depth review of all the environmental legislation relevant to UK manufacturing organizations, although chapter 4 does review the way that current legislation provides an ‘external’ pressure for organizational change.

Legislation is one of the most important external influences on organizations for change regarding the environment. This assertion is supported by evidence from the case studies in chapter 8. Within various interviews there were explicit references to parts of current legal requirements and enforcement that compelled organizations to undertake ‘green’ actions. This evidence supports the view that environmental legislation influences the level of environmentalism exhibited by UK firms. However, in terms of its influence on management accounting, legislation and its associated compliance costs appear to receive little formal attention within management accounting systems; such costs are simply treated as part of total corporate overhead.

Whilst it is generally argued that environmental legislation is socially beneficial and promotes good practice from companies, it can result in negative and adverse consequences for environmental protection. A recent example of this surrounded the introduction of EU

Regulation 2037/2000 in 2002, which made it a criminal offence for ‘unlicensed’ persons to recycle refrigerators. The aim of the Regulation was to prevent the escape of ozone depleting chlorofluorocarbon (CFC) gases by only allowing the disposal of refrigerators at specially licensed recycling plants. The problem was that existing plants were already operating at full capacity, leaving no legal method of disposal (Booker, 2001). This is a clear example of how environmental legislation may have unintended consequences for society. Thus it is important to see beyond the *intentions* of legislation, and focus instead on the way it *actually* influences organizational actions regarding the preservation of the natural environment (Hannigan, 1997). The potential of the current legal framework to act as an ‘external’ influence on corporate environmentalism will be explored in chapter 4.

This literature review will now explore the process by which key environmental concepts, such as environmental responsibility and environmental accountability, are constructed within society. The social meanings and values attached to environmentalism may put pressure on UK manufacturers for environmental accountability, and as a result, create a corporate need for investment in new forms of accounting or management information in order to discharge such demands.

2.3 The Constructed Notions of Environmental Accountability and Responsibility

In Western society there now seems to be a range of parties, including the general public, governments, pressure groups and academics, requiring increased corporate accountability and responsibility for the use and abuse of the Earth’s natural resources. Such demands are a major challenge for the firms who face them and, as a direct result, may potentially cause disruption within established and existing systems of corporate accounting. This potential for increased levels of accountability to cause changes within organizational accounting is explained by Hopwood & Burchell (1980, p.12):

With greater public emphasis being placed on the wider consequences of organizational activities, be they in the social, political or economic domain, it has been argued that some form of wider accounting must emerge to complement the more narrowly focused financial accountings of the past.

This perspective is widely shared within the social and environmental accounting literature (Gambling, 1974; Ullmann, 1976; Benston, 1982; Gray *et al*, 1987; Gray *et al*, 1993b, 1995), but is largely an unproven and empirically unsubstantiated argument. Wider demands for corporate accountability *may* have the potential to change accounting and *may*

even lead to the creation of new forms of accounting. However, such changes in either corporate accounting or reporting do not seem to be occurring on a consistent or economy-wide basis. Whilst certain organizations are using new systems of accounting or financial reporting to deal with increased demands for accountability, the vast majority of companies are not (Gray *et al* 1987; Gray *et al* 1993b). Such observations are initially surprising, especially as the demands for corporate accountability are widely believed to be increasing. However, organizations can discharge their corporate accountability in ways that do not require new and sophisticated forms of accounting. This poses the question: does corporate accountability require an organization to produce an accounting 'account' of their activities or could corporate accountability be discharged by adopting socially legitimate mechanisms of internal management? Finding the answer is critical to this thesis, as it will identify the current role of management accounting within environmental management. In order to do this the remainder of this section will explore the actual meaning behind the concept of corporate accountability, and establish how UK companies are presently attempting to 'account' for, and discharge, their environmental accountability.

The notion of corporate accountability is certainly not a new phenomena, as corporate entities have long been held accountable for their financial performance and stewardship (Edwards, 1989). However, defining the concept, and the means by which a corporation may discharge its accountability, are both extremely difficult. Accountability in its broadest sense simply refers to the "giving and demanding of reasons for conduct" (Roberts & Scapens 1985, p.447), and can be seen as "a chronic feature of daily conduct" (Giddens, 1979, p.57). Seen in these terms, accountability is a continuous and never ending process, and may be discharged in a variety of different ways. Furthermore, being held accountable for a series of actions seems to be related directly to being held responsible for those actions. For Gray *et al*, (1996, p.38), accountability is:

The duty to provide an account (by no means necessarily a financial account) or reckoning of those actions for which one is held responsible.

In a similar vein, Tricker (1983, p.32) sees accountability involving:

A requirement to give an account of actions taken. It represents a feedback mechanism by those held responsible for activities. Two parties are involved – the one with the right to demand accountability: the other one with the duty to be held accountable.

As such, accountability presupposes two parties (the principal and the agent) who are bound together by a contract that imposes responsibilities upon the agent. Thus, corporate

accountability seems to involve two responsibilities or duties: the responsibility to only undertake certain actions and the responsibility to provide an account of those actions. This basic accountability model is shown in figure 2-1, with each 'principal' issuing instructions, granting rewards and ultimately controlling the resources that are made available to an organization. In turn, the 'agent' must be seen to act in an appropriate manner and supply adequate information about its actions in order to discharge the accountability required by the principal.

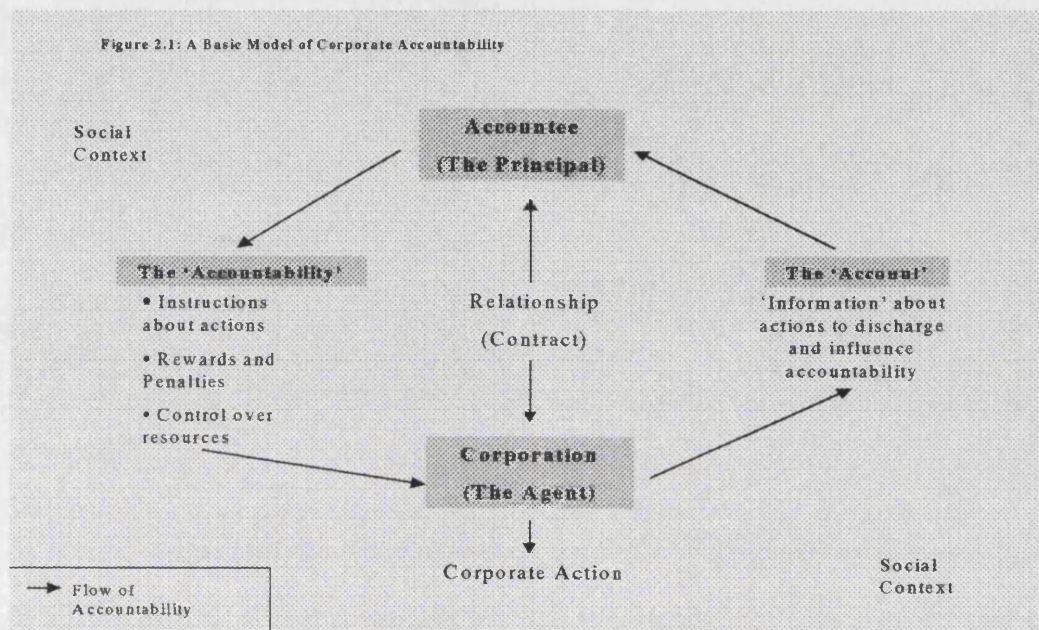


Figure 2-1 Basic Model of Accountability

Each individual organization may be an 'agent' or 'principal' in the great many different accountability relationships and social contracts that together comprise civilised society. However, the focus in this thesis is primarily on the organization as an 'agent' that is held accountable by a wide variety of different 'principals', including society, customers, employees, governments and industry bodies.

2.3.1 Modelling Environmental Accountability: Issues and Controversies

Three important issues can be derived from the basic accountability model shown in figure 2-1. Firstly, the information needed to discharge the accountability arises from a duty upon the agent and the rights of the principal. Secondly, as Roberts & Scapens (1985) argue:

'Accountability expresses a social relationship between the parties that encompasses a definition of the boundaries of the organization, the language of the principal, the moral values and moral order of the principal, and the power of superior over subordinate' (cited in: Gray *et al.*, 1991, p.6).'

Finally, the accounts required to discharge accountability need not be ‘formal’ accounts (Greer *et al.*, 1978). Indeed, formal accounts may actually obscure the discharge of accountability that they seek to enhance. Furthermore, the mere *existence* of a channel of accountability (a means whereby the information can be obtained) may be enough to discharge certain forms of accountability (Gray, 1978). This final point suggests a potential for internal EMS to discharge environmental accountability, as they provide a *means* by which information about environmental impacts could be obtained, even though such information is rarely disclosed publicly. This important point will be returned to later in this discussion.

Although the basic model of accountability shown in figure 1 is widely used across many different literatures, it has two conceptual and practical problems that need to be considered: (a) determining the exact responsibilities under each contract, and (b) determining exactly when an accountability contract actually exists (see Tricker, 1983; Stewart, 1984; Gray *et al.*, 1991; Gray, 1992). Establishing the exact responsibilities of an accountability ‘contract’ is far from easy, but this problem is never sufficient to question the ultimate requirement for accountability (Stewart 1984 and Gray *et al.*, 1991). In terms of the second problem, there is considerable disagreement within the literature about the determination of whether or not an accountability contract actually exists. Tricker (1983) and Stewart (1984) argue that unless a principal has the power to enforce the accountability, then no accountability is due:

Accountability is not discretionary. It involves rights and duties, not interests and options. To be able to demand accountability presupposes the potential to exercise power – whether it is based on legitimate authority or the wielding of some other sanction (Tricker, 1983, p.33).

This might be described as a form of ‘positive accountability’, with what *should be* being considered as *what is* (Gray, 1992). Thus, the only true accountability relationships are those which are empirically observable in the flows of information between agent and principal. For Tricker (1983, p.40), the voluntary disclosure of information by an agent is a mere *ex gratia* act, and should never be classified as accountability:

Accountability, thus, involves a right and duty; it is not to be confused with disclosure or socially responsible behaviour which involves discretion and *ex gratia* action on the part of management.

Tricker’s (1983) view of accountability involves more than simply reporting what was done: it also includes a requirement to say why actions were done and face the consequences resulting from these actions. Accountability is thus seen to imply some

degree of participation on the part of the principal. From this perspective, an agent only owes an account to those principals who choose to demand and show an ability and willingness to enforce their contractual rights. If a principal fails to exercise its rights to accountability, then those rights are extinguished (Stewart, 1984). In summary then, Tricker's and Stewart's view of environmental accountability would be limited to situations where the principal can, and actually does, enforce its rights on the agent. As a result, the environmental accountability as modelled in figure 2-1 would be severely restricted in both its scope and magnitude.

However, Tricker's and Stewart's views of accountability can be critiqued using the work of Likierman & Creasey (1985), Likierman (1986), Gray *et al* (1991), Gray (1992) and Gray *et al* (1996) who argue that accountability can also emerge from largely unenforceable 'moral rights' to information:

'We insist that accountability can be due, even when it cannot be enforced. A moral or natural right to information flows from an established (legal or non-legal) responsibility and the fact that it is not discharged at least reaffirms our reluctant arguments about the lack of democracy in modern Western industrialised society'. (Gray *et al*, (1996, p.44)

Thus, from this alternative perspective, accountability need not be legally enforceable, and can emerge from the moral and natural rights present within society. Furthermore, accountability does not require active participation on behalf of the principal (Gray *et al*, 1996). If the principal is able to enforce the accountability on the agent but chooses not to, its moral right to accountability still holds (Greer *et al*, 1978). Thus, even when a principal chooses not to enforce the accountability, the agent *should still* discharge it.

The alternative view of accountability proposed by Likierman & Creasey (1985) and Gray *et al* (1996) seems to possess greater predictive power in explaining the growth of corporate environmentalism than the Tricker (1983) view. As a result, this more 'flexible' view of accountability is the one that is implicitly and explicitly used within this thesis. However, this idea of flexibility is taken one stage further by using the work of Power (1991) to more formally appreciate the potentially fluid and socially constructed nature of environmental accountability. The basic model of accountability shown in figure 2-1 is comprised of four interrelated elements. In figure 2-1, the solid black arrows indicate the normal flow of the accountability relationship, which commences with the identification of the principal and then runs clockwise through the accountability required, the actions of the agent and ending with the 'account' needed to discharge the accountability. Power (1991)

identifies this basic model implicitly assumes that the accounting and information needed to discharge accountability are effectively derived and neutral activities that are the final element of the accountability process. Thus, the basic accountability model also assumes that there is always the same starting point and clockwise 'flow' to the accountability arrangement, with the 'account' being at the end.

The main problem with applying a clockwise 'flow' model to environmental accountability is that environmental accountability cannot be defined by reference to law alone, as was identified above. Furthermore, in trying to operationalize the environmental form of accountability, it seems almost impossible to accurately define each of the four elements that together comprise the basic accountability model shown in figure 2-1. For example, it seems almost impossible to define who the principals are, what type of accountability is expected of corporations, which corporate actions are deemed to be environmentally relevant and just how environmental accountability should be discharged. Because of these theoretical problems, Power (1991, p.37) suggests that no element of environmental accountability is prior to any other, since they are all open to negotiation:

'at the level of concrete practice we need not be committed to a formalised interpretation of the accountability structure'.

From this it is clear that the four elements of environmental accountability are socially constructed, and may potentially influence each other. As a result, the method of discharging accountability may influence, rather than merely reflect, other elements of the model. Thus, accounting practice:

'can be seen as potentially constructing, by virtue of rendering selectively visible, relations of accountability; an inversion of the traditional view of the sources of accountability' (ibid., p.39).

In order to reflect this potential, figure 2-2 presents an alternative perspective on environmental accountability that recognises the socially constructed, contested and negotiated nature of the accountability. Figure 2-2 includes unidirectional hatched arrows for the flow of the accountability contract which show that the model as a whole "is rendered hermeneutically fluid, such that no single point of theoretical elaboration can claim priority" (ibid., p.39).

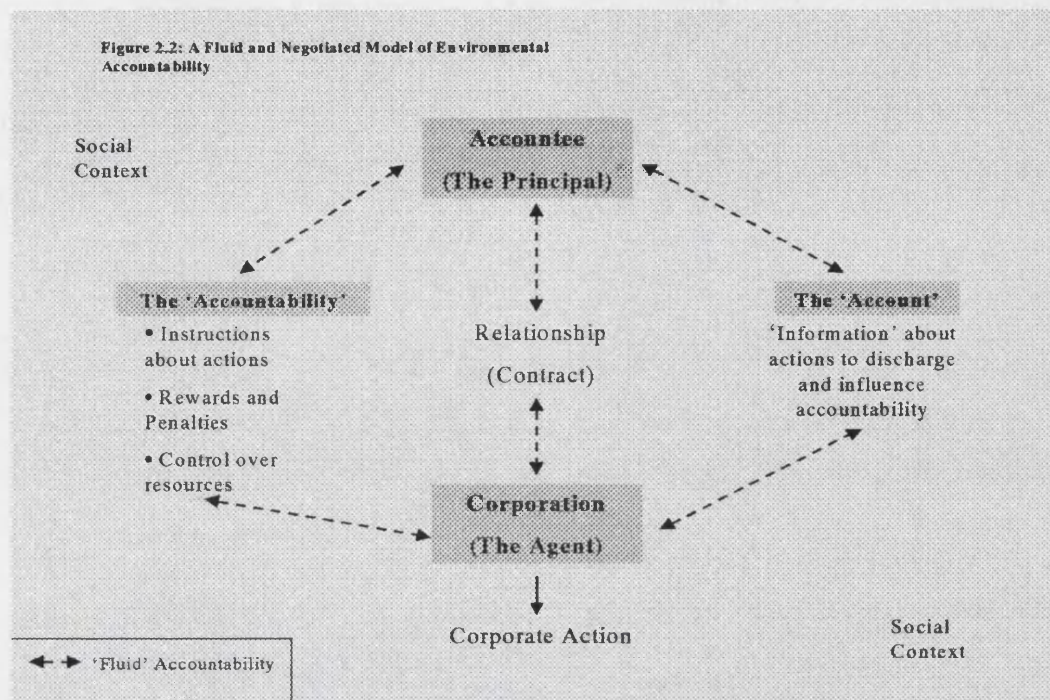


Figure 2-2 A Fluid Model of Environmental Accountability

Within the alternative model of accountability shown in figure 2-2, both the actions of the corporation and the form of 'account' needed to discharge accountability have the potential to influence, rather than merely reflect, the demands for environmental accountability. Thus, the corporation may enact rather than merely respond to social demands for environmental accountability. This important appreciation is implicitly used throughout the thesis and will be explored in more detail below during the discussion of the development of environmental accountability.

One final issue that still needs to be discussed is how the concept of power could influence accountability arrangements. Roberts & Scapens (1985) following Giddens (1976), argue that all accountability relationships can be potentially exploitative. Thus, the process of 'being held to account' determines and solidifies power relationships between the accountee and the accountor (Gray, 1992). Power normally rests with the principal, who is thus able to impose his/her social values on the agent (Roberts & Scapens, 1985). However, in terms of UK environmental accountability, the irony is that power seems to lay with the agents (e.g. manufacturers) not the principals (e.g. society). Quite simply, the principals cannot enforce their rights to environmental accountability onto agents due to their comparative lack of economic power and inability to enforce their 'moral' rights (Gray *et al*, 1996).

This section has discussed the theoretical problems associated with applying an accountability model to environmental responsibility. Attention will now turn towards developing exactly what environmental accountability might entail for UK manufacturing organizations.

2.3.2 The Development of Environmental Accountability

Discussion of social and environmental accountability has a thirty year history (see Bebbington *et al*, 1999; Lehman, 1999). The accounting literature is replete with debate concerning the need to extend corporate accountability beyond 'economic performance' (see Gambling, 1974; Linowes, 1974; Ramanathan, 1976; Gray *et al*, 1987; Gray *et al*, 1996), and provides a variety of proposals for new forms of environmental accounting, reporting and internal management accounting for discharging environmental accountability (see Dierkes & Preston, 1977; Hopwood, 1978; Preston *et al*, 1978; Burchell *et al*, 1980; Benston, 1982; Gray *et al*, 1987; Harte and Owen, 1991, 1992; Owen, 1992; Gray *et al*, 1996; Power, 1994; Harte & Newton, 1996; Bennett & James, 1998a).

Despite the weight of literature on the subject, environmental accountability and responsibility seem to defy exact specification, as they are socially constructed, contested and ever shifting phenomena (Berger & Luckmann, 1967; Berry *et al*, 1985; Burchell *et al*, 1985; Hines, 1988). The specific 'constellation' of social and organizational forces that determine accountability today may be disrupted and reconstituted tomorrow. As a result, such accountability must be seen as fluid. Responsibilities and accountabilities placed upon UK corporate entities are far from static, as Gray *et al* (1996, p.41) explain:

'The nature of what is considered to be responsibility is constantly changing and developing; moral and natural rights in a society exist but are changing and developing over time. Natural and moral rights and responsibilities will always be of this nature and thus the levels of accountability needed will be constantly changing'.

The required level and type of corporate responsibility and accountability may change as a direct result of changing societal imperatives and pressures (Berry *et al*, 1985; Burchell *et al*, 1985). For example, during times of recession, society may attach greater responsibility on manufacturing organizations to secure profitability and corporate survival and relatively less on firms to improve their environmental performance. Thus, an organization may become more or less accountable for certain of its actions as the social context in which it operates shifts. UK manufacturing entities are exposed to many different and conflicting

demands for accountability. Whether an organization needs to respond to all such demands may depend on a number of issues, including the ability of each 'principal' to enforce the accountability and the potential conflict between the demands. It seems implausible for an organization to satisfy the demands of all groups within society, and as a result, it will have to prioritise its responsibilities towards those groups who could most threaten its survival (Pfeffer & Salancik, 1978).

As was discussed earlier in this chapter, it is possible to identify different rights to accountability (Likierman & Creasey, 1985; Gray *et al.*, 1991; Gray, 1992; Gray *et al.*, 1996). Likierman (1986) identifies a number of different rights and responsibilities, such as legal, non-legal, moral or natural rights. Laws serve to lay down the minimum level of responsibility and rights and thus determine the minimum level of legal accountability (Tinker *et al.*, 1991). However, the legal responsibility for action and the legal responsibility for accountability are not equal. Environmental legislation in the UK identifies responsibilities for actions, but it does not specify responsibility to account for those actions. So, for example, an organization is legally responsible for ensuring that its operations do not result in certain forms of pollution entering local rivers, but there is no attached legal responsibility for the firm to disclose details of their environmental operations to anyone other than the Environment Agency. Indeed, apart from the requirements of the Companies Act 1985 to produce a financial report for shareholders, there are few instances of explicit accountability being established within law.

The lack of an explicit legal demand for environmental accountability seems to suggest that organizations have little reason to provide a formal account of their environmental impacts. However, for many authors on environmental and social issues (Likierman, 1986; Tinker *et al.*, 1991; Gray *et al.*, 1996), there also exists a *moral* right to accountability that stems directly from the legal responsibility for action, as Gray *et al.* (1996, p.40) explain:

‘the legal responsibility for action brings a moral responsibility to account which is only partially discharged by any legal responsibility to account. If we were content to leave accountability to only legal forces and voluntary initiative, the demands of accountability would rarely be satisfied’.

Such moral rights are largely non-legal and philosophical in nature, and, as a result, their establishment can only be “achieved through debate, education and agreement” (Gray *et al.*, 1996, p.41). The most ‘quasi-legal’ of these moral rights are the easiest to identify, as they are those that are enshrined in international codes of conduct, included in the

statements of industrial bodies of which organizations are part or may even be included within the environmental strategy of individual organizations. In contrast to these 'quasi-legal' moral rights, the more philosophical rights to accountability are harder to identify as they arise from social agreements that only 'exist' in principle. For Gray *et al* (1996) these philosophical rights can be divided into two sorts, *absolute* (unvarying with time and place) and *relative* (changing with time and place) rights to accountability. As will be shown in chapter 4, it is almost impossible in a philosophical sense to conclusively establish whether or not an organization has an *absolute* duty or obligation to be accountable for its actions towards the natural environment. Gray *et al* (1996, p.43) explain this dilemma when trying to establish moral rights to environmental accountability:

'There is now agreement that respect for the natural environment is a responsibility (of, amount others, business), but the view is a relative one because no one can show *conclusively* that respect for the natural environment is *absolutely* essential to a single criteria by which the species evaluates its actions. The *societal* (as opposed to individual) responsibility for the natural environment is therefore relative'.

If moral rights to environmental accountability are relative, one would expect society to place varying degrees of importance on environmental issues over time. As was discussed above, this does seem to be the case, especially in times of recession where organizations are urged to prioritise employment and survival rather than increased environmental protection (Hannigan, 1997). The existence of, and debate about, moral rights are certainly important constituents on corporate accountability, but it also seems that organizations have to be 'seen to be doing the right thing'. This suggests that environmental accountability emerges from an organization's need to secure organizational legitimacy. Without displaying some form of 'account' or evidence of social legitimacy, an organization will not be able to survive (Pfeffer & Salancik, 1978). Thus, it does appear that an important basis for the notion of corporate accountability can be derived from the idea of organizational legitimacy, as Hurst (1970, p.58) explains:

'An institution which wields practical power—which compels men's will or behavior—must be accountable for its purposes and its performance by criteria not in control of the institution itself'.

This view on accountability is shared by Anshen (1980, p.6):

'The conclusion is inescapable that the corporation receives permission to operate from the society and ultimately is accountable to the society for what it does and how it does it'.

For an organization to continue operating freely it must periodically supply society with some form of account that demonstrates its organizational legitimacy. Hines (1988, 1989) suggests that the survival of an organization depends on its being satisfactorily accountable since this is the only way by which social legitimacy can be conferred upon it.

Organizational legitimacy can also be gained by conforming to social ideologies about how organizations should work (Meyer & Rowan, 1977; Pfeffer & Salancik, 1978; Markus & Pfeffer, 1983). Such social ideologies create expectations about:

‘rational decision-making, hierarchical structures, proper documentation, consistency with precedents, and plans.’ (Starbuck, 1982, p.10)

Thus, an organization must create the image of conforming to these ideologies by investing in management systems and structures, such as accounting, that make it appear ‘rational’ to society. Organizations need to create an image of ‘rationality’, thereby discharging a large proportion of the accountability demanded of them by society. Being seen to be ‘doing the right thing’ is often sufficient accountability for many groups within society, and, thereby negates the need for the preparation of a formal external account of organizational actions (see Meyer & Rowan, 1977; Berry *et al*, 1985).

Due to the diverse nature of the values held in society, it seems impossible for an organization to appear universally legitimate (Pfeffer & Salancik, 1978). Thus, even though an organization conforms to the most valued social norms, it may still find itself under attack from some parts of society. Since the growth in environmentalism, profitable companies now receive criticism over their lack of environmental performance, at the same time as they are urged to provide increased economic growth and better standards of employment. As a result, an organization only needs to be accountable to those social actors that could threaten its continued survival (Pfeffer & Salancik, 1978). What is clear is that environmental accountability, responsibility and legitimacy are interrelated and socially constructed phenomena. Society places relative demands for accountability on the organization, and, an organization, through its actions can either discharge this accountability or attempt to influence the social values from which the accountability demands emerge.

2.3.3 Environmental Accountability: A Role for Management Accounting?

Having explored the meaning of environmental accountability above, it remains to discuss how UK manufacturers are currently discharging it. Within the model of accountability in figure 2-2 each element emerged from a negotiated process, and no single point of theoretical elaboration claimed priority. Thus, the type of ‘account’ needed to discharge environmental accountability is not forced on the corporation, and may be open to

negotiation. Furthermore, the 'account' itself may have the potential to influence and enact the type of environmental accountability that society requires from corporations. This more 'fluid' theoretical view of environmental accountability enables the corporation to play a more active role in the accountability relationship and does not implicitly assume that an 'external' financial account is the only method for discharging accountability. Instead of requiring an external account, the discharge of environmental accountability may simply occur when a corporation is seen to possess certain 'legitimate' forms of internal management systems. This idea, and its implications for management accounting, are examined here.

As highlighted in section 2.3.2, UK firms are now investing in a range of voluntary mechanisms for fulfilling corporate environmental accountability, although these tend to be large multinational firms or those firms who believe in such disclosures (see for example Xerox, 2000; Unilever 2000; The Body Shop, 2003). Research into these voluntary corporate disclosures suggests that the proportion of companies using them is small, and the quality, in terms of the verifiability or specificity of the data, is generally low, as:

'Very little disclosure would qualify as information under any normal criteria and very little of it indeed will contain numbers, financial or otherwise. The emphasis is on PR rather than transparency'. (Gray *et al*, 1993b, p.206)

This observation raises an issue about the *actual* form of the information that is believed needed to discharge the requirements of environmental accountability. It must be remembered that supplying financial accounting reports of results and position is only one of a multitude of ways in which environmental accountability may be discharged. Put another way, corporate accountability does not seem to demand information in either an accounting or financial form. Evidence shows that present corporate accountability can be discharged, at least to some degree, by an organization supplying voluntary non-financial data about its conduct (Gray *et al*, 1996). Furthermore, it may not be possible for an organization to provide meaningful financial data on certain actions for which it is held accountable (Gray *et al*, 1993b).

As well as the debate surrounding the *actual form* of accountability information, there is also the relatively unexplored issue of whether or not corporate accountability can be discharged by providing *internal* management information, and adopting legitimate forms of internal management systems and structures. Most of the theoretical literature on

corporate accountability implicitly and explicitly assumes that an 'external' account is the only way to discharge accountability. Under the requirements of the UK Companies Act 1989 there is a legal responsibility to publish annual accounts, but these simply do not provide sufficient information to discharge environmental accountability. Furthermore, the frequent publication of voluntary environmental reports is far from the norm (see Gray *et al*, 1994, 1996). So it seems that environmental accountability is currently discharged by a method or methods other than through issuance of an 'external' account.

Organizational research has shown how the adoption of new internal management control systems can present the perception of organizational rationality, innovativeness and sophistication that prevents the interference of external agencies in organizational operations (Sapolsky, 1972; Dowling & Pfeffer, 1975; Meyer & Rowan, 1977; Weick, 1979; Berry *et al*, 1985; Ansari & Euske, 1987; Hines, 1989). Developments in management information and control systems may not be for the purposes of enhanced decision-making, but rather as an attempt to appear socially legitimate within society. Simply being seen to conduct internal management in a socially appropriate manner can be a sufficient condition to discharge environmental accountability. This idea appears to possess considerable explanatory potential in explaining the current way in which many UK manufacturing firms are implementing ISO 14000 accredited *internal* EMS in an effort to discharge their environmental responsibility and accountability. This view of using internal management systems to fulfil public demands for environmental accountability is further supported by the widespread absence of 'external' corporate reporting of environmental performance.

The integration of environmental issues within internal information and measurement systems still remains relatively unexplored:

'Although the importance of the need to report the impact of corporate activities on the physical environment has long been recognised in the social accounting literature, very little research has appeared to date on extending internal accounting information systems to incorporate the wider range of social costs and benefits associated with corporate activities'. (Milne, 1991, p.82)

An internal environmental information system that prevents socially undesirable decisions occurring appears preferable to the external reporting of the resultant damage *ex post*. As a result, there are authors who advocate the development of a specific environment-related form of management accounting (see Gray, 1990; Birkin, 1996; Bennett & James, 1994a, 1998b) that would "strike at the heart of the organizational

accounting” (Gray, 1990, p.102). Unless such a system provides environmental accountability or social ‘legitimacy’, why would an organization implement it? Environmental management accounting information systems may be adopted by an emerging breed of ‘green’ capitalists, who value sustainability and environmentalism as much as the most fundamental ecologist (Elkington & Burke, 1987; Porter & van der Linde, 1995). However, whilst certain organizations, such as The Body Shop, appear to possess an in-built ethical stance towards environmentalism, either because of their ownership or other corporate characteristics, the vast majority simply do not. For this majority, organizational management will formally recognise and manage environmental concerns only when there are sufficient *pressures* to do so from either the market or society. The exact reasons behind such shifts in corporate environmental ideology and the implications for management accounting will be explored further in later chapters.

In summary then, the concept of environmental accountability is still a largely philosophical construct. As a result, it is difficult to prescribe the role of accounting within environmental accountability or what type of information is needed to discharge such accountability. The concept shifts in social importance and is balanced with other non-environmental social issues and cannot always be enforced. And, more importantly for management accounting, the adoption of internal EMS appear to discharge the environmental accountability required by certain external parties. Thus, environmental accountability may not require the public publication of an ‘external’ environmental account of organizational operations. Chapters 4 and 5 develop this idea by describing the array of ‘external’ and ‘internal’ forces that shape the environmental accountability of a manufacturing organization and establish the role of management accounting.

The above discussion provided a potential for developments in environment-related management accounting. However, the theoretical claims for such new forms of management accounting are not matched by empirical evidence of their use and development within UK manufacturing organizations. Whilst an environment-related form of management accounting does not currently seem to be emerging from increased environmental accountability, it may emerge from changes in the economic theories that guide the markets and businesses within society. The next section examines economics of the environment for its potential to influence management accounting practice.

2.4 Economics of the Environment: An Influence for Management Accounting?

Economics of the environment (and its various sub-branches) has emerged as bridging the gap between neoclassical economics and the biosphere, enabling environmental concerns to be incorporated within traditional human society and decision-making. Economics of the environment explicitly acknowledges the interactions between the economy and the natural environment, and, as a result, attempts to correct the environmental 'market failures' of neoclassical economic theory. Thus this new branch of economics aims to extend and reformulate the discipline, and in the process safeguard natural resources. Economics of the environment has a relatively long history, far longer than work on environmental accounting (see Pearce, 1992 and Bebbington *et al*, 1999). Because of this, the literature in economics of the environment appears to influence the terminology, concepts, debates and thinking within the literature on environmental accounting (see Milne 1991, 1996; Maunders & Burritt, 1991) and environmental management. As a result of this apparent link between economics and accounting, it is important to review the main theories and techniques of the economics of the environment in order to try and identify what environmentalism might become, and also to explore if such economic theory has the potential to influence management accounting practice.

Traditionally, the disciplines of economics and accounting do not share a unified voice (Hopwood, 1992), but the increased 'worrying' about the natural environment may be an issue where the two bodies of knowledge become entwined. The 'uncongenial twins' of accounting and economics have developed in different ways (Boulding, 1966; Whittington, 1977; Scapens & Arnold, 1986; Hopwood, 1992). Whilst the neoclassical economic framework, and in particular the neoclassical theory of the firm, played a central role in the initial development of management accounting techniques (Tinker *et al*, 1982; Scapens & Arnold, 1986), there is not now such an obvious link between the two disciplines. Accounting largely arose out of a practical need to report the results of economic activity, whilst economics arose out of a desire to understand the workings of the economy (Whittington, 1977; Scapens & Arnold, 1986; Hopwood, 1992). This explains why economics has a long established and dedicated environmental branch to its study, whilst an environmental-related form of management is still in its infancy. Financial accounting has a relatively long history of work on environmental and social reporting, but the management accounting literature has only recently started to 'worry' about the

environmental impact of organizational operations (Bebbington *et al*, 1999).

There is a generally held belief that the disciplines of accounting and economics share a close relationship, although the relevancy has been presumed rather than justified. Hopwood (1992, p.129) argues that economic theories and discourses may mould accounting practice, but suggests that there are tensions in the relationship, with accounting often seen to be providing information that is irrelevant for the purposes of economic decision-making and control:

'On one hand, economics provides a way of conveying a wider functionalism to accounting. Emphasis can be placed on its wider contribution to processes of economic decision-making and control. On the other hand, however, economics also claims to provide a way of gauging the adequacy of accounting for such ends. And almost invariably, accounting, as it is, is found to be inadequate to what it could and possibly should be'.

Economic discourse is not merely a reflective phenomenon, providing insight into the way in which the world is. It is also a constitutive phenomenon, having the potential to play a role in forging a new reality. Smith's *Wealth of Nations* can be seen as the ultimate example of this, being essentially a polemical manifesto for Capitalism (Galbraith, 1989; Cole *et al*, 1983).

Economics of the environment competes for theoretical and practical space within the field of economics, so must it within the field of economic influence upon accounting practice. Whilst the theory and discourse of economics of the environment may prove necessary for change in management accounting, it may not be sufficient to guarantee it. As Hopwood (op cit., p.127) states, other factors may provide this sufficiency:

'Accounting change is therefore never an unproblematic endeavour but rather a process that occurs amidst a complex of other influences that sometimes provide the possibility for such change and sometimes constrain the possibility of it'.

Thus, economic theories and discourses are but one influence on accounting:

'Even the possibilities for new accountings, let alone the practices of today, are shaped by socio-political values, legal presumptions, modes of bargaining, statutes and governmental regulations and a whole array of other institutional practices and bodies of knowledge that tie accounting to the contexts in which it operates'. (ibid., p.128)

Thus, the relationship between accounting and economics becomes a complex and uncertain one, and the one is not simply a reflection of the other. Present practice in accounting cannot be deduced from economic conceptions of it. Economic ideas for its reform, although articulated, find it difficult to become entangled within an accounting craft that appears to have interests beyond what are seen as its essential roles. Management

accounting is not a mere revelation of underlying economic potential, since its practices can possess an autonomy and power of their own, and enable more substantive transformations of organizational affairs than sometimes is envisaged. An investment in alternative forms of management accounting potentially results in a shift in organizational 'visibilities' and concerns. Similarly, the development of organizational EMS can reveal visibilities that serve to alter the perceived view of traditional management accounting practice.

In summary, it appears that any relationship between economics of the environment and management accounting is uncertain at best. The economics of the environment may provide the basis for the attribution of new meanings and roles to management accounting, resulting, in a potential for accounting change. Similarly, new forms of organizational management accounting and environmental management systems might moderate the operational sphere of economic practice. The environmental accounting literature is full of theoretical notions that have long been part of the common language of environmental economics, but this in itself may be insufficient for creating change within the management accounting practices of UK manufacturing organizations (Miller, 1991). Whilst the growth of environmental economics seems to be a necessary component of the forces driving environmentalism, it is just one amongst many. Environmental economics has extended neoclassical analysis to issues of environmental policy, and has resulted in the introduction of macro-level market-based environmental legislation. As management accounting has a tradition of following the assumptions of neoclassical economic theory, it may also accept certain aspects of an environmental economics that is also derived from a neoclassical economic base. Thus, it is important to review the main contributions of the economics of the environment as they have taken many of the environment arguments and applied them within economic models. As a result, such work has become a mainstream and powerful language promoting environmentalism throughout society, and may have the potential to influence management accounting when other supporting social forces are in place. The next section outlines economics of the environment for potential to change the theory underlying management accounting practice.

2.4.1 Tensions within the Economics of the Environment

Economics of the environment' is not a unified discipline. Works undertaken under the banner of the 'economics of the environment' often adopt vastly different approaches and stances. As a direct result of these differences, the legitimacy and usefulness society places on such work is effectively reduced. Whilst the economics of the environment provides an invaluable critique of neoclassical economics, it is not unified or powerful enough to become the dominant economic paradigm within modern society. In fact, much of the work on the economics of the environment is openly criticised by environmentalists for adopting a modified neoclassical framework (Common, 1998; Spash, 1999) that cannot adequately capture the full complexity of environmental issues.

The environmental paradigm of economics is divided into three distinct fields: natural resource economics, environmental economics and ecological economics (for a detailed review of the differences see Common, 1998; Spash, 2000). Natural resource economics views the natural environment as a source of materials which requires specialised management due to specific characteristics that differentiate them from manufactured goods. Within this view, the aim of natural resource economics is to describe and model the 'efficient' and 'optimal' use of commonly owned natural resources, such as fisheries, forests and minerals. By contrast, the aim of environmental economics is wider, since it seeks to link economic market models with ecological production functions to provide 'robust' values that include environmental issues. Within this general aim, the main work of environmental economists is to identify problems in the efficient allocation of resources and to expose the fallacy of neoclassical economic analysis independent of the biosphere.

The third of the fields is ecological economics, which only emerged as a formal discipline in 1987 with the formation of the International Society of Ecological Economics (ISEE). In contrast to the other two fields, ecological economics argues that understanding how economic systems interact with nature requires dismissing old approaches, such as neoclassical economics, and developing new paradigms. Ecological economists see mono-disciplinary approaches to environment-economy interactions as inadequate, and attempt to integrate and synthesise many different disciplinary perspectives, including economics and ecology. As the study of well-being in society, it has attracted economists of various persuasions (e.g. anarchist, socialist, institutional, environmental). Expanding beyond the

limits of the disciplines it combines, ecological economics intends to develop a political economy of nature that recognises the environment as a complex collection of ethical and evaluative considerations. Because of its interdisciplinary nature, ecological economics is probably more of a movement than a discipline, which makes defining its core methodology difficult.

Identifying the differences between the three fields is important, as they can help to identify the potential that each has for influencing both environmentalism and management accounting. Of the three fields, natural resource economics and environmental economics both aim to explain the flaws of neoclassical economic models and suggest market-based corrections that avoid these problems and achieve efficiency gains. Economists working in these two fields explicitly favour market-based instruments and optimal pollution levels determined by taking costs and benefits into account. Thus, both of these fields implicitly require the use of neoclassical theory as the basis for their models, and this ultimately restricts the extent to which they can 'operationalize' environmental concerns such as the value of bio-diversity, the intrinsic value of resources and the value of non-human existence (Pearce, 1992; Spash, 1999). Furthermore, such a theoretical underpinning also limits how far such work can actually influence mainstream economics:

'While neoclassical economics offers a type of theoretical rigour attractive to scientifically trained academics, this same rigour reduced environmental problems to narrow technical issues and deliberately excludes a range of potential options and an interdisciplinary approach'. (Spash, 1999, p.424)

Thus, there are a number of environmental problems that neither resource economics nor environmental economics cannot adequately address. Ecological economics has emerged as an attempt to solve such problems, but its interdisciplinary and relatively undeveloped nature renders it more theoretical than practical.

From the point of view of management accounting, the three fields of economics of the environment appear to offer a basis for extending corporate decision-making to include environmental issues:

'The recent and continuing developments in environmental economics, then, may provide a useful starting point from which to explore possibilities for extending rational corporate decision-making techniques to include environmental considerations'. (Milne, 1991, p.82)

However, as was discussed earlier, management accounting change does not seamlessly emerge from changes in economic theory. Economic discourse is but one of the many discourses that have influenced both environmentalism and accounting. As a result, it is

difficult to predict exactly how management accounting will be influenced by the economics of the environment schools. What follows is a tentative exploration of the way management accounting seems to have been influenced by the three fields of the economics of the environment.

Work on the economics of the environment has certainly helped to raise the social 'visibility' and 'value' of environmental issues, and, as a result, management accounting is increasingly being urged to consider the 'environmental' costs and environmental compliance costs of organizational operations (see Bennett & James, 1994a). Since a large proportion of economics of the environment analysis depends upon monetary data, it is not surprising to see management accounting research becoming bound up with it (Mauders & Burritt, 1991).

Of the three fields within economics of the environment, natural resource economics and environmental economics appear to have most direct relevance to management accounting as they rely on neoclassical theory, a theory which was the original basis for much of management accounting theory and practice. However, neoclassical economics emphasises the importance of the market to which an individual firm can simply react (for a discussion of this see Cole, 1983). This is not a terribly useful perspective for management accounting. Here concern centres on the behaviour of firms and of individuals within firms, and it is at this level of analysis that economists, generally, admit the limitations of neoclassical theory (Scapens & Arnold, 1986). This suggests that environmental economic theories derived from neoclassical economics will have limited use in helping to explain and predict corporate environmental behaviour. At best, these theories could be used to help provide an estimate of the total economic value or cost for either the environmental resources that a firm consumes, or the pollution that a firm generates (Mauders & Burritt, 1991). As part of this process, management accounting can plausibly provide supporting analysis of regulatory compliance costs (Bromwich, 1997).

As environmental economics and natural resource economics are both derived from neoclassical economics, their insights may prove problematic for direct application within corporate management accounting. In contrast, the methodological pluralism offered by ecological economics offers more potential to influence management accounting, although it currently offers few useful theoretical models. Scapens & Arnold (1986) argue that

methodological pluralism is as applicable for management accounting as it is for economics. They state that although management accounting has been shaped by neoclassical economics, it should be open to research from other perspectives. Just as economists and ecologists are coming together in ecological economics, could not accountants also be involved in such an interdisciplinary theory? Management accounting is more than a mere technical endeavour, and a greater appreciation is now being made of its interactions with other disciplines and professions (Hopwood, 1985a, 1987, 1990). In summary, the three fields of the economics of the environment currently seem to reveal little about the way management accounting should tackle environmental issues. Apart from raising the 'visibility' of both externalities and environmental costs, these new forms of economic theory seem to have done little to change the present theory and practice of management accounting. However, economics of the environment has helped to change the dominant social view of the interactions between the environment and economy, and this has the potential to affect the future practice of management accounting. Companies might plausibly be required to consider the environmental costs and impacts of their operations, but these are issues that management accounting has typically ignored. As a result of this, it seems vital to briefly review the major themes and developments within economics of the environment, as these may help to capture and shape the way society views environmentalism and the 'price' attached to environmental resources.

2.4.2 The Historical Development of Economics of the Environment

From an examination of the history of economic thought, it is clear that many of the building blocks that have helped to comprise economics of the environment were derived from work conducted by some of the earliest economic theorists (for a comprehensive history of economics of the environment see Pearce, 1992; Spash, 1999). Malthus (1798), Ricardo (1817) and Mill (1864) developed the idea that natural environments set an absolute limit on economy activity. This work was subsequently used by various authors to develop a distinct economic theory for depletable resources (see Gray, 1914; Hotelling, 1931). A third influence was the work by Pigou (1920) on the impact of pollution on the Pareto efficiency of a freely functioning competitive system. A fourth influence on the economics of the environment was the formulation by Gordon (1954) of the basic analytics for the optimal use of commonly owned renewable resources, such as fisheries or

forests. Finally, the critique by Little (1950) of the principles of neoclassical welfare economics was also a major influence on environmental economics.

By the 1960s, the building blocks necessary for the emergence of a distinct 'economics of the environment' were in place, and all that remained was to fit them together. It is now widely accepted that the seminal work enabling this synthesis was Boulding's (1966) essay on 'spaceship earth'. Whereas the conventional economic approach depicted the economy as a linear system (resources flowing to production for consumption and investment), Boulding drew on the two laws of thermodynamics (the conservation of energy and the law of entropy), to establish two propositions:

- a) all resource extraction, production and consumption results in waste products equal in matter/energy terms to the resources flowing into these sectors, and
- b) there is no possibility of the 100% return (recycling) of these waste products to enter the resource flow again because of the second law of thermodynamics.

Boulding's work was influential as it saw the economy as a circular rather than a linear system, with resources flowing through the economic system and then onto the natural environment as both a sink for residuals and partial recycling to become resources again. As the throughput of resources grows with economic growth, so the volume of residuals necessarily increases and comes up against the capacity of natural environments to absorb them and convert them into harmless products. In Boulding's terms, the world must cease to behave as if it functioned in a 'cowboy economy', with limitless new territory to be conquered, and learn to treat planet earth as a 'spaceship' – a circular system in which materials must be recycled, waste reduced and depletable energy resources conserved.

The views of ecologists, such as Boulding (1966), were formalised in the materials balance models of Ayres & Kneese (1969) and Kneese *et al* (1970). These materials balance models concluded that residuals were pervasive to the economic system and hence externality is pervasive. No longer were externalities seen in a manner that rendered them "a minor resource misallocation" (Beckermann, 1972, p.327). The extensive interdependence of economy and environment became established as an alternative economic ideology. Effectively, the general economic equilibrium view of an economy was extended to give a competing general equilibrium model of the economy-with-environment. Thus, the economics of the environment equilibrium locates the economy within a *constraining* natural environment. From this standpoint, two issues, which are normally described as the valuation and the existence issues, are the main focus for

economists working in the environmental arena. Firstly, how are shadow prices established for the various economic functions of the natural environments, so as to determine the optimal price-quantity of the new equilibrium? And secondly, can there be a simultaneous equilibrium within the economy and between the economy and environment? Of the two issues, the valuation issue seems to have more direct relevance and potential usefulness within management accounting. The search for techniques to place monetary amounts on unpriced environmental factors is now an established part of an alternative economic paradigm, and may influence future work on the same issue within management accounting. Furthermore, if future environmental legislation forces companies to recognise their full environmental accountability, then management accounting may need to provide information on the cost of environmental resources both within corporate decision-making and also externally to stakeholders. This issue will be returned to later in this chapter during the review of the economic techniques currently used to obtain the shadow price for environmental resources.

The emergence of a distinct discipline of 'economics of the environment' legitimises and supports environmentalism within mainstream debate. Work in the area provides an alternative and competing paradigm to that offered by neoclassical economics, and as a result has raised the prominence of environmental protection in public decision-making at both intergovernmental and governmental levels. This heightened 'environmental awareness' at governmental level seems to have flowed throughout UK society, albeit in an often *ad-hoc* and intermittent way. As mentioned earlier, more rigorous environmental legislation has been introduced, and this has tried to tackle at least some of the 'environmental externality' problem that environmental economics has highlighted. In addition, partly through the direct influence of environmental economics, cost-benefit analysis (CBA) has now become the major tool of public sector decision-making (see Bowers, 1993, 1997). These CBA exercises specifically include environmental costs and benefits, and a decision to invest is only made if the present value of the total social benefits exceeds the total social costs. Furthermore, in terms of private sector investment, environmental economics influenced the UK legal requirement to conduct an environmental impact assessment (EIA) before planning permission can be granted for any major project that may have significant environmental impact. Whilst there is no requirement under EIA to produce monetary evaluations of environmental impacts, it still

ensures that environmental impacts are formally acknowledged in private decision-making.

Whilst environmental economics has had a direct impact on both public decision-making and market regulation, it is also a major source of many of the techniques, concepts and terminology that together comprise modern environmentalism. Although many of these may themselves have been borrowed from other environmental literature, environmental economics does now have an established vocabulary and 'toolkit' of theories that have the potential to 'contaminate' and 'capture' the environmentalist debate in many other subject areas, including management accounting. This point will be returned to later in this chapter, but attention will now be turned to the actual meaning of environmentalism and the current tensions within it.

2.5 The Social Construction of Environmentalism: Terms, Concepts and Views

As was described earlier in this chapter, the literature on environmentalism has emerged from a number of different subject areas, and encompasses a variety of ethical bases and views. As a result of this, there seem to be vastly different approaches to the meaning and limits attached to the term 'environmentalism', and also the manner in which environmental resources and assets should be managed and conserved. Environmentalism, both as a term and as a subject area, is a socially constructed phenomenon (Berger & Luckmann, 1967; Hines 1988, 1991) that evolves as social debate, scientific evidence, and similar issues within society.

There is now a growing awareness and acceptance of environmentalism within many different areas of UK society. Notions of environmental protection (Pearce and Markandya, 1989), potential limits to economic growth (Boulding, 1966; Meadows *et al*, 1983; Daly, 1980), and the sustainable use of natural resources (Redclift, 1987) have moved from the fringes of mainstream thought to being central guiding concepts. Whilst this drift towards environmentalism has never been straightforward, and may be contested as social and economic conditions change, it has become an increasing pressure on UK manufacturing organizations. Environmentalism manifests itself as different pressures on organizations, and the potential range of these pressures is explored in chapter 4. In addition, environmentalism means different things to different individuals within society. Environmentalism is a contested concept within society, though it is generally accepted as

being beneficial to society to a whole. However, it does have the potential to be a negative force within society. To certain authors (Gorz 1980, 1988; Power, 1991, 1992; Sachs 1992), the social acceptance of environmentalism runs the risk of it being accepted without any corresponding change in underlying attitudes and beliefs. Instead of the 'non-green' and the 'green' individual, every person and organization sees themselves as an environmentalist. The only way to differentiate between environmental views then becomes to examine the degree of their dedication to the concept of environmentalism. From an analysis of both the environmental literature and individual attitudes there appears to be clear differences in the 'degree' of environmentalism exhibited. Now that the concept of environmentalism has become socially accepted, how the concept is implemented and made operational is vital. For many UK manufacturers, appearing to be environmentally aware may be more important than actually implementing such thoughts into programmes of action. Organizations may develop new EMS, but such systems may only be loosely coupled to organizational decision-making and action. In order to illustrate this idea, Gorz (1980, p.3) argues that although concepts of environmentalism and ecology may become socially accepted there is a danger that it may not really alter behaviour:

'Ecology is like universal suffrage or the 40 hour week: at first, the ruling elite and the guardians of social order regard it as subversive, and proclaim that it will lead to the triumph of anarchy and irrationality. Then, when factual evidence and popular pressure can no longer be denied, the establishment suddenly gives way – what was unthinkable yesterday becomes taken for granted today, and fundamentally nothing changes'.

Whether the growth of environmentalism has resulted in concrete changes is difficult to establish. The evidence of the case studies within this thesis is that firms are becoming 'environmentalists', but the actual impact that this is having on established organizational actions such as economic decision-making, and organizational systems (including management accounting) seems limited. The same conclusion is reached in the literature, with many organizations struggling to truly operationalize their commitment to environmentalism (Hines, 1991; Power, 1991; Gray 1993a *et al*, Greer and Bruno, 1996; Owen *et al*, 1997). Here, the concept of 'sustainability' will be examined to illustrate the need to recognise different environmental 'postures' adopted by individuals, institutions, professional bodies, customers and organizations. The concept of sustainability is at the heart of any notion of environmentalism, and as a result, the social construction and meaning of the term must be examined before one can truly distinguish between the different degrees of environmentalism.

2.5.1 Defining Sustainability and Sustainable Development

Disagreement [✓] than over the sustainable use of the Earth's natural resources is the central debate in the environmental literature. The concept of sustainability lies at the heart of environmentalism, and differentiates [^] between different perception within society. For ecologists 'sustainability' immediately connotes preservation of the status and function of ecological systems, but for economists, it is the maintenance and improvement of human living standards (Tomer, 1992). These tensions in definition have long been clear (for further details see Barbier, 1987; Pearce *et al*, 1989, Munasinghe, 1992; Nattrass & Altomare), but the level of sustainable development deemed politically acceptable and how the concept should be put into practice have come very much to the fore during the last fifteen years in the UK.

The concept of 'sustainability' first came to public prominence in the UK with the publication in 1987 of the so-called 'Brundtland Report' issued by the World Commission on Environment and Development (WCED). This document highlighted the need for Western society to adopt 'sustainable' forms of economic development. The Brundtland Report (WCED 1987, p.43) defined 'sustainable development', as development that:

'meets the needs of the present without compromising the ability of future generations to meet their own needs'.

The notion of sustainable development forces economists, governments, and manufacturing organizations to finally recognise the importance of the unfettered consumption of natural resources, as unsustainable consumption of these assets now involves a 'cost'. Consumption of natural resources deprives others of their use, both now and in the future, which requires compensation:

'Deteriorating environments and loss of natural resources represent one of the main ways in which today's generation is creating uncompensated future costs. Hence conservation of natural resources and the environment is crucial to achieving sustainable development'. (Pearce (1993b, p.7)

This definition of sustainability aims to conserve natural resources for future generations. However, according to such a definition, the *majority* of the actions that are generally deemed 'economic' will normally be characterised as unsustainable (Daly, 1980; Hardin, 1968; Gray, 1992; Gray *et al*, 1993b):

'Attempting to identify and develop activities which are both 'economic' and entirely environmentally benign is virtually impossible'. (Gray *et al*, op cit., p.10)

Despite this apparent problem, the various notions of 'sustainability' (see Barbier, 1987;

Pearce *et al*, 1989, Munasinghe, 1992; Pezzey, 1992; Toman, 1992; Hediger, 1999), have aroused a whole new environmental debate about environmentalism within both Western and UK society. However, certain authors have highlighted how the concept of 'sustainability', although internationally recognised, continues to suffer from ill-definition and misuse within the environmental literature:

'Like many evocative terms, the word sustainability (or the phrase "sustainable development," which more strongly connotes concerns of particular importance to developing countries) means many different things to different people and can be used in reference to a number of important issues'. (Toman, 1992, p.3)

Pezzey (1989, p.1) highlights the "fuzziness" in defining sustainability, but suggests that this has *helped* to raise the issue in areas previously thought impossible for it to reach. Despite these differences in definition, the concept of 'sustainability' has become widely recognised, accepted and valued across many different fields of study. This social consensus is crucial since it introduces sustainability to the language and rhetoric of business. However, business actions toward such an inadequately defined concept raises the concern of inappropriate responses that may limit and demean the concept, leading to its 'capture' within the *existing* language and practices of business (Hopwood, 1987; Power, 1991, 1994; Bebbington, 2001). The notion of capture will be returned to later in this chapter.

The problems surrounding definitions of sustainability appear to be nothing compared to the difficulty in implementing the concept:

'The difficult issue is in determining what has to be done to achieve it'. (Pearce, 1993b, p.7)

Disagreements about the salient elements of sustainability (see Dixon & Fallon, 1989; Pearce *et al*, 1989; Gray, 1990; Pezzey, 1992; Milne 1994; Bebbington & Gray, 1994b; Hediger, 1999; Bebbington, 2001; Mathews & Reynolds, 2001) highlight the problem in implementing the concept:

'Ascertaining more clearly where the facts lie in this debate [over sustainability] and determining appropriate response strategies are difficult problems – perhaps among the most difficult faced by all who are concerned with human advance and sound natural resource management. Progress on these fronts is hampered by continued disagreement about basic concepts'. (Tomer, 1992, p.4)

One economic interpretation of the concept of sustainable development is that the welfare of people alive today should not be increased by development activity if, as a consequence, the welfare of future generations would be reduced (Pearce *et al*, 1989; Turner, 1991). Neoclassical economists are familiar with this as the Pareto criterion,

where an increase in the overall welfare of society is only approved provided no one else is worse off (see Turner, 1991). In empirical use, such as in traditional cost-benefit analysis (CBA), this Pareto criterion has to be modified in order to incorporate the idea of 'potential' compensation, since few projects result in gains with no losses. Where there are both winners and losers from a project or policy change, neoclassical economists adopt the potential Pareto criterion in order to pronounce on economic efficiency implications. They therefore judge that there is an increase in 'potential' welfare if those that gain from a project/policy could, hypothetically, compensate those who lose. However, this neoclassical idea of 'potential' welfare is inconsistent with the objective of sustainability, as the latter is partly an equity-orientated goal (Turner 1991; Milne 1996). Sustainable development, as defined by the Brundtland Report, requires that both equity and efficiency objectives are served through *actual* compensation:

- a) by gainers now to losers now – intragenerational compensation; and
- b) by gainers now to losers in the future – intergenerational compensation.

The literature on sustainable development is generally agreed that compensation to future generations is through capital bequests (see Pearce *et al*, 1989; Pearce, 1993b). What this means is that the present generation leaves the following generation a stock of capital no less than currently exists. Capital provides the capability to generate well-being through the creation of goods and services upon which human well-being depends (Pearce *et al*, 1989). Defining the term 'capital' within sustainable development remains problematic. A widely used categorisation of capital provided by environmental economists (see Pearce *et al*, 1989; Turner, 1991) is as follows:

1. **Man-made capital** – such as machines and infrastructure, together with human knowledge and skills.
2. **Critical Natural Capital** – those elements of the biosphere that are essential for life, such as the ozone layer.
3. **Other natural capital** – those elements of the biosphere that are renewable or for which reasonable substitutes can be found, such as energy from fossil fuels.

With no special reasons for singling out one form of capital, the requirement for sustainable development then becomes one of passing on to the next generation an aggregate of capital stock no less than the one that exists now (Pearce, 1993b). This stance is labelled 'weak' form sustainability (Barbier, 1987; Pezzey, 1992; Pearce *et al*, 1989; Pearce, 1993b; Hediger, 1999), and assumes that increased levels of man-

made capital can substitute for the loss of non-renewable forms of natural capital. Within this 'weak' form interpretation of sustainability there is no special place for the environment (Pearce, 1996b); it is simply another form of capital. As such, this form of sustainable development is not a significant challenge for industrial might and human ingenuity. The 'weak' form interpretation of sustainability development is supported by certain authors (see the discussion below and Wildavsky, 1994), but is widely criticised as limiting and 'hijacking' the aims behind the sustainability concept (Pearce, 1996b; Welford, 1996, 1997; Mayhew, 1997; Bebbington, 2001). The critique of weak form sustainability concerns the alleged ability of society to substitute critical natural capital with man-made capital. For the critics, such substitution is neither possible nor desirable, and the critical natural capital stock must be passed on intact between generations, as Pearce *et al* (1989, p.43) explain:

'The alternative approach [to sustainable development] is to focus on natural capital assets and suggest that they should not decline through time'.

This is 'strong' form of sustainability (Barbier, 1987; Pearce *et al*, 1989; Pezzey, 1992; Pearce, 1996b; Hediger, 1999). Within the 'strong' form of sustainability, attention is still paid to the overall stock of capital, but the focus is upon maintaining critical environmental assets since it is uncertain whether society has the ability to recreate them. This 'strong' form version of sustainability seems to receive a level of support within both the economics, ecology and environmental management literature (see Pezzey, 1982 and Bebbington, 2001 for a detailed review of such literature), but it appears to be a difficult concept to operationalize. The exact nature of critical natural capital seems to defy definition, and varies according to the available scientific evidence (Wildavsky, 1994), making implementing such a concept difficult. The tensions between the 'weak' and 'strong' forms of sustainable development illustrate the contested nature of both sustainability and also environmental ideology, as Pearce (1993a, p.12) highlights:

'What the sustainability debate has, among other things, exposed is the insight that sustainability approaches differ because they are linked to alternative environmental ideologies'.

Thus, society includes many different forms and degrees of environmental ideology, each of which might influence the way that actions are taken to manage environmental issues and resources within society. This is a crucial point for understanding organizational responses and management accounting change in response to

environmental issues, since different organizations can undertake different responses due to their environmental ideology and their specific circumstances. The potential range of environmental ideologies are explored below. The array of factors that may influence an organization's environment attitude are modelled in chapters 4 and 5.

To this point, the discussion of sustainability development has focused on the general social tensions and disagreements about the concept. However, what remains unanswered is the potential the concept has for affecting the activities and views of UK manufacturing organizations. The concept of sustainability is now an established part of the language of environmentalism and environmental management, and is widely used in pronouncements by governments, non-governmental agencies, social groups, economists, scientists, professional institutions, business institutions and corporations. The concept is a socially constructed and constantly changing phenomenon, different meanings to alternative groups within society. Furthermore, the concept is highly political, and seems to have a different level of social importance as economic conditions change. As a result, it is not surprising to observe organizational managers who appear to be struggling to both understand and operationalize the concept (Bebbington & Gray, 1994a; Bebbington & Thomson, 1996).

Sustainable development is widely thought to be a social as well as an environmental issue, since its agenda asks both social and environmental questions with respect to organizational activities (Gladwin, 1993b; Hawken, 1993; Bebbington, 2001). From the environmental dimension, one needs to consider the extent to which organizational activities are environmentally sustainable. Thus, the concern is on the 'efficiency' with which the environment is used, termed 'eco-efficiency' (Gladwin, 1993b; Hawken, 1993; Bebbington & Gray 1994a, 1994b; Bebbington, 2001). Although the 'deep green' environmentalists would suggest that economic development can *never* be truly environmentally 'sustainable', the vast majority of writers on environmentalism disagree. The consensus argument is that it is possible to achieve some form of ecologically efficient economic development, and that this 'eco-efficiency' should be the aim. However, 'eco-efficiency' cannot guarantee sustainability, since it makes no effort to meet the needs of certain members of society. Thus, a social dimension to sustainable development is introduced, termed 'eco-justice'. Eco-justice is concerned with ensuring that development meets the needs of present and future generations, and

also results in a fair distribution of benefits. Eco-justice may therefore have a substantial impact on manufacturing organizations operating in the developed world, since they may have to compensate 'poorer' parts of society. Whilst the relative weights that should be attached to eco-efficiency and eco-justice within sustainable development is not made clear within the literature (see Bebbington, 2001), it seems apparent that eco-efficiency is the lesser challenge to the way that business is presently conducted in Western economies. As is evident from the case studies in chapter 8, there are organizations attempting to adopt at least some degree of eco-efficiency through the use of environmental management systems, but not surprisingly, there are few that are currently giving serious consideration to the issue of eco-justice.

Table 2-1 Definitions of Sustainability

| | 'Weak' Form Sustainability | 'Strong' Form Sustainability |
|-----------------------|--|---|
| Eco-Justice | <p>Intragenerational equity is another issue, and as a result, it may be harmed.</p> <p>Sustainability focus is on environmental issues.</p> <p>Focus on 'Western World'</p> | <p>Intragenerational equity is an integral part of sustainability.</p> <p>Concern for Third World as well as 'Western world'.</p> |
| Eco-Efficiency | <p>Environment as resource.</p> <p>Concern to simply prevent environmental catastrophe that would threaten society.</p> <p>Market and Technological Forces are solution to problems.</p> | <p>Humans and nature as one. Harmony sought</p> <p>Other species must be maintained.</p> <p>Major challenge to economic development. Technical fixes create further problems.</p> |

The two dimensions of eco-justice/eco-efficiency and weak/strong form sustainability are a powerful method for understanding the concept of sustainable development as viewed by organizations. Table 2-1 brings together the two dimensions by adapting work from Gray *et al.*, (1993b), Bebbington & Thomson (1996) and Bebbington (2001). Table 2-1 is a pedagogic device that attempts to illustrate the range of different viewpoints and tensions that may occur within societal and organizational views of sustainable development. Positions on the weak/strong continuum of table 2-1 are a function of the organizational perception of the seriousness of environmental and social crises, and positions on the eco-efficiency/eco-justice continuum indicate the relative weight given to each issue.

Certain organizations give zero consideration to the ideas of environmental protection and social justice (apart from legal compliance), and for those organizations the table will be irrelevant. This attitude seems prevalent amongst the majority of UK small and medium sized enterprises (SMEs), with neither the resources nor social demands to change (Winter & Ledgerwood, 1994; Gibbon & Holland, 1995). Where organizations do alter their stance and begin to adopt the 'weak' form of sustainability, they see no need to change their present mode of economic development. They view sustainability as being compatible with some modified version of 'business as normal' (Bebbington, 2001). Implementation of EMS and giving greater regard for eco-efficiency is perceived as adequate for such firms. In contrast, organizations adopting the 'strong' sustainability approach seek to adopt a new form of economic development that redefines the ends which human populations (especially in the West) should seek. Since the goal of pursuing increasing profits via expanded levels of economic growth has to be severely revised, it is clear that few, if any, UK manufacturing organizations come anywhere near to sustainability:

'a sustainable business is one which leaves the environment no worse off at the end of each accounting period than it was at the beginning of that accounting period. For full sustainability, the sustainable business would also re-dress some of the excesses of current un-sustainability and consider the intragenerational inequalities'. (Gray & Bebbington, 1996, p.3)

It seems impossible for corporations to become 'strong' form sustainable without changing the "rules of the game" (Bebbington & Gray, 1994b, p.24) under which they forced to operate. The ability of manufacturing organizations to pursue sustainability is hampered because of the primary social demand for economic growth and profitability. Despite evidence suggesting that UK companies are not actively pursuing the goals of sustainable development, there is a growing literature on how to account for and provide information on sustainable development (see Bebbington & Gray, 1994b, Bebbington & Thomson, 1996; Bebbington, 2001). The continuums from Table 2-1 can be used as the basis for envisioning and categorising the forms and types of organizational accounting that may be required under the different views attached to sustainable development. The types of accounting that might be generated will be explored in chapter 7, but the principle is that as sustainable development becomes adopted by an organization it may create the potential and demand for new forms of management accounting (see Gray *et al* 1993b, Gray & Bebbington, 1996; Bebbington, 2001).

All the disparate literature concurs that sustainability is proving very difficult to operationalize within Western society (Bebbington, 2001). Not surprisingly, UK governmental support for the term seems to be variable, and is clearly influenced by the level of social support granted to environmentalism (see Elkington & Hailes, 1989; Hannigan, 1997). Without government support behind its implementation, sustainability does not appear to be on the strategic agenda of most manufacturing organizations. In fact, the great majority of organizations do not seem to be in a position to begin implementing it within their decision-making (see Bebbington, 1991; Bebbington & Gray, 1994b). Furthermore, empirical evidence from the case studies in this thesis, together with the wider literature, shows that organizational management accounting and environment-related management accounting systems are not currently providing any data or information relevant to the systematic measurement and appraisal of sustainability (see chapter 8 and Bebbington & Gray, 1994a, 1994b; Wycherley, 1997; Frost & Wilmshurst, 2000; Bebbington, 2001).

Since the concept of sustainability strikes to the very heart of capitalist society, none of this may be surprising. Still it seems clear that the pursuit of some form of sustainable development continues to have widespread support within society, even though the concept continues to prove difficult to both define and implement. Sustainability is now part of the language of many different disciplines and is frequently referred to by various social actors. Despite this, however, the concept appears to have had little direct impact on either the corporate environmental ideology or management accounting of the vast majority of UK manufacturing organizations.

Now that the social meaning attached to the concept of sustainability has been explored, it seems appropriate to revisit the notion of environmentalism, and attempt to differentiate the different meanings attached to the term in both the literature and society. Only by understanding such differences can one understand the potential extent of the 'green' pressures facing both UK manufacturing organizations and management accounting. Furthermore, an increased understanding of the boundaries of environmentalism enable one to categorise the different degrees to which organizations may choose to become 'greener'.

2.5.2 Defining Environmentalism: Categories and boundaries

It has been shown that whilst environmental terms now have common usage in many different literatures, the meanings attached to them can be very different. Reconciling these different uses of similar terms led to one plausible attempt to extract and identify four main decision approaches to environmental resources (Norton, 1989; Turner, 1991, Pearce, 1996b). Within each of these approaches, the relative emphasis individuals place on economic, social and ecological values changes (Milne, 1996). Turner (1991) characterises these four basic world-views within environmentalism and environmental resource management (although he stresses that certain views can overlap categories):

- Resource-exploitative, growth orientated world view
- Resource-conservationist, managed growth world view
- Resource-preservationist, severely constrained growth
- Resource-preservationist, extreme view

Turner's classification will be used to structure the present discussion of the limits and nature of environmental ideology. Although Turner's classification of environmental approach is only one of many contained in the literature (see O'Riordan & Turner, 1983; Norton, 1989; Milne, 1991), it is used here as it is one of the most recent, and has become widely used in the environmental literature. Of the four categories, the second seems to receive the most attention within the environmental management, environmental economics and environmental accounting literatures, whilst the first category seems to be the present attitude of a great many organizations, especially small manufacturing enterprises (SME) within the UK economy. Table 2-2, adapted from work by Pearce & Turner (1990) and Pearce (1993b), tries to identify some of the main differences with Turner's four categories, and each position will be discussed in more detail below.

Taken together, the four approaches shown in table 2-2 demonstrate the upper and lower boundaries of environmental ethics and environmentalism. Each approach influences the type of decisions an organization makes, and thus the types of management accounting information and environmental management information needed for decision-making. Furthermore, a shift from one environmental approach to another may require supporting changes in management accounting and other information systems; each may require completely different forms of management accounting and environmental accounting information. Such differing information

requirements become a challenge to the established organizational dominance of management accounting, since the management accounting function might not be able to either supply or control such information. These assertions will be more fully developed in chapter 7, but it is first necessary to concentrate on describing the differences between the four environmental ideologies.

Table 2-2 Dominant Ideologies in Environmentalism

| Dominant Ideologies within Environmentalism | | | |
|--|--|--|---|
| Resource-exploitative, growth orientated world view | Resource-conservationist, managed growth world view | Resource-preservationist, severely constrained growth | Resource-preservationist, extreme view |
| Technocentric | | Ecocentric | |
| Anti-green economy, unfettered free markets | Green economy, green markets guided by economic incentive instruments (EIs) e.g. pollution charges | Deep green economy, 'steady-state' economy regulated by macro-environmental standards and supplemented by EIs. Constraints on economic growth are required because of physical and social limits | Very 'deep green' economy. Heavily regulated to minimise 'resource take' |
| Aim to maximise economic growth (gross national product). | Modified economic growth | Zero economic growth; zero population growth | Reduced scale of economy and population are essential. |
| Unfettered market mechanisms in conjunction with technological innovation will ensure infinite substitution possibilities capable of mitigating all 'scarcity/limits' constraints. | Infinite substitution rejected. Sustainable growth is a practicable option as long as certain resource management rules are followed. Constant capital rule | Economic activity must not consume critical natural resources. Health of whole ecosystems very important. Constant critical capital | Acceptance of bio-ethics (i.e. non-conventional ethical thinking which confers moral rights or interests on non-human species). |
| Instrumental value (i.e. recognised value to humans) in nature | Extension of ethical reasoning 'caring for others' motive. Instrumental value in nature | Interests of the collective take precedence over the individual; Primary value of ecosystems and secondary value | Intrinsic value in nature (i.e. valuable in its own right regardless of human experience) |
| Very weak sustainability | Predominantly 'weak' form sustainability | Predominantly Strong 'form' sustainability | Extreme sustainability |

2.5.2.1 Resource exploitative approach to environmental management

This approach embodies the conventional economic view, where preferences and valuations are expressed in the market place through the price mechanism. Pre-eminence is given to economic value and economic efficiency, whilst scant regard is granted to notions of environmental and social efficiency. Until the recent developments in environmental legislation, resource exploitative manufacturing organizations could consume environmental resources and generate environmental pollution largely at zero cost to

themselves. Thus, largely non-marketable assets, such as the majority of environmental resources, will either be ignored (granted a zero value) or only costed at their commercial use value. From this anthropocentric ideology the environment is viewed as a collection of goods and services of instrumental value to humans i.e. nature is valuable because humans use it, directly or indirectly, or rely on it for life support.

The resource exploitative ideology is implicit in many current market transactions, and was typical of early public sector cost-benefit analysis (CBA) studies, which typically concentrated on the commercial or market effects of projects (see Pearce & Turner, 1990; Pearce, 1992; Hanley *et al*, 1997). Quite clearly, the resource exploitative ideology implicitly favours an economic growth ethic, and suggests that human ingenuity will solve any problems associated with natural resource consumption (see Wildavsky, 1994). Within this approach, it is believed that technological advances and substitution mechanisms can resolve resource scarcities for future generations, as Turner (1991, p.214) explains:

‘Future generations will be richer and better able to cope with any environmental cost burdens they receive from earlier economic activities undertaken by their ancestors’.

The vast majority of environmentalists and environmental economists (see Pearce *et al* 1989; Pearce & Turner, 1990; Pearce, 1993b, 1995; Hanley *et al*, 1997) fundamentally disagree with the idea that the unfettered pursuit of economic growth, and associated profit maximisation by firms, will grant society with the resources and technologies necessary to cope with any future environmental problems. However, as discussed in section 2.1.1, there are a number of parties that strongly defend the resource exploitative ideology (Friedman, 1970; Wildavsky, 1994), claiming that organizations must profit maximise. These follow the lead of Coase (1960) and argue that the market will ultimately guarantee the control of environmental resource use and abuse. Despite such views however, it is clear that Western societies are moving away from a continued acceptance of resource exploitative, ‘non-environmentalist’ ideology. As will be described in chapter 4, UK manufacturing organizations increasingly face a diverse range of pressures for them to become ‘greener’, and markets are starting to value environmental resources and subsequently price their use and abuse into market prices. A clear example of this is in the cost of disposing of waste products. Prior to the introduction of recent UK environmental legislation, the main concern for a manufacturer was the market price of raw materials. However, after the introduction of recent legislation, manufacturers are now responsible

for the disposal cost of product packaging, the disposal cost associated with waste products and the fines and charges associated with pollution emissions into both air and water. Furthermore, the environmental actions of manufacturers could potentially be subject to monitoring by social pressure groups, and if such groups highlight bad performance, it could cause customers to abandon the firm.

All that remains is to consider the impact that this ideology could potentially have on the form and practice of management accounting. Quite evidently, conventional management accounting, as reflected in the content of the most popular texts and much research literature, seems entirely consistent with the traditional neoclassical resource exploitative ideology (see Milne, 1996; Burritt, 2004). As was described in section 2.4, management accounting research has a tradition of following the assumptions of neoclassical economic theory (see Scapens & Arnold, 1986; Hopwood, 1990, 1992) and focuses on market based transactions and values, which ultimately prevents it from including alternative social and ecological values for environmental assets. Implicitly, the conventional approach to management accounting “accepts the axioms of material value and abundance” (Milne, 1996, p.142). Milne (1996) shows that even the management accounting research that does challenge the neoclassical underpinnings of traditional management accounting addresses issues other than those of material value and abundance (e.g. motivational and behavioural issues). Conventional management accounting ‘fits’ the resource-exploitative ideology perfectly, and as a result, accounting need not change if such an ideology is followed. However, as was highlighted in both chapter 1 and earlier in this present chapter, management accounting systems and practices may originate for many different reasons, and fulfil roles other than to supply decision relevant information (see Earl & Hopwood, 1980; Hopwood, 1987). As a result, new forms of environment-related management accounting techniques and practice may emerge in order to make the organization appear legitimate, whilst the organization itself may retain a resource exploitative ideology within its decision-making. During the discussion of each of the remaining three of Turner’s environmental ideologies, this caveat about the resulting changes in management accounting should be appreciated and applied.

2.5.2.2 Resource-conservationist approach to environmental management

In contrast to the resource exploitative ideology, an organization adopting a resource-conservationist approach embraces environmental management and recognises the need to improve the efficiency with which natural resources are consumed during the generation of economic growth. Within this view, economic growth should not always be pursued at the expense of the natural environment because it is recognised that technology and resource substitution cannot be relied upon to solve all problems associated with resource scarcity. Whilst it is recognised that economic activity will always use some natural resources, provided the amount of resources used per unit of Gross National Product (GNP) decreases at a greater rate than GNP increases, the impact on the environment can be reduced per year. As a result, both the market and organizational actions should be adjusted to help conserve natural resources. Environmental 'externalities' should be reflected in prices so that markets generate economic activity that recognises the cost of any associated negative environmental impact.

In order to help operationalize the resource conservationist ideology, the apparent failures of the monetary approach of market prices would be overcome by using additional techniques to highlight environmental effects (Pearce & Turner, 1990; Turner, 1991; Gray, 1990). For example, environmental impact assessment (EIA) can be used to capture the environmental consequences associated with a decision in a non-monetary form (see Ball *et al*, 2000; Turner, 1991). The full range of environmental valuation and costing techniques that could be used to capture environmental impacts will be reviewed in chapter 7 during the discussion of how organizational management accounting could potentially become more environmentally focused.

Thus, traditional economic decision-making is enriched by the introduction of non-market indicators and values, based on public preferences, to ensure that an 'intact' stock of capital assets is conserved for each future generation. 'Intact' does not mean physically untouched, but rather that any depletion must be compensated for by technological advances or capital investment (e.g. conservation of renewable resources, enhanced technology and recycling innovation). Whilst this conservationist form of environmental ideology still retains an anthropocentric bias, it does try to introduce and appreciate the non-utilitarian values of environmental assets by introducing a comprehensive notion called 'total economic value'

(TEV):

The total economic value concept encompasses use, option and existence values. Provided that this value is generally recognized, humans will make arrangements so as to adequately protect their environmental assets (Turner, 1991, p.218).

The concept of TEV will be discussed in section 2.5.3 below, but Turner's observation does suggest that some notion of sustainability is made operational within the resource conservationist ideology. This ideology generally adopts the 'weak' form of sustainability rather than the 'strong' form. Economic growth that reduces natural assets *can* sometimes be pursued if it ultimately results in no reduction to the overall stock of capital present within society (see O'Riordan & Turner, 1983; Pearce, 1993b). Sustainability is introduced as an issue since the ideology includes an appreciation that technology and resource substitution may have their limits.

In terms of how the resource-conservationist environmental ideology might impact upon management accounting, there is now a growing awareness that present accounting systems are inadequate for capturing the effects of corporate environmental impacts and need to change (Dierkes and Preston, 1977; Benston, 1982; Gray, 1990; Maunders & Burritt, 1991; Milne, 1991, 1996; Bennett & James, 1994a, 1998b). The potential array of environmental-related management accounting techniques and systems that have been described in the literature and actually used by UK manufacturing organizations will be discussed in more detail in chapters 7. However, as was indicated earlier, it does not immediately follow that management accounting needs to change just because the organization has changed. If an organization adopts a more resource conservative ideology, its management accounting systems might remain completely unaltered by the change in culture. The evidence from the case study data provided in chapter 8 suggests that this might currently be the case, since the 'everyday' function of organizational management accounting remained largely unaltered and decoupled from corporate environmental initiatives.

2.5.2.3 Resource-preservationist approach to environmental management

In contrast to the previous two anthropocentric ideologies, the resource-preservationist ideology is an ecocentric approach that puts the protection of the environment before the continual pursuit of economic growth. Turner (1991) and Pearce (1993b) *inter alia* suggest that there are two distinct sub categories, the 'zero growth' version, and the more extreme

‘reduced growth’ version. Whilst both categories put the natural environment to the fore, they differ in the way economic growth is constrained as a result.

The ‘zero growth’ resource-preservationist ideology draws on Leopold’s (1949) writings on the ‘land ethic’. Leopold argued that society must be capable of passing on an undefiled earth to all future generations, and that the utilitarian criterion of maximising production must be constrained with additional safeguards. According to Turner (1991, p.219, emphasis added), Leopold’s ideas can:

‘be viewed as an argument for a two-level criterion of ecosystem health. A conservationist criterion, which applies to particular productive systems (agricultural systems, forests and wetlands, etc.) over the duration of their exploitation, must be supplemented by a broader criterion of ecosystem health, applying to entire geographical areas. Ecosystem health *requires the maintenance of biological diversity*’.

Thus, the health of the whole ecosystem is put before any attempt to pursue economic growth. In fact, pursuit of economic growth is virtually impossible without some negative impact on biological diversity, so a ‘zero growth’ or ‘steady state’ economy is society’s aim. Under the resource preservationist ‘zero growth’ approach, environmental standard setting and environmental impact assessments have power over traditional economic analysis. These pre-emptive standards become the primary objective, and are largely based on non-economic criteria i.e. scientific, cultural and ethical grounds. The power of economic analysis is secondary, and is only used to assess the most cost-effective way of achieving the desired environmental standards (Turner, 1991). ‘Strong’ form sustainability is followed. The preservation of the stock of critical natural capital is seen as essential for ensuring the health of whole ecosystem and is the only way of maintaining the health of the ecosystem for future generations.

In terms of management accounting, this ideology certainly appears to require additional investment in new forms of accounting systems that measure the ‘strong’ form variety of environmental sustainability (Gray, 1992; Milne, 1996). There is a slowly growing body of accounting research that explores accounting for sustainability (for a review see Bebbington, 2001). However, as was indicated earlier in the discussion of sustainability, much of the research uses different concepts and approaches, which makes it difficult to classify as a single body of work. The developments in accounting for sustainability relevant to management accounting will be reviewed in more depth in chapters 7 and 8.

Clearly, this ideology is not one that is presently followed by UK manufacturing

organization, but does reflect the attitudes of some social groups that pressure organizations to change.

2.5.2.4 Extreme Resource-preservationist approach to environmental management

The extreme resource-preservationist ideology can be characterised as that shared by the 'very deep green ecologists', the so-called 'green fundamentalists'. Authors who share this view to environmentalism argue that environmental resources have an 'intrinsic' or 'inherent' value, which do not necessarily provide any function to human society. This "bio-ethics approach" (Turner, 1991) to environmental protection is immensely difficult to operationalize since it has the potential to effectively render decision-making impossible when ranking intrinsic valuations with instrumental ones (Wildavsky, 1994). Turner (1991, p.221) explains the problems associated with applying this approach within Western economies:

'There seems to be little prospect of relaxing the modified economics paradigm to embrace wholly the bioethics paradigm. However, it can be argued that the incidental effect of employing a constant natural assets rule is to protect the values that the bioethicists believe are in nature'.

The extreme resource-preservationist ideology suggests that the world would have to change radically, with reduced economic growth and reduced levels of human consumption. As such, it seems impossible for a UK manufacturing organization to adopt such an ideology without destroying itself in the process. This ideology suggests that management accounting has no role in valuing nature (Hines 1991; Maunders & Burritt, 1991; Cooper 1992). Furthermore, from this ideological perspective, traditional management accounting is implicated as playing a major role in actually *causing* the current environmental crisis and so should be completely removed from the organizational decision-making of an environmental corporation.

As was explained at the start of this chapter, this 'upper boundary' (extreme) ideological view on environmentalism is not widely shared by either governments, corporate entities or the general public. As a result, this approach to environmentalism is not reviewed in much detail, although it is used in chapter 4 to explain the potential for organizations to face direct action from certain environmental pressure groups.

2.5.3 Constructing the Economic Value of Environmental Assets and Resources

From the above discussion it is clear that the terms 'environmentalism' and 'sustainability' are used interchangeably within the environmental literature and that different environmental ideologies are present within society. Different individuals and different social groups each seem to have their own view on the degree to which economic growth should be balanced with the conservation and protection of environmental resources. As a direct result of this, the implications of environmentalism for management accounting are not entirely clear. At least to some degree, management accounting may have to be used to systematically monitor and consider the environmental costs of organizational operations. This potential for management accounting may be forced on the company directly through legislation, or indirectly through the growth of environmentalism in its customers and wider society.

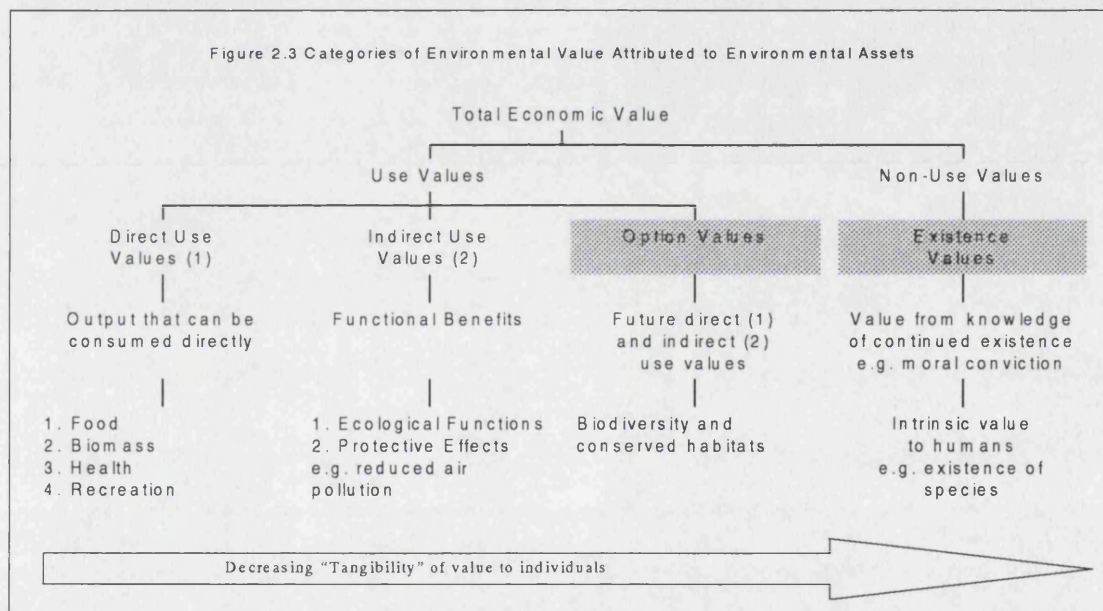
If management accounting is to be involved in the monitoring of environmental costs and values, then it must prove capable of obtaining a value for what is essentially a non-marketable asset. A great deal of work attempting this has resulted in a whole new notion of economic value, along with alternative methods of obtaining such values in decision-making situations. This section will review these alternative economic valuation concepts and techniques, and discuss their potential utility for use within organizational management accounting systems.

Despite the current lack of consensus on the correct limits for an extended notion of economic equilibrium, environmental economists and other environmentalists have actively pursued the development of shadow pricing of environmental factors, resources and assets. However, even a brief survey of the environmental literature suggests that establishing the shadow price or economic value for environmental resource is far from straightforward (see Munasinghe, 1992; Pearce, 1992). Within the environmental literature there are now a diverse array of notions and categories that each aim to capture the 'value' or 'worth' of natural environmental resources. Some of these 'values' have been variously described as: use, non-use, direct, indirect, option, bequest, existence, intrinsic, ecological, scientific, aesthetic, cultural, historic and therapeutic value (see Pearce, 1976, 1992; Pearce *et al*, 1989; Milne, 1991; Cropper and Oates, 1992, Hanley *et al*, 1997). This diversity in the concept of value reflects the different approaches and ideologies of economists, lawyers,

environmentalists, ecologists and ethicists when trying to identify the term 'environmental value'. More importantly however, it also reflects the lack of a standardised set of terms, concepts and definitions for environmental values, sometimes even within the same discipline (Pearce, 1993).

Despite the apparent disagreement on how to value environmental assets, within the economics of the environment literature a consensus has been built around the following categories of environmental value: direct, indirect, option and existence. Together, these four categories of economic value are thought to capture the TEV of any environmental asset. TEV is illustrated in figure 2-3.

Figure 2-3 Environmental Values attributed to Environmental Assets



As shown in figure 2-3, the concept of TEV is composed of values that include both market and non-market based values, and these range in "tangibility" from 'direct use' values, such as use of forests as timber, to 'existence' values, such as the ability of humans to look at and photograph a forest. Although the concept of TEV appears to have immense logic, it does raise a number of theoretical and practical questions that need answering before it can be applied within management accounting theory and practice. Firstly, what exactly do these economic 'values' represent? Secondly, do any of the four components of TEV impact on each other? Finally, how exactly are these values obtained in the absence of markets? Each of these concerns will be dealt with in turn.

Pearce (1993a) identifies that the problems caused by the confused terminology of economic valuation often obscures what is actually being valued. For Pearce (op cit., p.13), what is being valued is not the environment, but the *human preference* for environmental change:

'The language of economic valuation is often misleading. Studies speak of 'valuing the environment' or 'pricing the environment'. Economists are apt to speak of the 'the environment as a commodity' which leaves them open - perhaps justifiably - to charges that this is all the environment is worth. All these terminologies generate an unfortunate image as to what the activity of economic valuation involves. What is being valued is not the environment, but people's preferences for changes in the level of risk in their lives'.

Thus, the economic valuation of environmental assets is essentially about discovering the demand curve for environmental goods and services, the values which humans beings place on the environment. Individual human preferences reveal either the willingness to pay (WTP) for, or willingness to accept (WTA) environmental change. These individual preferences can be aggregated together to provide a total WTP or WTA that represents the economic value of an environmental asset. Whilst economic theory suggests that WTP and WTA should not differ (see Cropper & Oates, 1992), empirical studies have shown marked differences between the two concepts (see Pearce & Turner, 1990; Bowers, 1997). Despite this, WTP is more widely used, and will be concentrated on here.

This use of WTP to create a 'shadow price' for either securing an environmental benefit or preventing an environmental loss has helped awareness of environmental cost and value, and has allowed environmental change to be incorporated into decision-making systems, such as cost-benefit analysis (see Pearce & Turner, 1989; Pearce, 1992, 1993a). Furthermore, it has allowed the economic damage done to national economies by resource depletion and pollution to be visualised in monetary terms. For example, in a study of industry in the USA, Freeman (1982) estimated that national damage avoided by deliberate environmental policy was \$26 billion, or 1.25% of GNP, in 1978. Whilst the empirical validity of such studies may be open to question, their monetary focus allows them to act as valuable inputs into the social debate for further environmental regulation of manufacturing organizations.

Despite the widespread use of the WTP approach to economic valuation, it is not without its critics (see for example, Hines, 1991; Maunders & Burritt, 1991; Cooper, 1992; Wildavsky 1994). For such critics, the feasibility of obtaining accurate estimates of WTP is

questioned, as Turner (1991) states that people may undervalue the needs of others. Furthermore, placing a monetary estimate of value on an environmental asset is ultimately flawed as it is impossible to fully capture the value of an environmental resource:

‘With many environmental assets no meaningful monetary valuations can be derived. Progress has not been made on the matter because, from its very nature, progress cannot be made. However it is not necessary to value such assets in order to devise environmental policies’. (Bowers, 1997, p.139)

For the ‘deep greens’, obtaining the ‘intrinsic’ value of an environmental resource from a human perspective demeans the ‘rights’ of Nature, as intrinsic value will be very different if obtained from the point of view of Nature (see Turner & Jones, 1991). As a result, the value of the total ecosystem is much greater than the sum of the values of the individual functions. Total economic value may not, after all, be total.

2.5.4 Economic Techniques for Valuing Environmental Assets

When using TEV and WTP, the economics of the environment literature provides an array of alternative valuation techniques for eliciting the TEV of an environmental resource or externality. Used primarily within public decision-making situations by governmental and non-governmental bodies, the techniques have provided estimates of the relevant environmental costs mainly for inclusion within public CBA studies. Although each of these techniques have been typically used to value mainly environmental concerns for use in public decision-making, they might potentially be used to also provide measurements for use in a private decision-making environment, such as within a manufacturing organization (Milne 1991, 1994, Gray *et al*, 1993).

Apart from the work of Milne (1991, 1996), there has been little research investigating the potential use of these economic techniques alongside management accounting within corporate decision-making situations. Milne (1991) concludes that the techniques currently appear to hold limited potential for their wholesale use within either corporate decision-making or by management accountants, given the dominant environmental ideology held by most firms. Although all of these valuation models appear to have limitations for use within private sector corporations, they do provide a valuable role in rendering ‘visible’ the non-market value of environmental resources and externalities. The ‘visibility’ they provide has served to raise social awareness of the ‘value’ of environmental assets, and seems to have increased the social demands for environmental protection (Munasinghe, 1992; Pearce, 1992, 1993a). Furthermore, these environmental valuation techniques are now an

influential and established part of the environmental and environmental economics literature, and they must be reviewed in order to explore their potential role in the social construction of any environment-related management accounting.

Quite obviously, the majority of the valuation techniques provide values obtained from analysis of conventional markets, but there are some that derive their valuations from analysis of implicit and constructed 'artificial' markets (see Pearce, 1976; Bowers, 1993). Furthermore, the range of techniques also make use of both actual and potential behaviour. The main techniques are shown in table 2-3, and are categorised according to which type of market they rely on and also whether they utilise actual or potential behaviour.

Table 2-3 Taxonomy of Economic Valuation Techniques

| Taxonomy of the Main Economic Valuation Techniques | | | |
|--|----------------------------|------------------------------------|----------------------------------|
| | Conventional Market | Implicit Market | Constructed Market |
| Actual Behaviour | Dose-Response Model (DRM) | Hedonic Pricing Model (HPM) | |
| | Defensive Expenditure (DE) | Travel Cost Valuation Method (TCV) | |
| Potential Behaviour | Replacement Cost | | Contingent Valuation Model (CVM) |

These techniques obtain values from either physical linkage or behavioural linkage models (Mitchell & Carson, 1989). Physical linkage models, such as the dose-response model, attempt to model the relationship between physical damage and its consequences, and then attempt to apply a value estimate to it. In contrast, behavioural models, such as the contingent valuation model, focus on human behaviour and welfare changes following the effects of physical changes. There is considerable questioning about the applicability and information requirements of each model, and none of the presently available valuation techniques appear to be universally applied or used. Each type of technique seems to be specified and used slightly differently in different studies, and there appear to be many variants clearly in operation. The most widely used techniques for eliciting environmental values will now be reviewed in turn to identify their potential usefulness for management accountants.

2.5.4.1 Replacement Cost Approach (RC)

Of all the widely used economic valuation techniques, replacement cost is the one that accountants readily understand and use. The approach is relatively straightforward. If environmental damage is done, it may be possible to find out quite easily the cost of

restoring the damaged environment, and this is taken as a proxy for the *minimum* value of the environmental asset under consideration. However, the replacement cost approach is only an appropriate technique if there is some compelling reason as to why the damage should be restored, or certainty that this will occur.

This approach appears to possess huge potential for use within management accounting. Along with opportunity cost, the concept of replacement cost is widely used by accountants and could easily be applied to environmental issues. This RC approach could even build on the EIA that is legally required for certain major projects in the UK. Although the EIA only provides a non-monetary account of the environmental impacts of a project, estimating the RC of such impacts may be relatively easy once they are identified. However, in practice it might require substantial expertise to obtain an accurate estimate of the replacement cost, and as a result, the accountant might need additional help.

2.5.4.2 Defensive Expenditure Approach (DE)

Individuals, firms and governments undertake a variety of 'defensive expenditures' in order to avoid or reduce unwanted environmental effects. Whilst environmental damages may be difficult to assess, information on the defensive expenditures may be available or can be obtained at lesser cost than direct valuations of the environmental good in question (see Pearce & Turner, 1990; Munasinghe, 1992). Such actual expenditures indicate that individuals, firms or governments judge the resultant benefits to be greater than the costs. Thus, the defensive expenditures can then be interpreted as a minimum valuation of benefits (Munasinghe, 1992). However, caution is advisable with this approach, especially in cases where defensive expenditures are arbitrarily mandated by governments, with little or no consideration to market forces or free choice by informed economic agents.

Whilst the cost of obtaining the information that this technique requires may make it prohibitive to a corporation, it is relatively easy to use. Obviously, the corporation should systematically monitor its own defensive expenditures, and may be able to find published studies that supply estimates of other relevant societal defensive expenditures. Even if the full-scale application of the DE approach proves cost prohibitive, a variant focused on the corporation itself may have value for use within management accounting. If the focus is limited to the defensive expenditures of the corporation itself, a corporate application of the

DE technique may prove beneficial to management accounting as it may help to raise 'defensive expenditure awareness' throughout the firm. This type of benefit was evident from applications of activity based costing (ABC) within corporations, and applying a form of DE may prove just as beneficial for raising the awareness of corporate waste and externality management.

2.5.4.3 Dose-Response Valuation Models (DRM)

In contrast to many of the other techniques, the dose-response method (DRM) does not rely directly on using individual preferences to estimate environmental costs or benefits. Instead, it attempts to isolate, using a two-stage process, the financial consequences of human exposure to a specific amount or 'dose' of environmental pollution. Firstly, the relationship between the level of pollution (dose) and physical damage effect (response) – the physical damage function – is determined. Secondly, by assigning largely market determined unit prices, a monetary estimate of environmental damage is obtained (Pearce & Turner, 1990; Bowers, 1997). Typically, this type of analysis has been conducted in the form of multivariate regression, involving variables such as age, class, and access to medical care and pollution variables (Crocker *et al*, 1979; Pearce & Turner, 1990).

A fundamental problem of the DRM stems directly from its inability to supply objective monetary estimates of the 'cost' of pollution. For example, it appears very difficult to provide an accurate value for either 'life' or 'health'. This example highlights the main weakness of the DRM approach, as it is almost impossible to assign prices or values to the pollution damage function the model provides. Another problem of the DRM is how to obtain the costly scientific data about how pollution affects the natural environment. A final problem of the DRM arises when attempting to apply it at the corporate level, as it will likely prove extremely difficult to clearly establish the individual pollution liability of an individual organization. Not surprisingly, the majority of the DRM type studies have been conducted at the macro-level, where dose-response is much easier to observe. Whilst analysis at the micro level is possible, especially in circumstances where a polluter can be clearly identified with a damage function, conducting it may be largely cost prohibitive (Pearce and Turner, 1990). The use of DRM damage estimates within management accounting may be criticised for being inaccurate, but Milne (1991) suggests they could still prove useful for internal decision-making.

Clearly then, the use of such techniques within organizational management may be influenced by both the government policy on regulating pollution and also the amount of the pollution charge that the company has to manage. From the case studies included in chapter 8, it seems that it is the environmental managers, and not the management accountants, who are currently involved in the systematic monitoring and management of pollution. As a result, it would be extremely surprising to find a version of the DRM being used to manage effluent charges within UK companies.

2.5.4.4 Hedonic Pricing Valuation Model (HPM)

Hedonic pricing uses an implicit market approach to find environmental values. It assumes that the values of environmental or resource amenities are *implicit* in the price of some related commodities traded in the marketplace (Rosen, 1974). The model assumes that the price of a marketable good is a function of its different attributes - its hedonic price function. This function is, in fact, a locus of equilibrium points on household willingness to pay functions. From this function, an implicit price function can be derived for environmental attributes, which in turn can be regressed on income and pollution levels to derive an inverse demand schedule for the environmental quality attribute. Normally, hedonic pricing is applied to property prices, where values are thought to include the value of environmental site characteristics including pollution variables.

The problem with the HPM approach is how to isolate the environmental attribute within the commodity price function. It is highly unlikely that all other attributes can be included, and even if they are, statistical problems will occur. Data collection will be problematic. Cost is a further concern of this method. In addition, the assumption that people are aware of environmental differences when they choose property can be questioned. There is little evidence to suggest that people do adjust their attitudes, and, until there is, the results of the HPM must be interpreted with care (Pearce *et al* 1990). The applicability of the HPM to corporate decision-making remains small. Assuming a link with corporate activity, improvements or degradation to environmental attributes can only be captured after the event. Milne (1991) suggests that its role could be to aid corporate learning via before and after analysis, but even this role is limited by the rigorous data requirements.

2.5.4.5 Travel Cost Valuation Method (TCV)

The travel cost valuation (TCV) constructs an artificial market for environmental sites with a zero entrance fee, such as public parks and other facilities (see Clawson & Knetsch, 1966). The basic idea is simple: the distance travelled to a site is a proxy for price, and the number of trips is the substitute for quantity. The model then hypothesises that travellers will respond to an increased entrance fee in the same way as they would an increased travel cost. A demand curve can be estimated for varying levels in environmental quality. TCV requires only observations of the number of trips to areas of varying environmental quality. From this data, the consumer surplus from the environmental area can then be identified, as can the benefits from providing a new site.

The TCV method has been widely used to provide estimates of the use value for certain environmental sites (for a detailed review of these studies see Pearce, 1992). The main problem with the TCV approach is in deciding what should be included as part of the travel cost. Travel cost normally includes vehicle costs, and the opportunity costs of travel and time spent on-site. Of these elements, there is considerable disagreement about what precisely should be included as the value of time (Pearce & Markandya, 1989), with many studies using different approaches and thereby obtaining differing estimates of consumer surplus. Another problem with the method is that it only captures 'use', and thereby excludes the economic value of intrinsic non-use values.

Quite clearly, the TCV approach appears to have limited applicability for use within corporate decision-making, except for those organizations with either an interest in recreational facilities or where the organization has a clear impact on the environmental damage to a site.

2.5.4.6 Contingent Valuation Model (CVM)

The contingent valuation model (CVM) attempts to elicit direct information on consumer preference by asking questions about individual WTP for an environmental resource. The methodology seeks to ask individuals what they are WTP for a benefit, or what they are WTA by way of compensation to tolerate a cost. Preferences are found by way of questionnaire or survey of respondents whose views are thought to be relevant. In more recent studies these have tended to also include less obvious user groups, thereby hoping to

include non-use values of resources. The CVM has been used to value common property resources, amenity resources with ecological characteristics and to other situations where market information is not available (Mitchell & Carson, 1989).

Although the CVM has been widely used within environmental economics, there is considerable disagreement about the appropriate means of applying the methodology (Pearce & Turner, 1990; Pearce, 1992; Bower, 1997). Successfully applying the CVM is far from easy. A further problem with the CVM is how to account for bias and strategic behaviour from the respondents, although Pearce and Markandya (1989) argue that the results from CVM studies generally compare favourably with the results obtained from more market based techniques.

The power of using CVM within corporate organizational decisions lies in its ability to capture *ex-ante* estimates of environmental improvements or degradations. Furthermore, the CVM is the only method that can price the non-use, 'existence' element of total environmental value (see figure 2-3). In terms of its usefulness alongside management accounting, the results obtained from any CVM are extremely subjective and might not be acceptable to decision makers used to more 'neutral' measures of performance.

2.5.4.7 Applying Economic Valuation within Management Accounting

It is evident that the majority of economic valuation techniques need to be applied carefully within private sector decision-making. Clearly, the potential applicability of such techniques within management accounting needs further research. Apart from work by Milne (1991, 1994, 1996), management accounting theorists have made few direct appeals for the use of environmental economic valuation techniques favoured by economists. This may be explained by the difficulty in applying such techniques without specialist help. However, as Milne (1996) identifies, management of environmental externalities within accounting may require the adoption of such techniques in order to extend traditional discounted cash flow analysis. Whilst the direct application of an individual economic valuation technique might prove beyond the capability of an individual accountant, previous economic studies could supply the desired information (Milne, 1991).

Quite clearly, additional research is necessary before the direct usefulness of economic valuation techniques to management accounting can be definitively stated. However, much

of the rhetoric demanding an environment-related form of management accounting *implicitly and explicitly requires* it to provide the environmental monetary valuations that economic valuation techniques can provide. This rhetoric has emerged from accounting professions across the world, who suggest that present accounting systems are inadequate in terms of their ability to measure the financial effects of corporate environmental impacts (Macve & Carey, 1992; Society of Management Accountants in Canada (SMAC), 1992; Stone, 1994; CIMA, 1997; Macve, 1995a & 1995b; International Federation of Accountants (IFAC), 1998, 2004; Howes, 2002a, 2002b):

‘The role of the management accountant must change to support an organization’s obligation to be environmentally accountable. Accountants must develop new financial and non-financial measurements for valuing environmental assets and provide information and environmental report’. (SMAC, 1992, p.22)

It is plausible that such pronouncements are in part influenced by legislative action. For example, the European Union’s (EU) Fifth Action Programme on the Environment ‘*Towards Sustainability*’ embraced the use of full cost pricing as the appropriate method for internalising the external social and environmental costs of corporate actions (Council of the European Union Commission (CEC), 1993a). Whilst this EU initiative still remains undeveloped, it promotes such ideas within society. Economic valuation of environmental assets provides a body of knowledge that management accounting draw upon if environmental costing becomes part of a legislative requirement. At present, however, economic valuation techniques have little direct influence on management accounting practice.

2.6 Environmentalism: A Role for Management Accounting?

As a result of the socially constructed and contested nature of environmentalism, it is not surprising that the majority of UK manufacturing organizations (and their management accounting systems) seem to be struggling to balance their environmental responsibility/accountability against the need to manage an economically successful business. Despite examples of mainland European organizations including concern for the environment within their ‘economic maximisation’ (e.g. the Danish textile manufacturer, Novotex, and the Swiss corporation, Esprit), there appears little evidence to suggest that the traditional economic notion of ‘efficiency’ is being *truly supplanted* by widespread acceptance of ‘eco-efficiency’ within UK manufacturing organizations.

The case study material in chapter 8 suggests that UK manufacturers appear to be struggling to fully introduce the concept of 'environmentalism' and are largely ignoring the concept of 'sustainability'. All the organizations studied 'acted' on the environment, but only when 'forced' to do so or if it resulted in clear cost reductions or other benefits. This evidence suggests that UK manufacturing organizations are not becoming 'truly green' in their activities, and are simply trying to manage environmental issues in the most cost-effective manner that can guarantee continued social acceptance or 'legitimation' of their actions. Within the cases, the primary approach to managing environmental issues is through the implementation of ISO 14001 accredited EMS. This is seen as the socially appropriate way of managing green issues, even though it may effectively 'capture' or limit the way such issues are dealt with. The case study findings, along with the role played by management accounting within them, are explained in more detail in chapter 8.

Environmentalism is a new and constantly shifting phenomenon, relatively new to the corporate agenda. As a result, organizational investments in EMS and environmental information may influence, rather than simply reflect, society's view on what environmental management (and also management accounting) should become. These corporate initiatives on the environment have the potential to change either management accounting or environmentalism, and make them what they (currently) are not. Thus, the introduction of EMS may create new organizational and social 'visibilities' and sources of legitimacy, in turn serving to question the perceived rationality of established organizational actions. They may also serve to question the accuracy and decision relevance of the information provided by established management information systems, such as management accounting. The social legitimacy that EMS grant the company might also protect it from demands for environmental accountability. In addition to their ability to create 'visibility' and 'legitimacy', the role of EMS within strategic decision-making is also vitally important, as is their coupling, or otherwise, to the other organizational management systems, such as management accounting. Such themes were highlighted in chapter 1, and will be further developed in later chapters. What is important here is to obtain an appreciation of how corporate environmental initiatives, such as EMS and new forms of management accounting, can influence, as well as merely reflect, corporate and social ideologies for action on the environment.

2.6.1 Environmentalism: A need for Environment-related Management Accounting

This chapter analysed the development of environmentalism and environmental accountability highlighting the past, present and potential roles for management accounting. Despite developments in environmental economic theory that may logically 'support' its growth, the environmental potential of management accounting appears underdeveloped. This failure of management accounting to become environmentally 'focused' might be a failure of the accounting profession, but it also occurs because many UK manufacturing organizations appear to lack a consistent environmental ideology.

The development of non-accounting EMS seems to be the dominant UK organizational approach for dealing with social demands for environmental accountability and responsibility. Despite this chapter identifying a potential role for management accounting within the growth of environmentalism, management accountants are largely uninvolved in corporate environmental initiatives, and this observation is supported from the testimony obtained from organizational management accountants during the interviews for the thesis case studies contained in chapter 8. In the case study companies surveyed for the thesis, the management accounting function played no systematic and routine role in the management of environmental issues. This evidence supports the findings of the small amount of UK focused research on the issue (see Gray, 1990; Wycherley, 1997; Bennett & James, 1998b). In the majority of UK manufacturing organizations, the management accounting function appears to be loosely coupled (Weick, 1976, 1979) and 'buffered' from corporate EMS. This evidence seems especially surprising given the increasing body of literature suggesting how management accounting can be made more environment-related.

Whilst the apparent absence of management accounting expertise within present corporate EMS appears surprising, it should be balanced against the 'newness' of environmental management as a discipline. From the case studies in chapter 8, it appears that EMS are currently controlled by professional managers with either engineering, chemistry or production management backgrounds since these are the managers who best understand the environmental impacts of the operations. Since EMS are likely to be BSI certified ISO 14001 EMS, introduced as an extension of an existing ISO 9001 quality management system (see BSI, 2000a), the organizational 'genesis' of environmental management is in an area of organizational operations that management accounting has traditionally

experienced difficulty in penetrating (see Bromwich & Bhimani, 1989, 1994; Johnson & Kaplan, 1997). As environmental management becomes institutionalised within the firm, management accounting may become more active in green issues. In addition, the 'visibilities' created by new EMS might serve to question the existing logic of management accounting information, creating the potential for accounting change. (Bhimani, 1994). Thus, the provision of non-accounting environmental management information may affect the existing attitudes, ideology and behaviour of organizational participants including management accountants (Prakash & Rappaport, 1977).

Despite the apparent lack of management accounting involvement in environmental management, many authors argue that this situation simply has to change (as an example, see Bennett & James, 1998b). After examining the calls within the literature for a more environment-related management accounting, Milne (1991, p.100) argues that there appears to be an urgent need for management accounting techniques, systems and decision-making to systematically tackle environmental factors:

'This normative conclusion is based on an increasing call in the accounting literature for broader-based decision-making and accountability concepts, and the increasing probability of imposed liability for negative environmental impacts by corporate entities'.

Such calls are typically seen in the accounting literature, but can also be observed in the mainstream environmental and business literature, and are extended to all types of management information and decision-making systems, not simply management accounting. Whilst a wide range of literature provides environment-related management accounting theories and techniques, the adoption of such techniques seems at best *ad hoc*, and certainly appears to be influenced by the organizational and social contexts from which they emerge. How then does the potential for management accounting change either arise or be stifled? As was highlighted in chapter 1, management accounting is increasingly seen as embedded in the context of a wider set of institutional and social processes and objectives, and is seen as much more than just a collection of calculative practices and procedures (see Hopwood, 1987, 1990; Miller, 1991). Emerging as it does from such contexts, management accounting does not always develop as it should (Hopwood, 1987). Management accounting may become institutionalised, and this may limit the possibilities for it to change, even in the face of theoretical demands urging its reform.

One of the primary problems for the management accountant is to establish whether or not

they have a role in the 'greening' of internal decision-making. Gray (1990, p.64) states that accountants have a positive role to play, but suggests that traditional management accounting practice might have lead to the current environmental crisis:

'On the twin characteristics of professionalism (a conceptual framework and overriding concern for the public interest), there seems to be no question: our methods of accounting are implicated in (and may even contribute to) the present state of the environmental crisis; and it is clearly part of our duty in the public interest to attempt to contribute to the reversal of that crisis'.

Gorz (1988, p.85) goes further to argue that a 'true' relationship with nature can only be achieved by totally rejecting the calculative rationality that is accounting:

'Only what can be calculated, quantified and expressed in figures is *real*. Everything else has only a *subjective* existence; that is, it is in a sense added on to the world by subjectivity and must be relegated to the margins of thought'.

This negative view on using management accounting numbers to value the natural environment is shared by others (Hines, 1991; Maunders & Burritt, 1991). However, in defending accounting from such critiques, Gray (1990) *inter alia* sees an accountant's role as wider than merely concentrating on financial implications. Gray (1990, p.66) argues that the environmental contribution of management accountants may emerge from their talent for designing, assessing, reforming and controlling the information systems in an organization:

'It is the quality of the systems upon which he/she relies which determine whether or not that value, cost, accrual or provision is likely to be an apposite one. And so, in the same way that the accountant must rely on others for the valuation of inventory and fixed assets, work-in-progress and provisions, etc., so may the accountant equally rely upon others for the measurement of sulphur dioxide emission, biological oxygen demand or site toxicity'.

Thus, despite his own criticism of management accounting involvement in environmental management, Gray (1990) contradicts himself and envisages a more positive potential for management accounting. Gray (1990) stresses that professional management accountants have a reputation for possessing a wide set of abilities, including evaluative ability, experience in communicating information and a logical and systematic approach, and these skills give added justification for an accounting involvement in the provision of internal environmental information. This more positive view on the potential of management accounting to help manage environment issues is widely shared by the 'practitioner' literature on the subject (see Bennett & James, 1994a).

Despite such assertions, there are now a growing number of authors who do not share such a positive view of management accounting's potential in tackling environmental problems (see Benston, 1982; Maunders & Burritt, 1991; Power, 1991, 1994; Tinker *et al*, 1991;

Hines, 1991; Cooper, 1992; Gray, 1992). The view of such authors is that accounting is part of the current environmental problem and not the cure, and it would be better if environmental management was left to non-accountants. These authors, often employing either a 'deep green' or 'feminist' perspective, argue that the vast majority of the management accounting-related initiatives on the environment take for granted a conventional accounting and business framework, and deny the value of instinct, intuition and spirituality in guiding action (Hines 1991; Maunders & Burritt, 1991; Cooper, 1992). Because such management accounting initiatives focus on the financial and operative imperatives rather than environment-centred considerations, it is difficult to see how they could enable a fundamental shift in the environmental attitudes of organizations:

'The introduction of 'green accounting', however well thought out, will, under the present phallogocentric system of accounting do nothing to avert today's environmental crisis. In fact it would make matters worse'. (Cooper, 1992, p.36)

Maunder & Burritt (1991, p.17) argue that the very ideological assumptions behind management accounting may lead it to 'capture' and 'reduce' the environmental actions that firms and society believe to be necessary:

'The ecological reporting function, at least at organizational level, appears to be open to capture by those most familiar with the operation of integrative information systems at present. To draw a parallel: accountants appear to have retained their controlling role in company information systems despite predictions that computer and/or management science specialists would usurp this. This time, however, it is not the technology of the system which must apparently change, but its subject matter'.

The 'practitioner-type' literature is replete with largely normative prescriptions of management accounting tools and techniques developed with the natural environment in mind. They include investment appraisal techniques with specific environmental criteria, budgets which explicitly recognise environmental spending requirements, and altered overhead allocation techniques that make environmental costs more visible (see for example Bennett & James, 1998b; Burritt & Schaltegger, 2001). Thus within this 'practitioner' literature, management accounting is implicitly seen as becoming what it should be, rather than what it was not (Hopwood, 1987; Miller & O'Leary, 1990). From this observation, the 'new' tools and techniques described by the practitioner literature can be critiqued in two different ways. Firstly, they seldom consider the organizational and social contexts in which all management accounting techniques emerge and function, and secondly, they implicitly use a conventional accounting and business framework from which to forge new forms of environmental accounting. The first critique is an essential part of this thesis, as it was evident from the thesis case material in chapter 8 that

management accounting was currently playing an extremely small part in the development of corporate environmental initiatives, remaining largely unchanged and decoupled from such developments. As research has shown, management accounting is largely a function of the interactions within the specific organizational and social contexts of which it is part (see Earl & Hopwood, 1980; Burchell *et al*, 1985; Meyer, 1986; Hopwood, 1987). As a result, accounting's role in corporate environmentalism will also be a function of the very same interactions. Thus, there is no imperative for fundamental management accounting change in response to environmental concerns.

2.6.2 Environmentalism: Its Potential Capture by Management Accounting

To many authors, there appears to be more of an 'illusion' of UK corporate 'greenness', rather than actual substantive action on environmental issues (Gray *et al* 1993; Gray and Bebbington, 1996; Greer & Bruno, 1996; Beder, 1997; Welford, 1997). Whilst UK manufacturing organizations certainly seem to be investing heavily (see Steger, 2000) in accredited EMS in an effort to appear more legitimate, empirical evidence about the achievements and effectiveness of these new systems within decision-making presently remains thin, at best. The recent environmental management initiatives of organizations have the potential to effectively 'capture' and limit future action on environmental issues (Cooper, 1992; Power, 1991; Gray *et al*, 1993a; 1993b; Greer & Bruno, 1996; Beder, 1997). Whether such a 'capture' of environmentalism is a deliberate action on the part of manufacturing organizations remains unproven. Greer & Bruno (1996, p.12) suggest that certain transnational organizations (TNC) are following a strategy of "greenwash":

'Through a sophisticated greenwash strategy, TNCs are working to manipulate the definition of environmentalism and of sustainable development, and to ensure that trade and environment agreements are shaped, if not dictated, by the corporate agenda'.

It is hard to conclusively prove the widespread existence of deliberate 'greenwash' strategies. Although the actions of organizations on environmental issues may effectively lead to the corporate 'capture' of certain elements of the environmental debate, it may not be as a result of a deliberate or coherent corporate strategy. Equally, organizations facing 'real world' paradigms might reasonably claim to be 'doing their best' to genuinely engage with environmental concerns (see Xerox, 2004; Unilever, 2000).

Whether the prospect of 'environmental capture' is a serious problem or a structural

mechanism whereby organizations engage with environmentalism becomes a subjective discussion. Regardless of this, however, 'environmental capture' is a vitally important phenomenon, and must be recognised in present and future study of the organizational change that occurs in response to 'external' social demands. Appreciating the impact of 'environmental capture' grants organizations with the potential to enact rather than simply react to 'external' social pressures (Child, 1972). There is presently little research exploring the concept of 'environmental capture', but there is an established literature on how accounting and management systems can be involved in the 'capture' of issues and debates (Hopwood, 1987; Miller & O'Leary 1990; Miller, 1991).

Whilst the environmental information provided by an 'environment-related management accounting' system may help to increase the 'visibility' of environmental issues, each increase in visibility, in focusing on some matters, decreases attention on others, and, thus, inevitably makes other things 'invisible' (Hopwood, 1987, 1990; Hines, 1988, 1991, 1992; Broadbent *et al*, 1991; Hanninen, 1995). This ability of management accounting to render things 'invisible' serves to critique the practitioner literature prescriptions of potential environmental management accounting techniques. By implicitly adopting the conventional accounting and business framework, any environment-related form of management accounting cannot hope to capture the full dimension of environmentalism. As a result, the use of such techniques for such purposes effectively allows environmental issues to be 'captured' or colonised', and reduced to the mundane equivalent level of any other organizational cost or management issue (see Owen, et al, 1997; Cooper, 1992; Power, 1991, 1994; Mouck 1995). Environmental capture by accounting refers to:

'the appropriation of a potentially liberating or empowering mechanism by those who currently hold power such that the liberating potential of the mechanism is removed or severely reduced'. (Owen *et al*, 1997, p.196).

The 'capture process' it is not always performed in an obvious manner, with the more subtle manifestations of it emanating in disciplines and language, such as accounting:

'Conventional accounting speaks about accountability and the environment but does so in very narrow terms. It therefore seeks to capture these debates and (given that accounting is principally a mechanism for supported vested economic interest) does so on behalf of companies and capitalism'. (Owen *et al*, 1997, p.196).

Thus, if either management accounting techniques or ISO 14001 EMS are used to manage and render 'visible' environmental issues, they will benignly remove the radical content from 'greenness'. Effectively, environmental management and accounting concern for the

natural environmental becomes part of the ‘proceduralisation’ that is evident within capitalist society. Power (1991, 1994) illustrates this idea by registering concern about the involvement of the accounting profession in creating new bodies of ‘expertise’ in environmental audit. Power (1991, p.39) suggests that whilst environmental audit has enabling potential because it renders the notion of environmental accountability ‘visible’, it may also act less positively as “a powerful discursive reductionism, appropriating environmental issues and translating them into its own economic and risk based language”. Thus, environmental audit loses its “potential protest-driven nature” (Bebbington, 1997, p.369), and simply becomes part of traditional audit practice. Power’s ‘capture’ can be equally applied to ISO 14001 EMS and environmental accounting (Hines, 1991). By inappropriately translating environmental issues into the language of accounting, management accounting effectively removes the very attributes that makes them dynamic, as Bebbington (op cit., p.369) highlights:

‘While the intention behind the expansion of conventional management accounting to encompass environmental matters may be emancipatory, the very nature of accounting is such that it may capture, colonise, pacify and make routine environmental accounting practices and thus rob them of their radical intent’.

‘Capture’ of this type seems to prevail within both accounting and environmental management initiatives that UK organizations are currently using to tackle environmental issues (see Gray *et al*, 1995). Whilst the use of established management accounting techniques is described as potentially “capturing” ‘environmentalism’, the literature need not infer a value-based opinion upon whether this is inherently ‘bad’. Capture describes a transformation process, where the concept of environmentalism or sustainability becomes one that the organization understands and is able to respond to within its given paradigm. This might horrify the originators of the idea within a different perspective, but should not necessarily be seen as a deliberate process to demean or deceive; this is referred to variously as de-coupling, legitimacy and greenwash elsewhere in the thesis. Pragmatically, many would argue that capture is preferable to a situation where UK organizations do nothing to moderate their environmental impacts. This potential of accounting to ‘capture’ environmentalism, together with these other concepts, will be returned to in later chapters.

2.7 Chapter Conclusions

This chapter has shown that the notions of environmentalism, environmental accountability, environmental responsibility and sustainability are socially constructed within society. Economic theories and techniques have been constructed to show the economic value of environmental assets and externalities. UK environmental legislation is slowly increasing, and 'environmentalism' is fast becoming an accepted part of the language of both society and business. Management accounting is being urged to change in response to environmental change. These calls for reform are typical of the growth in the "practical worrying about management accounting" (Hopwood, 1985, p.228). Modern management accounting is urged to regain its "lost relevance" (Johnson & Kaplan, 1987, p.145) for decision-making within the modern 'environmentally friendly' corporation. Developments in environmental management accounting are urged as the way to "make accountancy practical" (Miller & O'Leary, 1990, p.479) for the modern UK manufacturing organization. Environmentalism is being seen as another challenge to modern management accounting practice. Whether accounting *should*, or actually *can* be applied to manage such issues will be discussed in later chapters.

The following chapter builds on the discussion of environmentalism and management accounting to outline the specific research questions, philosophy and methodology of the thesis.

Chapter 3: Exploring strategy, Accounting and the Environment: Methodology

3.0 Introduction

The purpose of this chapter is to describe and justify the methodology and research design adopted to answer the overarching research question:

What role(s) do management accountants and management accounting play in the development and use of environmental initiatives within UK manufacturing organizations?

The first part of the chapter frames the rationale and motivation behind the choice of research question within a discussion on how traditional management accounting information is criticised for its inability to provide relevant information for support of *corporate* and *environmental* strategies. Once this discussion establishes the rationale for the research, the chapter then establishes the methodology of the thesis.

3.1 Strategy, Accounting and the Environment

UK manufacturing organizations are centrally implicated within social concerns for environmentalism. However, organizations appear to have discretion when formulating and implementing their strategic response towards environmental pressures. As a result, organizations, through their choice of strategy, can *enact*, as well as simply react to, social demands and governmental regulations for corporate ‘greening’, as Barrett (1991, p.1) explains:

‘The challenge for business is to identify how regulation will affect them, and then to influence the shape of regulation that is imposed accordingly. At least some firms will find that they can influence the form of the regulations that are introduced in such a way to enhance their competitive advantage and also improve the environment’.

Thus, an organization might go beyond minimum ‘compliance’ with environmental legislation, and develop a more ‘positive’ environmental strategy in order to secure an additional source of competitive advantage (Porter, 1991a). A growing number of UK organizations can be seen to be *voluntarily* introducing internal EMS, and are publishing environmental policies, strategies and other programmes of action. Whether such initiatives are indicative of an environmental strategy beyond ‘compliance’ remains debatable (see chapter 2). For example, such initiatives can provide ‘legitimacy’ rather than competitive advantage over ‘non-green’ competitors. However, there *are* examples of organizations adopting positive environmental strategies, especially in the US (see for example, Fisher & Schot, 1993; Ditz *et al*, 1995). In contrast, the majority of UK manufacturing

organizations appear to possess neither the vision nor the resources to adopt a systematic and wide-reaching strategy on environmental issues, and even claim that a strategy of 'compliance' with UK environmental regulation is costing UK businesses £4 billion a year (see Confederation of British Industry (CBI), 2004).

Should concern for the natural environment be an issue that is included within the strategy process of UK manufacturing organizations? Starik (1996, p.14) suggests it should, since business operations threaten ecological sustainability, but recognises that doing so may be far from straightforward:

'the natural environment itself and human business interactions with the natural environment are, in most senses of the word, 'strategic'. This connection then leads on to the central question of how can a strategic management process be used to assist in developing environmentally sensitive policies and practice?'

This view represents those held by the prescriptive 'practitioner' literature on the link between business strategy and environmentalism. For such authors, environmental issues are fast becoming a key strategic issue, and cannot be ignored. As a result, organizations are increasingly urged to develop *voluntary* environmental strategies and programmes in order to fully integrate environmental concerns within their overall strategy process (Porter, 1991a; Shrivastava & Scott, 1992; Fisher & Schot, 1993; Porter & van der Linde, 1995; Sarkis, 1995; Starik, 1996). Less certain is whether this type of integration is happening in practice, but this does not prevent a mini-industry selling new forms of management information and control systems to guide decision-makers in this field (see BSI, 1992, 1996b, 2004).

What remains unexplored is the potential role of management accounting and accountants to provide management information specifically tailored towards the integration of environmental issues within strategic decision making. From the little research that is currently available, it appears that management accountants are largely uninvolved in the systematic provision and control of environmental management information within organizations (see Bebbington & Gray, 1994b; Bebbington & Thomson, 1996; Wycherley, 1997; Wilmshurst & Frost, 2000, 2001). Furthermore, management accountants are generally not involved in decision-making on environmental issues, except where they have to grant permission for a capital expenditure project (see the case studies in chapter 8 of the thesis). However, such empirical evidence of a present non-role for management accountants within environmental management stands in direct contrast to the calls within

the literature for the profession to appreciate the environmental aspects of organizational performance. From the perspective within this literature, traditional management accounting fails to manage and reveal the 'hidden costs' of environmental regulation, but is involved and as a result, does not provide decision relevant information on environmental impacts (see Bennett & James, 1998a, 1998b; White, 1994; Joshi *et al*, 2001). In effect, management accounting fails to provide 'relevant' information that allows an organization to *strategically* manage the environmental impacts of its operations.

Environmental focused criticisms of the 'lost relevance' of traditional management accounting are certainly not unique. Management accounting also faces general criticism for its failure to provide 'strategically relevant' information within modern manufacturing environments (see Johnson & Kaplan, 1987; Bromwich & Bhimani, 1989, 1994). Although both these critiques are aimed at the apparent 'strategic irrelevance' of management accounting information, the 'environmental' critique is more wide-ranging because it represents demands for management accounting reform that may ultimately go beyond mere concerns for improving the efficiency of business decision making. Whilst the 'non-environmental' focused critiques of management accounting have received more attention (see Roslender, 1995), the 'environmental' critiques may become more important as environmental impacts of operations become strategically important to organizations (see Bennett & James, 1998b). The following section uses each of these critiques and their proposed solutions to discuss the apparent failure of traditional management accounting to provide strategic relevant information on organizational operations.

3.2 The Strategic Irrelevance of Traditional Management Accounting

As was discussed in chapter 1, traditional management accounting has been criticised for becoming increasingly irrelevant to decision making in the modern corporation (Kaplan, 1983a, 1983b; 1986; Johnson & Kaplan, 1987). The implicit assumptions of traditional management accounting theory and practice no longer match the 'realities' of modern manufacturing environments:

'Traditional cost accounting systems based on an assumption of long production runs of a standard product, with unchanging characteristics and specifications, will not be relevant in this new environment. The challenge is to devise new internal accounting systems that will be supportive of the firm's new manufacturing strategy. Improved measures of quality, inventory performance, productivity, flexibility, and innovation will be required. Managerial performance measures based on achieving these manufacturing goals should be developed to replace the current emphasis on short-term financial performance measures.' (Kaplan, 1983b, p.688)

Thus, management accounting must evolve in order to provide 'longer term', externally focused and 'strategically relevant' information and performance measurement (see Bromwich & Bhimani, 1989 for a review of such critiques). If such criticisms of traditional management accounting were not sufficient, management accounting has also been criticised for failing to systematically monitor the environmental impacts and costs of organizational operations, as Bennett & James (1997, p.37) explain:

'There is growing evidence that environment can have significant impacts on expenses, revenues, assets and liabilities and that these impacts are often underestimated. ...Making such financial impacts apparent can make it easier to take, and win support for, further environmental initiatives.'

Thus, there are increasing calls for traditional management accounting to urgently address its apparent failure to provide both strategically relevant information on business issues *and* information on the environmental dimension of corporate operations. What is interesting however, is that each piece of management accounting literature calling for change implicitly and explicitly focuses on only one of these two concerns. For example, the critique of Johnson & Kaplan (1987) does not mention environmental issues, and Bennett & James (1997) do not mention the need for accounting to monitor the costs of competitors. Can one management accounting solution be devised that can tackle both concerns? Environmental concerns can be deemed one additional strategic issue, and many strategic issues can also have an, often 'overlooked', environmental dimension to them (see Porter, 1991a; EPA, 1995a; Burritt & Schaltegger, 2001).

In seeking to improve the management of either manufacturing or environmental performance, management accounting will not be the only organizational function that plays a vital role:

'Accounting is only one discipline among many that must be mobilised to improve manufacturing [and environmental] performance. The development of improved [and environmental efficient] manufacturing processes will require the active involvement and contributions of many fields of engineering. ... Whilst accounting can not play the key role in initiating or implementing technological innovations and organizational change, the accounting system should provide incentives for improving manufacturing [and environmental] performance and measurements to evaluate progress to this goal'. (Kaplan, op cit, p.689)

Thus, engineers, production managers and chemists can be just as essential for improving manufacturing or environmental performance, although management accounting is seen to provide the incentive and evaluative systems that serve to support and assess the strategic goals of the organization, be they environmental or just more 'normal' in ambition. The recognition that management accounting might provide the professional expertise needed to

facilitate and monitor organizational strategies is especially important for research into corporate 'greening'. Other organizational functions, such as health & safety and production, could take control of environmental management, and supply the necessary management expertise and performance measurements. As a result, management accounting may not have to play a central role in environmental strategies or undergo any fundamental operational change as a result of their implementation. This situation was clearly evident in the case study material in chapter 8, since management accounting was largely uninvolved with day-to-day management of environmental management strategies and initiatives. This issue will be discussed in more detail throughout the thesis, but attention will now be turned towards the proposed solutions to the strategic, manufacturing and environmental shortcomings of traditional management accounting.

3.3 Rediscovering The Strategic Relevance of Management Accounting

Can management accounting control systems be made more 'strategic' and market orientated in focus, and indeed, need they? A number of authors argue that they can and must (see Simmonds, 1981; Goold, 1986; Bromwich, 1990). The development of systems of 'strategic management accounting' (SMA) has been hailed as the mechanism by which management accounting can once again provide strategically relevant information for decision-making (Simmonds, 1981, 1982, 1986; Shank & Govindarajan, 1989; Bromwich, 1990, 1991). Similarly, prescriptions of systems of 'strategic environmental management' (SEM) are promoted as mechanisms by which corporate environmental management systems can provide information that both protects the environment and provides a source of competitive advantage to the greener corporation (Porter, 1991a; Wever & Vorhauer 1993; Wever, 1996; Department of Environmental Protection (DEP) for Pennsylvania, 1997). In addition, systems of 'environmental management accounting', 'environment-related management accounting' (EMA), 'eco-management accounting' (ECOMA) and 'green' management accounting (GMA) are all promoted as providing the necessary management accounting information on corporate environmental issues (see Birkin, 1995, 1996; Ecomac Project, 1996; Bennett & James, 1997; Bojie, 1999, Burritt *et al*, 2001; Burritt, 2004). Certain authors also envisage a more integrated system of 'strategic environmental management accounting' (SEMA) providing both strategic and environmental information within all types of organizational decision making (see for example Azzone & Manzini, 1994; Epstein, 1995). This array of potential management

systems represent the full spectrum of ideas about how corporations should approach the provision of management information for the purposes of strategic and environmental decision making. The proposed SMA, SEMA, ECOMA, GMA and EMA management systems explicitly envisage a role for management accounting and accountants within the provision of such information, and even SEM uses environmental accounting as a “helpful supporting tool” (DEP, 1997, p.9). Whilst the names of the proposed systems may vary, all are aimed towards the provision of environment-related management accounting information.

Aside from the original theoretical work on SMA, many of the calls for developments in new forms of either ‘strategic’ or ‘green’ management accounting are largely normative prescriptions and are ‘practitioner based’ (see for example Bennett & James, 1997). As a result, such prescriptions implicitly accept that management accounting should play a role in providing new systems of strategic or environmental information (see for example Howes, 2002a, 2002b). Furthermore, they also implicitly ignore the role that organizational and social contexts play in ‘shaping’ the actual development and utilisation of management systems, such as accounting (Hopwood, 1987). Finally, empirical evidence on the actual use, proliferation and roles of such systems within UK manufacturing organizations is at best weak (see Burritt, 2004). A major contribution of this thesis is that it provides empirical case study evidence of the current role(s) of the management accounting function within corporate environmental initiatives. More detail on the empirical work will be presented later in this chapter.

A critical point that is often overlooked by those calling for environment-related management accounting is that traditional management accounting should *already* be used to actively manage certain elements of environmental impacts as part of normal ‘efficient management practice’ (see for example Claret, 1980; Wolstenholme, 1982; Herman, 1989). The creation of excess waste and the inefficient use of energy have always resulted in costs to manufacturing organizations long before they were given an additional ‘green’ dimension by concerns for the preservation of the natural environment. Consider for example, the role of management accountants in energy management. The conservation of energy became a key strategic issue within the UK during the energy crisis of the 1970s. In 1974 the ‘Watt Committee on Energy’ was formed with a membership comprising of a number of different professions, including the Institute of Cost and Management

Accountants (ICMA), the predecessor to CIMA. The aim of the Watt Committee was to influence government energy policy and thereby benefit the community. The ICMA played an active role in the preparation of the Watt Committee's Report No. 6 *Evaluation of Energy Use*, which described the process of energy accounting and energy audit (Watt Committee on Energy, 1979). Writing as long ago as 1980, Claret (1980, p. 23) highlighted the importance of energy accounting:

'Whichever emphasis is chosen for dealing with accounting for energy, a method is certainly required. Energy has been often been treated as having a trivial cost compared to other expense items. It has become important and is forecast to become more important; the experience of those who have worked to save energy costs demonstrates that impressive savings are available. If accountants are unable to report on and their systems do not control energy costs, they are likely to be neglecting an aspect of business which is constantly increasing in cost and therefore importance'.

And yet many modern management accounting systems fail to monitor these types of quasi 'business-environmental' issue. Only through the growth in environmentalism are businesses (and management accountants) finally refocusing on the cost control of 'environmental' issues that should already be part of everyday cost management. That this inaction was originally due to the relatively small magnitude of such costs seems ridiculous when one considers the work on energy accounting in the 1970s and 1980s. Furthermore, the recent growth in advanced manufacturing technology (AMT) production also increased the importance of such costs within total cost (Bromwich & Bhimani, 1989, 1994). Despite these drivers, it seems that it required the growth of environmental management to render energy and waste issues worthy of systematic management and measurement within the firm.

As management accounting and accountants are finally coming to terms with the need to provide strategically relevant information, it seems obvious that it should also include environmental strategy on its agenda for reform. As will be shown in chapter 8, the three manufacturing organizations studied all had a defined environmental strategy (in addition to their corporate strategies), and needed environmental management information to report on this strategic imperative. Should management accounting and accountants have a role in providing this new form of strategic information, and, just as importantly, will this role require the development of new forms of strategically relevant management information?

3.4 Supporting Corporate & Environmental Strategies: A Role for Accounting?

In order to investigate the role of management accounting within the design and operation of corporate and environmental strategies some reference has to be made to the general literature on strategy. Due to the word limit, and the flow of this thesis, the review of the strategy literature has been moved to appendix 1. Appendix 1 reviews the concept of strategy, explores the different 'schools' of strategic thought on formulation and implementation of strategy and reviews some of the classic empirical and field research. Although little of this literature focuses on the strategic role of management accounting, the work has been heavily influential on subsequent writers and researchers. From this review, it is evident that the literature varies widely, both in terms of theory and empirical results. The next stage is to use these insights alongside more relevant literature in order to investigate the potential relationship between management accounting and the corporate and environmental strategies of the organization.

Organizations may have a corporate strategy and an environmental strategy. These can appear integrated and seamless, or the environmental strategy can appear secondary to corporate strategic intent. Dent (1990, p.10) suggests that strategy and management control systems share a contingent relationship:

'Notwithstanding environmental and technological contingencies, organizations can be seen to exhibit differing competitive characteristics in many contexts. These may be supported by different structural arrangements and control systems designs. Accordingly there is a case for exploring relationships between organization's strategies and their control systems, recognising strategic posture as an important variable in the contingency framework.'

Thus, choice of strategy may influence and restrict the design and operation of management control systems within the organization. The firm, in order to enhance performance, should design its management control systems in order to support its various strategies. In an effort to illustrate this idea, Simons (1990) extended Miles & Snow's (1978) analysis of different strategic types of firm to include the attributes of their financial control systems. Simons found clear differences between the management control systems used by 'defender' and 'prospector' organizations. This empirical evidence suggests that the use of management information systems is contingent on the strategy adopted by the firm, and the two must be mutually supportive. This observation is a critical one, since it suggests that organizations approach the design and implementation of environmental management and management accounting systems differently, because strategic choice should intervene somewhere during the process. As a result, any universal 'prescriptions'

of 'appropriate' EMS and management accounting systems seem fundamentally flawed.

Both the 'green' and non-green literature seem replete with 'prescriptions of appropriate' organizational systems of SMA, SEM, EMA, GMA and ECOMA, and yet such systems do not receive widespread implementation in the manner that the literature predicts. This is not surprising, given that empirical research in more traditional management accounting research shows that the organizational functioning of seemingly identical management control systems can be organizational specific (Hopwood, 1987; Bhimani & Pigott, 1992a, 1992b; Bhimani, 1994). Different meanings and levels of importance can be attached to management control systems, and different organizations may require vastly different types of control systems to help manage. Just as importantly, existing management information systems do not have to change in response to strategic changes (Meyer & Rowan, 1977, Meyer, 1986; Hopwood, 1987, 1990). Thus, existing systems of management accounting may remain unaltered and undisturbed by changes in either corporate or environmental strategy, effectively offering only a loose coupling with new information systems.

As a result of such findings from the mainstream accounting literature, both the design and function of management control systems are seen as organizationally specific, and so it would not be surprising to see firms approaching environmental and strategic management in different ways. Whilst systems of SMA, SEM and EMA may be present within an organization, they may not be in a form that coincides with *ex ante* theoretical representations of such systems.

Strategy may influence the design of management information and control systems, but management control systems can also influence the very choice of organizational strategy, aims and objectives. This 'multi-directional' contingency relationship has been documented in empirical research (Hopwood, 1989; Dent, 1990; Simons, 1994; Chapman, 1997), and appears to be important if one considers a potential shift in management accounting to a new form of environment-related management accounting. New forms of management information and control may reveal the potential for changes in strategic direction, rather than merely support current strategies (Simons, 1987, 1990, 1994). For example, Simons (1994, p.169) observed how new managers often used management control systems as a way to introduce programmes of strategic renewal and change:

'In situations of strategic change, control systems are used by top managers to formalise beliefs, set boundaries on acceptable strategic behaviour, define and measure critical performance variables, and

motivate debate and discussion about strategic uncertainties’.

Thus, new and existing management control systems can prevent (and preserve) organizational inertia, communicate new strategic agendas and ensure attention is paid to new strategic initiatives. However, a criticism of the work of Simons (1987, 1990, 1994) is that it focused on the formal routines, procedures and controls within the organization, and failed to consider the more ‘irrational’ control processes highlighted by Meyer and Rowan (1977) *inter alia*.

Empirical research has also shown how embryonic management ‘notions’ can become manifest through new systems of accountability and performance measurement, providing the possibility for organizational reform and the emergence of new strategies (Dent 1990; 1986; Simons, 1994). Alternatively, new organizational imperatives can be dealt with in a less than rational manner, by established management techniques and so limiting their organizational ‘visibility’ and meaning. Research such as this helps understand the role of management control systems in the strategy process, but still remains an underdeveloped area of research.

3.4.1 Strategically Relevant Forms of Management Accounting

Despite the urgent calls for the provision of management accounting information that is more relevant for use within the strategy process, there is not an extensive literature exploring the relationship between management accounting and corporate strategy (Lord, 1996; Tomkins & Carr, 1996). Furthermore, even within the existing literature there is no agreement on either the scope or the extent of management accounting’s usefulness within the strategy process. There is no agreed conceptual framework for SMA, as Tomkins and Carr (1996, p.165) explain:

‘An agreed and well specified overall framework for SMA has not been worked out yet, even though one can see the main thrusts of the development. It is perhaps not surprising that such a framework does not yet exist when one takes into account the way in which the corporate strategy literature has developed and shifted over the last decade in its attempt to describe and define the nature of strategic management itself.’

Thus, due in part to the diverse nature of the corporate strategy literature, SMA remains a divided ‘work in progress’ focusing on many different areas. Despite this however, SMA attempts to describe the management accountant’s contribution to corporate strategy that involves the provision of certain types of information. What sort of information would SMA provide? This is explained by appealing to the definitions of SMA in the literature.

Strategic management accounting was first defined by Simmonds (1981, p.26) as:

‘The provision and analysis of management accounting data about a business and its competitors for use in developing and monitoring the business strategy, particularly relative levels and trends in real costs and prices, volume, market share, cash flow and the proportion demanded of a firm’s total resources’.

Strategic management accounting is similarly defined by Bromwich (1990, p.28) as:

‘The provision and analysis of financial information on the firm’s product markets and competitors’ costs and cost structures and the monitoring of the enterprise’s strategies and those of its competitors in these markets over a number of periods’.

From these definitions it is clear that SMA information has a more explicit ‘external’ focus than that provided by traditional management accounting, as it seeks to ascertain the organization’s market and cost position relative to its competitors (Roslender, 1995). However, a comprehensive approach to SMA would also be concerned with providing new forms of internal information that will help management devise better strategies (Simmonds, 1981; Shank & Govindarajan, 1989; Wilson, 1991). Using the business strategy taxonomy suggested by Porter (1980, 1985), one would expect an organization to attach more importance to traditional cost management when it pursues a strategy of cost leadership (Shank 1989; Shank and Govindarajan, 1989). The management control systems of the organization should ‘match’ and support the type of strategy being followed. One could also suggest that inappropriate management information systems serve to limit the strategic possibilities considered by the organization (see Dent, 1990).

Despite the slowly growing number of theoretical papers on SMA, particularly in the professional and practitioner journals, there is a paucity of examples of SMA actually being used in the manner prescribed by the theorists (Roslender, 1995; Lord, 1996). Furthermore, many of the elements of SMA may already be in place within organizations without the need for the information gathering and analysis skills of management accounting, as Lord (1996, p.348) explains:

‘The techniques and elements of strategic management accounting may in many cases already be found in firms. However, the information may not be quantified in accounting figures, and may not be collected and used by management accountants. Rather, the techniques for gathering and using information necessary for survival in a hostile and competitive environment may be part of the operational management of firms’.

Thus, although accountants are purported to be ideal for or necessary to the strategic management activities of an organization, such activities may take place without the involvement of the management accountant. This exact same point seems to apply to the use of environment-related management accounting, at least in the UK.

3.4.2 Environmentally Relevant Forms of Management Accounting (SEM)

As with SMA, there is no agreed conceptual framework for the scope and extent of environment-related forms of management accounting. What makes matters worse, is that there are many alternative definitions and types of terminology at work. The US Department of Environmental Protection for Pennsylvania (DEP, 1997, p.1) defines strategic environmental management as a system that:

‘integrates environmental management objectives into an organization’s strategic goals to enhance the efficiency and effectiveness of its operations and gain a competitive advantage. It provides a management framework within which most companies and local governments can identify cost-effective actions that maximise their operational efficiency when they strive for zero emissions over time. A strategic environmental management system can improve products, save significant costs, improve production processes, reduce liabilities and waste management costs, enhance market responsiveness, lower insurance premiums, and improve competitiveness, while achieving environmental efficiencies’.

Green management accounting (GMA) is defined as:

‘a management tool used for a variety of purposes, such as improving environmental performance, controlling costs, investing in "cleaner" technologies, developing "greener" processes and products, and informing decisions related to product mix, product retention, and product pricing.’ (Bojie, 1999, p.1)

Eco-management accounting (ECOMA) is defined as:

‘as the generation, analysis and use of financial and related non-financial information in order to integrate corporate environmental and economic policies and build sustainable business. It is an emerging area which is of great importance to all companies who take their ecological environment seriously and wish to fully integrate environmental concerns into their business. (ECOMAC Project, 1996, p.1).’

Environment-related management accounting is defined as:

‘The generation, analysis and use of financial and non-financial information in order to improve corporate environmental and economic performance.’ (Bennett & James, 1997, p.36)

Environmental Management Accounting (EMA) is defined as:

‘EMA is broadly defined to the identification, collection, analysis, and the use of two types of information for internal decision-making:

- physical information on the use, flows, and fates of energy, water, and materials *and*
- monetary information on environment-related costs, earnings, savings’. (United Nations Division for Sustainable Development.’ (UNSD), 2001, p.2)

This definition is widely used in the recent literature (see IFAC, 2004). However, an alternative definition of EMA comes from Birkin (1996, p.34), who sees it as a whole new profession with the following features:

1. EMA is concerned with the provision and interpretation of information which assists management in planning, controlling, decision-making and appraising performance.
2. The key feature of the information is that it must be relevant for the intended purpose.
3. The information supplied by the *environmental* accountant is future orientated and must reflect *environmental* and economic realities unfettered by accounting conventions.
4. The *environmental* management accountant must be aware of the behavioural consequences of his

actions and information. Goal congruence must be encouraged.

5. EMA systems should be designed in accordance with system principles and are improved by the judicious use of appropriate statistical and operational research techniques.
6. Uncertainty exists in all business situations and the information supplied by the *environmental* management accountant must reflect the uncertainties and variabilities of the situation.

Birkin (1996, p.34) suggests that EMA is rooted in the internal functions of the firm “but is outward-looking where appropriate”, and the basic goal of the profession is “to optimise the efficiency of the a company’s resource conversion processes”. Birkin sees EMA as a logical development of management accountancy, with many traditional management accounting tools useful within EMA.

In all of the above definitions, it is not entirely clear if these environment-related forms of management accounting are designed to be an additional system or totally integrated and subsumed within the conventional management accounting systems. Whilst this is a problem, the more pressing problem may be how this environmental information is used within strategic decision-making, and whether management accountants are the ones to supply this information.

3.5 Researching Links Between Accounting, Environment & Strategy

Manufacturing organizations are now facing ‘external’ demands for environmental ‘accountability’ on their actions to reduce environmental impacts. Because of this, many corporations are now publishing environmental ‘strategies’ and objectives as part of their overall corporate and business strategy (see Fisher & Schot, 1993). As a result, management accounting is facing demands for it to become more strategically focused and also for it to reflect environmental issues. Management accountants have traditionally been seen at the centre of the provision of management information for strategic decision-making (see Loft, 1991; Miller *et al*, 1991). Calls for SMA, SEM and environment-related accounting all imply that present systems of corporate information systems are in some way deficient for management decision-making within the modern corporation.

The role of management accounting within the provision of strategically and environmentally relevant management information is not clear. Despite the literature urging management accountants to become more involved in the provision of information for these two issues, evidence for it happening is limited and suggests that the provision of SMA information does not require the involvement of management accountants (see

Roslender, 1995; Lord, 1996). Likewise, the provision of environment-related management information does not currently involve the management accounting function. For example, Birkin (1996, p.36) observes that management accountants are not involved in EMA:

‘Who is doing EMA? Unfortunately not UK accountants! There are exceptions, of course, but in my experience of a broad range of companies and practitioner surveys, UK accountants are carrying on business as usual’.

This lack of widespread accounting interest in developing either environment-related management accounting or generating environmental information is supported by evidence from more recent research (see Wycherley, 1997; Bennett & James, 1998a; Larrinaga-Gonzalez & Bebbington, 2001; Burritt, 2004). Apart from SEM and Birkin’s (1996) reference to the “outward-looking” nature of EMA, all of the definitions of environment-related management accounting implicitly envisage a largely ‘internally’ focused management system with little requirement for external strategic comparisons of the environmental costs and record of market competitors. None of the definitions of environment-related accounting include the notion of ‘strategy’ within them, but can it be assumed to be implicit within each definition? If this cannot be assumed, then the authors of such definitions do not see such systems as playing a fundamental role in directly shaping the overall strategic direction of the firm. Thus, such systems may be seen as fulfilling a secondary and supporting role, which may even be de-coupled from conventional management accounting.

If management accountants are uninvolved with the provision of environmentally or strategically relevant information, could such new types of management information challenge their existing organizational power? Answering this question requires empirical research. However, it could be that elements of what SMA, SEM and EMA aim to manage are already being measured and managed without the need for further management accounting systems (e.g. ISO 14001 EMS already provide a considerable array of non-financial data on environmental impacts). Furthermore, as the relatively slow adoption of SMA indicates, UK management accountants could be slow to establish a role within the provision of environmental information within the firm. What is needed is further empirical evidence that describes the current role of management accountants in UK environmental management. This need provides the rationale for this present thesis.

3.6 Thesis Methodology and Research Methods

This first part of this chapter highlighted the rationale for the choice of research question. Despite the literature being replete with prescriptions for environment-related management accounting, few UK studies have been carried out that seek to identify the role of UK management accountants within the development of EMS. This thesis aims to provide further evidence about these roles, and the remainder of this chapter explains the research design used to achieve this.

3.6.1 Research Paradigm

Kuhn (1962, p.viii) defines research paradigms as “universally recognised scientific achievements that for a time provide model problems and solutions to a community of practitioners”. In essence, there are two main research paradigms or philosophies, which can be defined as ‘quantitative’ and ‘qualitative’ (Creswell, 1994). Choosing which paradigm to use is influenced by the nature of the topic under investigation:

‘The choice and adequacy of a method embodies a variety of assumptions regarding the nature of knowledge and the methods through which that knowledge can be obtained, as well as a set of root assumptions about the nature of the phenomena to be investigated’. (Morgan & Smircich, 1980, p.491)

It has been argued that the choice of a paradigm (tending towards the quantitative or the qualitative) is predicated upon ontological assumptions concerning the nature of reality; on assumptions concerning human nature and the relationship of man and environment; and on epistemological assumptions concerning the nature of knowledge itself (Burrell & Morgan, 1979; Morgan & Smircich, 1980). These four dimensions are viewed as being situated along a continuum from qualitative to quantitative. A researcher’s position on this continuum is governed by the nature of the phenomenon under investigation (Morgan & Smircich, 1980). This means that there is a strict linear relationship between ontology, assumptions regarding human nature, epistemology and method (Burrell & Morgan, 1979). However, as Bryman (1984, p.88) argues:

‘while the apparent debate between quantitative and qualitative methodology may have some meaning at the epistemological level, e.g. in terms of casual adequacy as against adequacy at the level of meaning, in the context of research practice there is no direct link between these precepts and particular techniques, since research typically comprises both elements’.

Thus, a technique can be used in a variety of ways according to the orientation of the researcher (Morgan & Smircich, 1980). This would mean that there is no necessary causal link between ontology and epistemology, and the methods chosen for a particular piece of

research. Rather, the ontological and epistemological stance of the researcher and the phenomenon under investigation could be construed as important determinants of the way in which particular methods are used. This research attaches primary importance both to the views and experiences of accountants and environmental managers themselves in constructing their social world, and to the way that institutions and organizations can construct social reality. This implies an ontology and an epistemology towards the qualitative end of the continuum (Morgan & Smircich, 1980), and is indicative of an action perspective, which assumes that people are social actors, creating, as well as created by, their environment. Accordingly, the most appropriate method for the thesis is one that permits direct appeal to the voices of the organizational managers and accountants themselves and, at the same time, allows institutional patterns to emerge.

3.6.2 The Role of Theoretical Models under the Qualitative Paradigm

The normal process under a qualitative paradigm is to *not* develop a theory from the existing literature as: ‘methods of enquiry need to be uncluttered from theoretical definition on the grounds of the potential damage they may do to the perceptual process’ (Laughlin, 1995, p.81). However, as will be discussed in chapter 4, there is an established literature on the way that management control systems play a role within organizational change and also on the factors that may influence a firm’s responses to ‘external’ green demands. It was decided to use this existing literature in order to build a number of ‘skeletal’ theoretical models that provide a broad understanding of the relationships between management accounting, organizations and environment management. Accounting practices are not some technical, context-free phenomenon; therefore, it was not possible to provide a definitive model of such relationships. However, even if accounting practice is shaped by organizational and social contexts, it does not mean that the functioning of each and every accounting system is totally unique and separable from all others. Thus, a number of ‘skeletal’ theoretical models were produced to provide a framework for exploring the role of management accounting within corporate ‘greening’. As a result of this decision, the research paradigm shifts to a ‘middle-range’ paradigm devised by Laughlin (1995). Within such an approach, unlike the pure qualitative paradigm, it is believed that ‘skeletal’ theoretical generalisations of reality are possible, but require empirical data to make them meaningful. Thus, the ‘middle-range’ paradigm recognises a material reality distinct from our interpretations, but does not dismiss the “inevitable perceptive bias in models of

understanding” (ibid). Laughlin (1995) argues that in the social sciences it is only possible to have a ‘skeletal’ theory. This would be incomplete, but “empirical data will always be of importance to make the skeleton complete in particular contexts” (ibid, p.81). This does not mean that the theory will be changed or permanently completed, but will remain as a general framework within which a study can be completed.

This thesis develops a number of interrelated ‘skeletal’ theoretical models that, in their totality, attempt to provide a general model of the process of ‘organizational greening’. From initially identifying the ‘external’ pressures faced by the firm, through to the method by which organizational context interacts with them, these models aim to locate and describe the role of management accountants, EMS and environmental information within the overall process of organizational ‘greening’. Each of these ‘skeletal’ models (and six general hypotheses) were described in chapter 1 (section 1.6.1), so will not be elaborated upon further until they are actually developed in forthcoming chapters.

Each of the ‘skeletal’ theoretical models are given meaning by the empirical data. The primary role of these theoretical models is to “amplify” (Broadbent *et al*, 2001, p.577) the role of management accounting within the whole process of organizational greening rather than being used to derive a “formal set of propositions that are to be tested through empirical detail” (ibid). Although six very general hypotheses are derived from the ‘skeletal’ models, they are simply designed to test general issues that may influence corporate greening, rather than predict the precise nature of greening (see chapter 5). The skeletal models will be ‘fleshed out’ by the empirical detail found, and be used to explain what has, and may happen in a certain organizational context. Alternatively, if the ‘skeletal’ theoretical models do not adequately explain each empirical situation, then at least one of the models, and the theoretical literature from which it derives, must in some way be inadequate for describing the role played by management accounting within organizational ‘greening’. It is the presence of such theoretical ‘inadequacies’ that makes empirical work both essential and interesting to the researcher. The ‘skeletal’ greening models might be revised, ‘fleshed out’ or ‘completed’ by the empirical data that gives them meaning. However, even if revision of a model is the only option, it is still valuable by the fact that it proves that certain theories espoused in the literature do not adequately explain the role of management accounting in environmental management. As indicated in previous chapters of this thesis, the literature claims that organizations must adopt EMS

and environment-related accounting, but there is very limited empirical testing to validate this position. The ‘skeletal’ models and empirical data presented by this thesis are an attempt to discover the validity of such claims, and offer insight into the way that accounting actually becomes entwined within the organizational ‘greening’ process.

However, the work contained in this PhD is only the start of this research program in the field, and will be developed and expanded over time. The aim of the thesis is to advance understanding of the interactions between management accounting and environmental management within UK organizations. Only continued empirical work can hope to fulfil this aim; this original study establishes a beginning, and a contribution to the field.

3.6.3 The Use of Theoretical Triangulation

In order to overcome the potential bias of a single-theoretical approach, theoretical triangulation (Easterby-Smith *et al*, 1991) was incorporated into the research design. This approach follows the “distinct tradition in the literature on social science research methods that advocates the use of multiple methods and theories” (Jick, 1979, p.602).

The theory used to construct the ‘skeletal’ models of ‘greening’ was taken from a number of different disciplines, including environmental studies, philosophy, economics, accounting and organizational management. This included contingency theory, institutional theory, social contract theory, population ecology theory, resource dependency theory and economics. The use of this theoretical triangulation avoided a single theory approach to the study of the role of accounting within greening, since existing research shows that no one single theory appears to explain the rich array of different ‘greening’ responses of UK organizations (see chapter 4).

3.6.4 Data Collection Method: The Case Study

Within the chosen ‘middle-range’ research paradigm, the case study approach appears to be the perfect method to obtain the necessary first-hand data from organizations and individuals.

An important characteristic of case study research is that it is a way of looking at a complete set of phenomena and their interrelationships (Smith, 1990). The value of case

studies as a form of research lies in their potential to demonstrate the validity, or otherwise, of theories by logical, as opposed to statistical, inference (Mitchell, 1983). What this suggests is that cases need to be especially selected so that they can illustrate aspects of theory, rather than, for example, using a randomly chosen sample, as in survey research. There is some debate as to whether the case study approach is a valid form of research (Smith, 1990). However, as Mitchell (1983, p.190) argues, inference from case studies 'is in fact based on the validity of the analysis rather than the representativeness of the events'. Thus, the theoretical foundations upon which the case rests, together with the way in which the results are analysed and relationship identified, determine the validity of the study.

The case study seems to be the best way to approach an analysis of the role of management accounting within the development and use of EMS since it enables organizations and their management to be examined holistically. From this an overall picture emerges as to the attitudes and actions of management accounting in corporate 'greening'. For these reasons, it was decided to adopt a case study approach for collecting the majority of the data.

3.6.5 The Approach to the Case Studies

Existing studies of the role of management accountants within environmental management have focused on interviewing and surveying one of either environmental accountants or environmental managers (see for example Bennett & James, 1997; Wycherley, 1997; Frost & Wilmshurst, 2000; Wilmshurst & Frost, 2001). Obviously, the evidence from questionnaire-based studies is biased by not being generated within the specific organizational context in which such roles are created (see for example, Wilmshurst & Frost). However, both these and interview-based studies are limited in their ability to describe the role of management accounting within EMS if their empirical evidence originates from just one type of professional manager data. A single type of functional manager cannot be expected to possess an in-depth knowledge of the operation and functioning of both management accounting and EMS. Interviewing both accountants and environmental managers establishes just who controls, and is *responsible* for, the development and operation of corporate environmental management innovations within the firm. Furthermore, it enables the researcher to obtain an insight into the use and meaning attached to EMS information alongside conventional accounting information. These

insights can also be cross-referenced by interviewing production managers and other personnel who may have an alternative view of the role of accountants within environment management.

To fully and accurately describe the role of accounting within corporate 'greening', the case studies needed to explore the 'organizational' as well as the mere 'technical' aspects of the firm. The 'organizational' side is critical for making sense of the case studies, since conventional management accounting creates a specific 'visibility' of environmental problems and feasible solutions within the firm. New systems of EMS and environmental information create alternative 'visibilities' of organizational action that may have important consequences for the management accounting function. Alternatively, environmental management and its associated information may simply have no effect on the use of conventional management accounting information within decision-making. These issues are specifically explored within the case work in this thesis.

In order to achieve the aims of the project and to apply the general 'skeletal' models in an empirical setting, it was vital to observe and interview environmental managers, management accountants and production staff in the specific organizational context in which they operate. As a result, it was essential to visit the site at which operations took place to assist contextualisation of the studies. Environmental issues are not invisible, and one may often gain an insight into the corporate environmental attitude from just walking around an interview location and observing what takes place. During this study, the researcher made a total of eleven site visits to the three main case study sites, and two further site visits at the preliminary case study. These site visits allowed the researcher to observe the *actual functioning* of manufacturing operations, environmental management and management accounting, rather than solely relying on descriptions of how they *should function* via questionnaire or interview data from organizational participants. In addition to these site visits, the researcher was also allowed to undertake three periods of participant observation and 'shadowing' of environmental managers at two of the case study sites. Further details of the site visits and observation undertaken will be provided later in this chapter.

3.6.6 Selection of the Case Studies

The very breadth, complex nature and relative 'newness' of this thesis's subject matter has made the research both exciting as well as very challenging. This newness has certainly made the identification of both 'fertile' and 'willing' case study subjects relatively problematic. Relatively few UK manufacturer organizations had fully developed environmental management systems when the thesis was started, and this situation has only begun to improve more recently (see Chapter 4). Furthermore, organizational participants were often too busy struggling with the management of environmental issues to allow this researcher the time and access needed.

One firm approached stated that the small scale of their environmental management function made it almost impossible for them to participate in the research (Severn Trent plc). Another firm stated that further development of their EMS must take priority over participating in a case study (Eastern Electricity), but an interview with the environmental manager revealed that management accountants were uninvolved in the implementation or operation of the EMS (see chapter 7 for details). A further company denied access, but documented that there was "no significant input from the accountancy functions in the development of the EMS" (Unigate Dairy Crest Ltd).

Such responses were in stark contrast to certain organizations only too willing to demonstrate how far they were reacting to environmental pressures. These two extremes of responses to the request for involvement in this project are in themselves extremely informative. The 'skeletal' theoretical models developed in this thesis would expect to observe firms that are struggling to cope with the introduction of EMS, due in large part to the relatively *ad hoc* and emergent nature of such issues. Furthermore, the theory would also expect to observe firms dedicating relatively small amounts of manpower and other resources towards developing 'green' innovations. Firms have to balance environmental issues and may only act on the environment when, for example, their customers finally demand it (see chapter 4). Seen from this viewpoint, the reasons for the firms declining to be included with this research project are as predicted by the 'skeletal' theoretical models. It is extremely hard for an organization to allow an outside researcher access to its environmental innovations if these merely serve to highlight areas of organizational crisis, disagreement and uncertainty. It must also be recognised that, especially where firms did

not give specific reasons for declining to participate in the research, a firm might simply be disinterested in the project and this researcher.

In contrast, firms happy to allow access to their environmental innovations could have done so for a variety of reasons. They might want to help an academic researcher, but seemed to go much deeper than this altruistic reasoning. Hopefully, the firms truly believed in the value of their systems and wanted to share the academic value of this with an outside party. However, the theoretical models would also argue that the very process of firms sharing their experiences and developments could be motivated in some degree by a desire to appear more 'legitimate' to the outside world. As discussed in chapter 4, firms can be observed to be discussing their environmental innovations in the public domain, even when it does not appear to directly enhance their existing knowledge of environmental issue. For example, within this study, two firms have held specific opening evenings at their premises in order to demonstrate their 'greenness' to invited parties. As the theoretical model predicts, this could be motivated by a desire for outside 'legitimacy'; why else would firms be willing to share such information? As was explored earlier in this chapter, firms might secure a source of long-term competitive advantage by leading the way in environmental innovations (Porter, 1991a). If this holds, it would seem foolish to openly allow others access to such valuable experiences, successes and failures in the area of environmentalism. Obtaining 'legitimacy' seems to play a role in explaining the openness of firms to talk about their environmental issues and initiatives, and suggests greater weighting within the organization than hoped-for competitive advantage.

In conclusion, even the reasoning for accepting or rejecting the offer of participation in this research project offers important insight and adds to the discussion of 'greening'. The 'skeletal' theoretical models clearly anticipate the conjecture, and it is something that could easily be overlooked by the researcher. However such observations can give vital clues as to the role management accounting ultimately plays within environmental innovations.

3.6.7 The Empirical Data

The corporate operations at three UK manufacturing sites were selected as the main case studies for this work. Additional evidence was obtained from a site visit to Cobe Laboratories, but could only be used as a 'preliminary' case study due to the failure of

securing an interview with a company management accountant. All the manufacturing sites were indirectly selected through their membership of the Gloucestershire Green Business Club (GGBC). GGBC was part of a network of such clubs partly sponsored by the Environment Agency on a county by county basis (see chapter 4). The author was employed at that time by the academic institution responsible for organising the Gloucestershire Club, and had indirect access to the membership details of certain members. Following discussions with the Head of GGBC, the author approached (via letter) eleven members of the GGBC thought most willing to help with the research. A copy of this contact letter is included in appendix 2. In addition to these eleven members of the GGBC, the author sent further contact letters to four corporate environmental managers that he had conversed with at various conferences. Out of the fifteen approaches, the author received ten replies of which three turned into in-depth case studies and one into a preliminary case study. Of the remaining six replies, three resulted in the author obtaining useful, if limited, empirical evidence about the role of accounting in EMS.

Of the three sites used as the main case studies, all of them were manufacturing organizations. All are examined under pseudonyms, at the request of the participants. The first two, Iceco and Paperco, manufacture products from the raw materials stage, whilst the third, Copyco, largely manufactures and assembles its products from ready-made bought-in components. The primary product manufactured by Iceco is ice cream, Paperco produces industrial filter paper, and Copyco manufactures and disassembles photocopiers and printers. Of the three UK sites, Iceco and Copyco were UK subsidiaries of large multinational parent organizations, whilst Paperco was a small/medium sized enterprise that had recently been taken over by a US parent company (group turnover \$162 million in 2003). It was important to obtain this variety of different sized organizations and different product types within the sample, as size and type of product were two factors that were hypothesised to influence the level of corporate 'greening'. This was demonstrated by the research. Also important was to observe the influence of intra-organizational linkages such as ownership structure, and the case studies illustrate the powerful impact of multinational ownership on the environmental activities of UK manufacturing subsidiaries.

Of the three firms, Copyco and Iceco had established EMS that were certified as conforming to the requirements of ISO 14001. In addition, Copyco had also had its system accredited to EMAS specifications. At the time of the case study, Paperco did not have an

EMS in place, but was actively seeking to develop such a system if it was “cost effective to do so”. The existence within the firm of an ISO 14001 certified environmental management system, or the potential for one, was deemed very important when selecting the case studies. The presence of such systems showed that firm was 'greening' on some level, and that the theoretical models could be fully explored during the case study. At the very least, it meant that there would be something to investigate during the case study. X

3.6.8 Limitations of the Case Material

There was a degree of bias in the sampled selection of case studies for a number of reasons. Within the theoretical models, the pressure and influence of professional and business-related organizations was identified as one of an array of ‘external’ greening pressures. All three firms (along with Cobe Laboratories, the preliminary case) were members of the GGBC, which suggests that this could have been a powerful ‘external’ influence. As such, the sample of firms were each being influenced to some degree by the same thing, which prevented the testing of the existence of certain other ‘external’ greening pressures, such as customers. The second problem of bias came from the fact that all organizations were being ‘pro-active’ in dealing with green pressures, as they were all members of GGBC and faced pressure to act through their overseas ownership structure. In order to reduce the potential bias in the selected research sites, it would have been useful to include ‘independent’ UK manufacture organizations from outside the membership of GGBC. Four such firms were approached, and none of them wished to participate in a case study.

As well as the bias from the selection of the companies themselves, there is also the problem of bias within the information supplied to the researcher by the participants within the case study. Environmental managers and production managers may dislike accountants, and vice versa. Although this can be very revealing, it may also distort the way each type of manager talks about the other organization function, and may downplay their role and importance. More directly, each type of manager may not have enough knowledge about the other function to comment on them. For instance, environmental managers may not understand what accountants do and need to achieve, and vice versa. However, this lack of cross-functional understanding may be important to the research as it may directly inhibit the possibility for environmental change within the firm.

Another problem with the case study data was that it only gave a 'snapshot' in time of the development of environmental management within the firm. The case studies were conducted over an eleven-month period at each site. Obviously, the author would have liked to now conduct further case work at each site in order to see how things might have changed since the original interviews and observations took place, thereby giving a more a 'robust' longitudinal study of 'greening'. Obtaining such longitudinal empirical evidence was especially important for applying the 'skeletal' models of greening change and the tracks of greening. However, after the initial case study work, access to all three sites was no longer available for a variety of reasons. At Iceco, the environmental manager responsible for granting access to the researcher retired, and the European parent company forced the factory to reorganise and make 70% of its workforce redundant. At Copyco, the US parent company decided to move manufacturing activities away from the site, and 90% of the workforce were eventually made redundant. At Paperco, the director responsible for environment and accounting retired, and the company "no longer wished to divulge confidential operational information into the public domain". In terms of the events at Iceco and Copyco, it suggests that environmental management initiatives were insignificant when compared to the corporate demands for increased profitability and competitiveness. Furthermore, the retirement of key environmental 'champions' at Iceco and Paperco suggests a powerful influence of individuals as 'leaders of corporate greening'. At Paperco, the US parent lost a costly court battle six months after the case work ended, after it was alleged that the company had taken part in an elaborate cover up over the harmful impact of one of its products. This could explain the sudden reluctance to advertise the environmental qualities of its products and operations to an outside researcher.

A final, and very important, limitation of the case studies was that the researcher was not actually present during the original organizational 'genesis' of environmental management innovations in two out of the three case studies. By not being party to the start of such innovations, the researcher cannot observe the unique constellation of factors involved in bringing 'external' greening pressures within the boundaries of the organization. More specifically, neither could one directly observe the role of management accounting within the process. However, conceptual problems are not unique to this thesis, and have been widely documented in empirical work into management accounting (see Scapens, 1990). As Hopwood (1987) suggests, the solution to such problems is to search backwards and

forwards through the 'archaeological' layers behind the development of such innovations. In order to do achieve this, the researcher does not have to directly observe what is going on from start to finish. Clearly, an 'archaeological' investigation into the role played by accounting within 'greening' can equally be performed by using the views elicited by organizational members, and supplementing those views with information from internal documentation. This is the approach used in the case study analysis in this thesis.

3.6.9 The Case Study Interviews

Each case study obtained interviews with the environmental managers, management accountants and production personnel at each site. The definition of 'environmental managers' included the organizational participants with responsibility for environmental management within the firm. The definition of 'management accountants' included organizational participants with responsibility for the finance and accounting functions of the organization. On the basis of the literature evidence, the expectation was that the person or persons performing the accounting and environmental management roles would be different, but this was not the management arrangement in one of the cases, where one manager had overall responsibility for both roles.

An interview has been defined as an interaction between two people with the aim of eliciting information from the respondent (Denzin, 1970). The interview method is particularly well suited to collecting subjective data. It also enables more complex and 'unbiased' information regarding attitudes to be elicited than is possible by postal questionnaires, as the interviewer can use judicious probing to pursue avenues of interest and to encourage the interviewee to provide further information (Hussey & Hussey, 1997). For these reasons, it was decided that the interview method would be particularly appropriate for use within this study, which is aimed at eliciting information from organizational managers about the role of accounting within environmental management. By interviewing the managers, it was felt that further information could be obtained on this issue that was possible by questionnaire.

There are a number of problems associated with the interview method. These include, in particular, problems concerning the need to phrase questions in a neutral manner that does not lead the interviewee to a particular answer (Saunders *et al*, 2000). Many of the

problems concern possible biases introduced by the interviewer (Smith, 1990). An interview is a social situation, and the co-operation of the interviewee depends, to a large degree, on the way the interaction is handled by the interviewer. Even unknowingly, the interviewer can produce 'signals' of approval or disapproval of particular answers, thus influencing the interviewee. The way the interviewer is dressed, his/her age and social background can also influence the responses given (Hyman *et al*, 1978; Saunders *et al*, 2000). The validity of the responses given can also be affected by respondents providing the answers that s/he believes the interviewer would like to hear (Smith, 1990). However, the interviewer can do much to encourage the interviewee to provide accurate information and especially encourage expressions of affect (Denzin, 1970). Moser & Kalton (1971) refer to three elements necessary for a successful interview, all of which can be fostered by a good interviewer:

1. Accessibility of the required information to the respondent – this can be impaired by memory lapses.
2. Cognition on the part of the interviewee of what is required of them, together with an awareness of how much s/he should say.
3. Motivation of the interviewee to proceed with the interview and to answer correctly and accurately.

For these reasons, a good 'fit' between interviewer and interviewee has been recommended (Denzin, 1970) to produce the best results, although over-identification can be a hazard too. In this case, the researcher was an academic accountant, which made conversing with organizational accountants relatively easy. More care had to be taken when interviewing production staff and environmental managers, as many seemed slightly intimidated by conversing with an 'outside accountant lecturer'. However, the researcher's father worked as a production manager at a food manufacturer, and was able to provide advice on how to talk to such individuals about the research project. Furthermore, the researcher had prior experience of how best to approach talking to environmental managers during various meetings of the GGBC.

Various types of structured and unstructured interviews have been advocated (Denzin, 1970), but it was decided that, as the interviews were to be held in different companies and with various types of managers, it would be best to work from a reasonably standardised schedule to facilitate comparisons, and a semi-structured format was regarded as the optimal solution. The interview schedules took the form of a series of topics and themes about which the interviewee should be asked, including points which should definitely be

raised in each section, but provided no specific questions. During various preliminary conversations with environmental managers at conferences it was found that asking specific questions about environmental accounting issues produced little useful information and often discouraged the individual to talk about their knowledge and experience of environmental management within the firm. Thus, the aim of the interview schedule was to allow the respondent to elaborate on areas of particular importance to him/her, rather than imposing a rigid format, and allowed the researcher to discover how each functional area saw their role in environmental management. A copy of the interview schedule used is attached as appendix 3.

All the interviews began with an explanation of the nature and purpose of the research, and by thanking the respondent for agreeing to be interviewed. Agreement was then sought to the interview being recorded, it being explained that this was necessary to ensure that no points were missed. The previously agreed right to confidentiality and anonymity was reiterated by stating that nothing said by the respondent would be attributed to her or him or their employing organization without first seeking and obtaining permission. Before the substantive discussion got under way the interviewer outlined the way that he wished to conduct the meeting, provided the respondent with a copy of the interview schedule 'themes' to be covered and to confirm the amount of time available.

In the interviews, the interviewee was asked to talk about their background, organizational role and view of environmental issues. In each case, information was sought about their knowledge of, and involvement with, environmental management at the site. Information was also sought about their view on the need for corporate 'greening' and how it affects, and is influenced by, the operations and activities they were involved with. Finally, each respondent was asked about their knowledge of the interactions between environmental management, production staff and the finance function within environmental management at the site. As the respondent discussed each of these 'themes', the researcher politely asked a variety of open, probing and closed questions (Saunders *et al*, 2000) in order to obtain further description, details and confirmation of facts relevant to the research topic.

The number of interviews conducted at each site depended on the level of access granted to the researcher by the company. A total of twenty-seven interviews were conducted at the three main case study sites, including ten at Copyco, six at Paperco, and eleven at Iceco.

At all the interviews, notes were taken by the researcher, but they were also recorded if the interviewee granted their permission, so that a full transcription could subsequently be made and analysed. However, four interviews were not recorded, due to the recorder breaking down during the interview, and a further fourteen were not recorded according to the wishes of the interviewees. On average, the interviews lasted around one-and-a quarter-hours, although the longest were over two hours and the shortest, ten minutes. Data collected via interview was supported, validated and cross-checked with internal documentation and external publications obtained from the interviewees and other sources within the firm. In addition to the interviews held at the three main case studies, the researcher also conducted five other interviews for this research, including two with the environmental manager at Cobe Laboratories, the site of the preliminary case study.

3.6.10 Site Visits & Participant Observation at the Case Sites

In order to supplement the data obtained from the interviews with organizational participants and the examination of documents, the researcher also undertook a total of eleven site visits, three periods of participant observation and attended three corporate meetings at the three case sites. During the site visits, the researcher was able to observe the manufacturing operations, operation of the EMS procedures and environmental conditions at each site. The researcher took written notes of each visit, meeting or period of participant observation, specifically recording anything of particular note to the research question. Permission was not given to tape record any of the meetings attended or the participant observation sessions.

Five site visits were made at Copyco, with the researcher able to undertake participant observation 'shadowing' of the assistant environmental manager for two afternoons. He was also allowed to attend two two-hour cross-functional meetings on environmental issues. Four site visits were made at Iceco, with the researcher able to 'shadow' the activities of the environmental manager for one afternoon and attend a meeting an environmental meeting of production managers and the environmental unit at the site. Two site visits were made at Paperco, but the researcher was unable to 'shadow' managers or attend corporate meetings.

The site visits and participant observation provided a critical source of information, and

provided meaning to the views, opinions, examples and descriptions expressed during the interviews with organizational managers. For example, at Copyco the car parking pass was printed on recycled paper and there were signs throughout the site stressing that waste must be treated in the manner prescribed by the EMS, factors which demonstrate the systematic way that environmental issues were handled by the firm.

3.6.11 Interpretation of the Case Study Data

'Data collection, data analysis and the development and verification of relationships and conclusions are very much an interrelated and interactive set of processes'. (Saunders *et al*, 2000, p. 387)

The interpretation and analysis of the case study data commenced during its very collection at the site, rather than being left until all the cases work was completed. This approach helped to refine the analysis, and also improved the researcher's approach to collecting the key data at each site. As soon as the data was obtained from the various interviews, site visits, participant observation, meetings and document analysis at each site it was archived by the researcher. This data was then divided into categories or 'themes' depending on whether it related to EMS, environmental greening, the role of accounting or the general attitudes of the individuals concerned. Each category of data was then analysed alongside the 'skeletal' theoretical models in order to give it meaning in terms of answering the research question. This analysis helped to uncover the motivation for corporate greening, and the relationship between accounting and environmental management at each firm. It also helped to 'flesh out' the 'skeletal' theoretical models, especially with regard to the relative power and influence of certain 'external' and 'internal' greening pressures.

3.7 Conclusions

This chapter has outlined the rationale for choosing the project, the research question to be studied and the 'middle-range' thinking research paradigm adopted. The chapter described the methodology used to construct the 'skeletal' models, collect the empirical work and explained how the 'skeletal' models are used to amplify the empirical data. It also included a discussion of why certain empirical data was collected, what data was collected, when, from where and how it was collected. The limitations of the empirical data were discussed, along with ways to overcome them.

The next chapter develops the first of the 'skeletal' theoretical models that are used to give meaning to the case study data.

Chapter 4: The Social Demands for Organizational Greening

4.0 Introduction: The Impact of the 'External' on the 'Internal'

As was discussed in chapter 2, the continued degradation of the natural environment, and the crises so caused, have been widely discussed and documented. Whilst the available scientific evidence on environmental damage is still debated (see chapter 2, section 2.1.1), there are calls for urgent changes in the environmental actions of manufacturing organizations. Despite this, however, Gray *et al* 1993b, *inter alia*, indicates that the majority of Western organizations seem to be largely unaffected by the direct impact of such environmental degradation, and thus remain free to continue operating as before. 'No change' appears to be the philosophy adopted by many organizations when choosing their response to environmental pressures. However, the environmental literature is now rich in evidence to suggest such corporate philosophy is 'out-dated', and must change in response to the increasing environmental criticism from within many areas of society. (See for example Elkington & Hailes, 1989; Department of the Environment, 1992; Gray *et al*, 1993b; Pearce *et al* 1989 *inter alia*). Chapter 2 reviewed a selection of the environmental literature, with its concern with how both organizations and the economic system in general need to preserve environmental resources. The message from the environmental literature is that changing social regard for environmental protection should ultimately alter the strategic direction and operations of UK manufacturing organizations (Porter, 1991a; Porter & van der Linde, 1995).

UK public opinion has become more aware of environmental issues, although empirical evidence concerning the strength of such opinions is still relatively poor (see Elkington & Hailes, 1989). However, changing public perceptions have led to the wider social discussion of environmental problems, with clear implications for UK manufacturers:

'Increased legislative pressure, tougher regulatory bodies, diminishing insurance cover, greater public awareness and major environmental disasters have all conspired to propel environmental issues onto the business agenda'. (Hillary, 1993, p.13)

Social pressures for organizational 'greening' are affecting businesses, but in different ways (Greer & Bruno, 1996). Certain demands for 'greening' appear to require careful monitoring e.g. legislation, whilst others can be largely ignored e.g. lobbying from pressure groups. In practice, UK organizational response to green pressures remains mixed, with evidence of environmentally proactive, defensive and reactive organizations.

Organizations such as Eastern Electricity, The Body Shop, Xerox and Unilever appear to be implementing environmental strategies and setting environmental targets that go beyond those dictated by current environmental legislation (see Eastern Group, 1998; Body Shop, 2003; Xerox Corporation, 2000, 2004; Unilever, 1999, 2000). In contrast to this more 'positive' approach, Hillary (1991), in a survey of 1,420 UK managing directors, found that corporate environmental strategies were largely *ad hoc* and driven by legislation.

How then, can one approach the theoretical modelling of corporate 'greening'? It is indisputable that organizations do not blindly respond to the 'external' greening demands present within society. Such pressures have to be scanned for, interpreted and then balanced with other concerns and pressures on the firm. It is hypothesised that the unique organizational context of the firm predominates in determining the environmental 'posture' adopted by it, and management accounting systems should play a central role. As outlined in the introduction to the thesis, aspects of organizational context may actively 'encourage' or even 'filter' out the force of 'external' greening pressures, leading to different levels of organizational greening response in different organizational contexts. Finally, it can be hypothesised that the whole process of organizational greening is not a simple uni-directional process, where the firm adjusts 'internally' to 'external' demands. Rather, it is clear that the internal actions of the firm can influence 'external' pressures for change. Firms can be observed influencing the external context they face. Firms can lobby 'externally' and adopt practices and actions that are seen as socially 'legitimate'. As such, the firm is not a powerless actor in the greening debate, and can influence as well as be influenced. The role of both management accounting and the overall organizational context in determining the extent of 'greening' change are modelled in depth in later chapters, but attention will first be focused on the 'external' pressures for greening, and determine what they are and why they should bother firms.

Present environmental regulatory policy serves to limit the environmental harm caused by organizations. Since the publication of the UK Government's *Sustainable Development Strategy* in 1994 environmental issues in general, and the pursuit of sustainable growth in particular, becoming prominent areas for discussion and legislative action (see Sustainable Development Commission, 1998). It was issued in response to various international initiatives, such as the Brundtland Report (WCED, 1987), the 'Earth Summit' in Rio de

Janiero (United Nations Conference on Environment and Development, 1992) and the development of the European Union Action Programmes on the Environment (CEC, 1993b). The environment became an area for governmental action on both an international and national level, to be included in all future policy making which affects organizations.

In addition to these obvious regulatory pressures for 'external' greening, firms are also experiencing such demands from many different areas of society. Customers and employees have become more environmentally concerned, thereby influencing their consumption patterns and employment choices respectively (Elkington & Hailes, 1989). Green 'pressures groups', such as Greenpeace and Friends of the Earth, have also become socially acceptable, as well as more vocal. Scientific evidence has highlighted the impact of certain products on the environment and called into question the sustainability of commonly owned resources. Professional bodies, such as CIMA and the Institute of Chartered Accountants in England and Wales (ICAEW), have announced responses to environmental issues (see Howes, 2002a; Macve & Carey, 1992). Even industry and business associations have attempted to demonstrate their responsiveness towards green issues, such as, the Chemical Industries Association's (CIA) Responsible Care programme (see CIA, 1999).

The range of potential 'external' green pressures is discussed later in the chapter. More fundamental is to examine why firms should respond to these pressures at all, and what theory or theoretical ideas can be used to explain this.

4.0.1 The 'Non' Boundaries Between Organizational and Social Contexts

As organizational 'greening' can take place within both social and organizational contexts, the reality of an 'organization' should be seen as:

'A particular site of interaction of practices conducted in the name of the social and the economic, among other things...Seen in such terms the organization and society and the economy are no independent realms. Rather than residing without, the social and the economic pass through the organization in the course of their own formation'. (Burchell *et al*, 1985, p.404)

Thus the social and the organizational contexts should be viewed as interconnected and interdependent when one is studying organizational phenomena. The organization is embedded within society, and not a closed system. 'External' pressures and discourses can thus permeate the organization leading to change. Equally, 'internal' developments and discourses can flow back into society and alter social perceptions of accepted practice and

good management.

The contested nature of organizational 'greening' means that it is crucial to recognise the interdependent nature of social and organizational contexts, particularly when focusing on the subsequent development of new types of environmental management or environmental accounting system. The roles of, and development of, any organizational environmental accounting or management system are 'externally' and 'internally' constructed. Miller & O'Leary (1990) and Loft (1991), *inter alia*, argue that new forms of management accounting and information systems do not always emerge effortlessly in response to a 'practical need' for better managerial information. In this context, the need to develop an EMS and associated accounting measures may not arise from a 'practical need', but rather from environmental concerns within wider society. For example, Netlon Limited, saw the introduction of a BSI certified EMS as a way of demonstrating to its customers, insurers, the general public and regulatory agencies that it was environmentally responsible, as Ian Robinson (1994, p.5) the Works Manager explains:

'We believe that we shall need to be able to demonstrate our commitment to the environment to ourselves and our customers. Recently, a number of companies including B&Q have started sending out enquiries about environmental policies and grading the company as suppliers according to their response. By being able to publicly demonstrate our environmental awareness, we expect to achieve increased market share with the increased revenue and new product opportunities this represents...[and] we have already been asked for environmental information by our insurers'.

Within Netlon, the initial purpose behind the implementation of an EMS was not to improve managerial information on environmental efficiency. Rather, the EMS development primarily originated from the demands of external social forces, such as local government customers under the 'Best Value' criteria and regulatory bodies who wanted evidence of environmental performance of the firm:

'If we do not control our environmental problems [by] attaining specified environmental standards [it could result in] loss of contract as a supplier because of impaired environmental integrity, loss through plant shut down by regulatory agencies and loss of sales resulting from a poor image'. (ibid, p.6)

Suddenly, the measurement and management of environmental impacts and demand became critical and Netlon was forced to systematically manage its environmental impacts and produce evidence for its customers about its EMS.

Wider social pressures may encourage organizational innovations in EMS and environmental accounting:

'Other processes and concerns external to enterprises intervene and affect the tempo of accounting innovation. The analysis of internal accounting change needs to take seriously the complex network of

political and cultural debates within which accounting is enmeshed, rather than assuming it away'. (Miller & O'Leary, 1990, p.481)

Thus the ultimate role of management accounting within corporate environmental innovations may emerge from the ways in which:

'diverse types of events - institutional, technical, political, moral - are linked together to provide the conditions which make certain types of innovation possible'. (Miller & O'Leary, op cit, p.481)

Thus social concerns about the destruction of the natural environment, coupled with its 'alleged' cause, economic organizations, have helped to shape the potential for managerial innovation in organizational responses to environmental issues. In the UK, performance based upon purely 'economic' grounds no longer appears to satisfy various social groups, and organizations must be seen to attempt to minimise their environmental impact.

Hopwood (1990, p.14) identifies that social concerns may shape organizational actions:

'When the bases of organizational action are being challenged, when prevailing views of organizational purpose are being undermined, when significant groups start to interrogate and question the organization on grounds different from those involved in its current functioning and when questions are asked of either the adequacy or appropriateness of its modes of operation, there is a tendency both for the organization to account for itself by offering a more detailed and strategically directed explanation of its rationales, modes of functioning and consequences, and, where possible, for it to invest in the symbols and practices of the newly emergent rationality, seeking at least to conform outwardly to the newly articulated expectations for its behaviour and mode of operation'.

Thus, organizations may introduce new management practices in order to comply with social demands for 'greening'. For example, since 1992 a number of UK manufacturing organizations have implemented voluntary EMS in compliance with the BSI's BS7750 and ISO 14001 standards on EMS (BSI, 1992, 1996a, 2004). The BSI standards provide a basic model for an EMS, that, if followed:

'ensures and demonstrates compliance with stated environmental policies and objectives'. (BSI, 1992, p.2).

The current ISO 14000 series of standards have become accepted practice amongst many types of firms, and are now viewed as the 'appropriate' way to manage environmental issues (see for example, BSI, 1996b, 2004; Bennett and James, 1998a). These BSI standards on EMS emerged from interactions between specific organizations and bodies of expertise within society, but, surprisingly, did not originally include any professional accounting body such as CIMA. The standard was heavily derived from the existing BS5750 standard concerned with quality systems, and this helped to shape its meaning, scope and power. Although a bare framework, its development was a direct response to external social demands, attempting to enhance and demonstrate the green management credentials of UK organizations. However, the development of the voluntary standard also

prevented the threatened introduction of more stringent environmental legislation by government. It acted as a method of making BS7750 certified organizations appear legitimate to both UK government and other 'external' groups; evidence for factual behaviour change is less conclusive. Thus the interplay between social demands and organizational response may cause the existing management accounting system to change, or create new systems to supplement its deficiency in reporting on environmental impacts.

4.1 Coping with External Greening Demands: More or Less Accounting?

Chapter 3 outlined the range of largely prescriptive systems of environment-related being promoted in the accounting literature, and the roles such systems may play. Whilst the main discussion of the types of accounting and environmental information to manage environmental issues is contained in chapters 7, it is useful to also introduce it here as the basis for the theoretical modelling process.

Whether the organizational adoption of new environmental management initiatives involve accountants remains relatively unexplored, although the empirical evidence that exists has found that current environmental management practice is largely performed without the systematic involvement of accountants (see Birkin, 1996; Bennett & James, 1998a). Indeed, the increased social concern with the environmental impacts of organizations has called into question the alleged 'legitimacy' of economic calculations that exclude the environmental dimension of actions, most notable of which is traditional accounting (Gray *et al* 1993b). Hopwood (1985b, p.11) identifies that the obviousness of accounting functioning is increasingly starting to be questioned from a wider managerial perspective:

'Accounting is increasingly being seen as something that needs to be much more pro-actively mobilized and consciously related to the functioning of other organizational practices if organizational objectives are to met'.

In terms of managing environmental issues, organizations are now thought to require more appropriate forms of accounting and performance measurements, not less. The notion of 'environmental accounting' has been widely used, and has been applied in the context of national income accounting, financial reporting and management accounting. As highlighted in chapter 3, there are frequent calls for the development of a managerial form of environmental 'accounting', an 'accounting' which can be used to monitor the environmental performance of business enterprise. The US EPA (1995a, p.28) sees

environmental accounting as a tool to help business managers in:

'making capital investment decisions, costing determinations, process/product design decisions, performance evaluations, and a host of other forward-looking business decisions'.

However, the EPA does not state that accountants are actually *needed* to perform 'environmental' accounting. In addition, the development of the ISO 14001 specification for EMS has been devised in isolation from accounting bodies, which does question the role of accountants in such developments.

Social questioning of the efficiency of organizations may result in organizations using *increased* investment in the apparatus of economic management and accounting. Thus, new forms of accounting may be used in order to demonstrate a commitment to legitimate modes of economic functioning:

'accounting has been appealed to as much, if not more so, for what it is rather than what it might help the organization to become'. (Hopwood, 1985b, p.16)

Accounting can be seen as a manifestation of good economic management, of correct organizational arrangements and of a commitment to achieving efficiency. Importantly for the study of greening, Hopwood (1990, p.16) suggests that:

"in the midst of the urgency to change, accounting was provided with a symbolic rather than a technically instrumental role".

Thus accounting may be implicated in the 'management of appearances', and may only be loosely coupled with certain organizational functions. This idea seems very fertile when applied to organizational 'greening'. Organizations may seek to adopt new forms of accounting in order to give the appearance of economic efficiency, even though such systems may only be partially applied in decision making situations.

The work of Burchell (1985), Hopwood (1988), Miller and O'Leary (1987, 1990) and Miller (1991) are important for the understanding the importance of the social context in which organizational greening takes place. Miller (1991) describes how the promotion of discounted cash flow techniques for investment appraisal in the UK in the 1960s was closely linked to notions of the relative failure to generate 'economic growth'. Miller and O'Leary (1987) identify how efforts to re-invent Western managerial accountancy for the factory were supported and interwoven with theories of South East Asian economic superiority that pointed to a malaise in American business culture. Burchell *et al* (1985) explain the network of social relations and values that were a means for bringing about the introduction of value added statement accounting in the UK. These studies point to the

importance of the social context in understanding accounting and management innovations within the firm. This thesis uses these theoretical insights for the study of greening and the role of accounting within it. As such, environmental management innovations must be expected to arise from both *inside* and *outside* the organization. 'External' greening forces exist within society and firms are observed to be reacting to them. Greening responses within an organization, such as accounting, may be shaped by the organizational context in which they arise. Critically, these organizational environmental innovations may also serve to constitute, as well as just reflect, the demands of society, helping to shape the social 'reality' of environmental concern and expectations.

4.2 Organizational Responses to Social 'Greening' Demands: A Call to Theory

Before the chapter switches its attention to discussion of the range of 'external' greening pressures present in the UK, it is important to ascertain why firms should react to them at all. Whilst certain pressures must be acted upon, it could prove economically 'efficient' to ignore others. At present, there is no theoretical model directly aimed at answering the question of why and how firms respond to greening demands. This thesis will appeal to a range of theoretical models and ideas from other literatures in an attempt to explain the role of 'external' context environment in explaining organizational change. The intention is to bring out the elements of each that can be applied as a theory for explaining something as multidimensional as organizational 'greening'.

4.2.1 Neoclassical Model of Organizational Behaviour Towards 'Green' Pressures

Before considering theories supporting the importance of 'external' social constraints on organizations, attention will first be given to the economic theory of the firm, since this indicates the way organizations are meant to respond to the market within a given economic paradigm. Some of these issues were initially discussed in chapter 2, but are developed here in order to fully describe the type of green behaviour predicted by economic theory, and its associated problems.

The neoclassical model of the market assumes, *inter alia*, that organizations have perfect knowledge, or at least the equivalent to it under conditions of uncertainty, of all courses of action open to them. Based upon this information, they are *expected* to act in a manner that

guarantees profit maximisation. These actions are directly influenced by the economic incentives derived from the prices in the markets in which the organization operates.

The environmental problems with the neoclassical approach stem from its fundamental value premise that only individual preferences should count. Neoclassical theory only considers those preferences as revealed by individuals in their willingness to pay for goods and services in the marketplace. Thus neoclassical theory has economic actors holding the preference structure of indifference and operating on the basis of constrained satisfaction (utility) maximisation. Environmental considerations are given little value and weight under such an approach, and consequentially, environmental factors are considered to have no cost or value, other than their extraction costs and commercial use values (Milne 1991; Pearce, 1993a). These 'green' contradictions are most clearly illustrated by examining the problems which neoclassical models have with the concepts of externalities and the non-sustainable use of commonly owned resources.

4.2.1.1 The problem of environmental externalities

As was highlighted in chapter 2, the first environmental problem with the neoclassical economic model is the unpriced social cost externalities arising from business transactions. Within traditional economic theory an externality is defined as the physical side effects of organizational activities, such as pollution, that cause actual damage or economic loss to third parties. By contrast, within environmental economics an externality can include any economic, moral or political value that markets leave unpriced. (Sagoff, 1988).

Under Pigou's (1920) classic solution to environmental externalities, an offending manufacturing organization should pay a government imposed tax equal to the amount of externality burden it imposes on society. This tax penalty forces the polluting organization to either bear the burden of the difference between marginal social cost and marginal production cost or curtail activity levels. Coase (1960, p.2) provides the most important critique of Pigou's theory of externality prevention via regulation of markets by highlighting the unidirectional nature of externalities:

'we are dealing with a problem of a reciprocal nature. To avoid the harm to B [member of the public] would inflict harm on A [Polluting organization]. The real question that has to be decided is: should A be allowed to hurt B or should B be allowed to harm A? The problem is to avoid the more serious harm'.

Coase demonstrates that if the market is assumed to work without cost, the result that maximises the total value of production for society is independent of the legal liability regarding compensation for damage between the parties. Furthermore, when the assumption of costless market transactions is abandoned, Pigovian theory can lead to inefficient results as the initial delimitation of legal rights will affect the efficiency of the economic system, leading to reduced welfare for society:

'One arrangement of rights may bring about a greater value of production than any other. But unless this is the arrangement of rights established by the legal system, the costs of reaching the same result by altering and combining rights through the market may be so great that this optional arrangement of rights, and the greater value of total production which it would bring, may never be achieved'. (Coase, op cit., p.18)

Coase argues that government regulations may introduce market inefficiencies:

'There is no reason to suppose that the restrictive regulations, made by a fallible administration subject to political pressures and operating without any competitive check, will necessarily always be those which increase the efficiency with which the economic system operates'. (Coase, op cit., p.18)

If that is the case, governments clearly have to acknowledge pressure and lobbying from many areas of society, and this may ultimately influence the rigour and economic logic of further environmental legislation. Coase maintains that certain organizational activities which economists such as Pigou would curtail may prove to be socially justified:

'It is all a question of weighing up the gains that would accrue from eliminating these harmful effects against the gains that accrue from allowing them to continue'. (Coase, op cit., p.26)

Despite this assertion, Coase acknowledges that government intervention can sometimes increase total social welfare. Coase, however, states that governments may push protection from nuisance too far. Coase uses this idea to highlight a common paradox where calls for legal actions against environmental externalities could be a result of previous government action and legislation. Coase neatly summarises the critique against Pigovian theory when he shows the folly of conceiving better worlds that correct defects in one part of the system, but which introduce new problems in other parts:

'It is quite illegitimate for Pigou to draw the particular conclusion he does...When an economist is comparing alternative social arrangements, the proper procedure is to compare the total social product yielded by these different arrangements. The comparison of private and social products is neither here or there'. (Coase, op cit., p.34)

Neoclassical behaviour is concerned with maximising profits. Coase develops this principle to explain the minimisation of the organizational transaction costs of externalities. Through such action the 'invisible hand of the market' will ensure that total social welfare is maximised. Coase's argument is based on his earlier work on transaction costs (Coase 1937), and predicts that certain organizations may use an extension of their boundaries as a

cost-effective method of dealing with the legal problem of environmental externalities. Such a boundary extension would internalise the costly rearrangement of rights that flow from environmental externalities.

'The firm would acquire the legal rights of all the parties [in the externality situation] and the rearrangement of rights by contract'. (Coase, *op cit.*, p.16)

The problem with the Coase theory on neoclassical externalities is its two fundamental assumptions. The first assumption is that transaction costs of the negotiation process are zero or negligible. In practice, this appears unrealistic, as transaction costs may well increase with the number of polluters and victims (see Williamson, 1979).

The second fundamental assumption of Coase's (1960) work is that negotiation on externalities will be successful and that agreements can be enforced. In practice, negotiation is a difficult process and may not lead to a mutually beneficial agreement. Furthermore, in reality, definitive agreements between certain societal groups and the polluting organization may not be possible. In conclusion then, when either of Coase's two assumptions do not hold, public intervention, via government legislation, is the only efficient solution to environmental externalities.

4.2.1.2 The Problem of Commonly Owned Environmental Resources

The second environmental problem associated with the neoclassical theory of the firm is that it fails to appreciate the unsustainable use of commonly owned resources. Chapter 2 showed that the various definitions of 'sustainability' all assume the intergenerational ownership of common resources. As commonly owned resources are not bought and sold on a market they can be overused or damaged by pollution. Hardin (1968, p.1246) describes this process as the "tragedy of the commons", and illustrates it with the example of a cattle herder using common grazing land. As the negative utility from overgrazing is shared by all in society, an individual herder does not bear the full marginal cost of his/her actions and will maximise profit by increasing the size of his herd until the common land is exhausted. However, assuming that the marginal use or extraction costs of the resource vary, scarcity increases cost over time, thereby reducing consumption and ensuring that the resource lasts until substitutes become available, or technological improvements reduce exploration costs or demand (Tietenberg, 1992).

Neoclassical economic theory considers environmental problems as solvable via human ingenuity and market transactions. Scarcity of environmental resources, and punitive legislation will eventually force up prices, leading to the conservation of resources and investments in pollution reduction technology. As a result, organizations only need consider the requirements of environmental legislation when determining their environmental strategy.

Neoclassical economic theory provides an important 'boundary' position of the very 'minimum' environmental actions that an organization may undertake. However, it is clear that many UK manufacturing organizations appear to be adopting environmental strategies that go beyond that expected by neoclassical theory. In order to explain such a discrepancy, the remainder of this chapter utilises a range of alternative theories in order to reveal the reasons behind the environmental behaviour of UK manufacturers.

4.3 Organizational Responses to 'Green' Pressures: Theoretical Support

The neoclassical economic model fails to explain why a number of UK firms are responding to 'external' green pressures in a manner exceeding the requirements of current UK environmental legislation. In an effort to explain such developments, this section will appeal to a diverse range of established theoretical models in order to try and build a more accurate theoretical explanation of organizational 'greening'. The aim is to review each and determine their relevance to the study of the role of management accounting in organizational 'greening'. Empirically, it is clear that UK firms can be observed to be reacting in many different ways towards 'external' green pressures. This might suggest the need to develop a model that adopts elements from a variety of approaches to capture the varied dynamics involved in 'greening'. Ultimately though, the true test of the theory is its ability to explain the data produced in the thesis case studies presented in chapter 8.

4.3.1 The Philosophical Dimension to Environmental Responsibility

There continues to be considerable debate surrounding the existence of a social responsibility and accountability of organizations (see chapter 2). One of the keys in understanding this debate is to identify the fundamental purpose, or purposes, that justify and govern corporate existence and agency. The philosophical construct of the social

contract provides a simple explanation for an organization's environmental responsibility.

The principle of the social contract is that an organization would only be allowed to operate within a society if it agreed to obey the contract created by all its members when they formed their society. One clause of this social contract should concern the protection of the natural environment amongst other social responsibilities obligated upon the organization as a contracted member of society. Therefore, the organization would straightforwardly operate in an environmentally sound manner. The issue of environmentalism becomes a simple contractual issue, to which the organization has voluntarily agreed. If it did not, then it would not be within society.

A social contract arises because members of society enter into a contract to enjoy the benefits of having a civil society, each surrendering equal amounts of freedom from their natural rights, and each receiving equal rights under the contract. These natural rights arise from the equality present in the state of nature. As Hobbes (1986, p.3) states:

'Nature hath made men so equal, in the faculties of body, and mind; as that though there be found one man sometimes manifestly stronger in body, or of quicker mind than another; yet when all is reckoned together, the difference between man, and man, is not so considerable, as that one man can thereupon claim to himself any benefit, to which another may not pretend, as well as he'.

Hobbes examined the creation of the social contract in some detail. Natural man has almost unrestricted freedom and individual rights, but all men may transfer their rights, thus forming a 'Contract'. This attempts to obey the fundamental law of nature, that every man ought to seek peace and is consistent with the second law, that a man be willing to waive his right to all things if others equally respect this. Man gives up the right to act just as he wants, as does everyone else who is party to the social contract. Thus there are boundaries on the way people have to act to others. Only through such a process can peace be obtained. For Hobbes, a Contract is only possible where all individuals are given equal respect since they would not sign up if this were not the case.

There is nothing within social contract theory that specifically endorses an environmental or sustainable position; the original architects (Hobbes, Locke and Rousseau) could not reasonably be expected to develop one. However, the pre-Contract State of Nature construction in which natural man roams *is* described as one where resources are scarce, and competition for these is the fundamental mechanic for the physical violence that dominates the existence. This suggests that fair resource allocation is central to the

Contract, which infers a sustainable one. More, it is inconceivable that any contract drawn up by rational modern individuals would not consider the widest view on their environment. For these reasons, the social contract is regarded in this work as the upper boundary on greening demands. Since the Contract is drawn up by the individuals that ultimately form the society, their 'greening' requirements *would* form a part of the final social contract. Any factor that an organisation recognises as an external pressure would be present within the Contract by its very nature.

The main problem with the idea of social contracts is to understand how such contracts are actually drawn up. Peters (1956, p.196) summarises the argument, when he points out that the Hobbesian contract:

'ascribed a degree of calculation and sophistication to earlier people that was unwarranted by the evidence; it overlooked the enormous importance of habit, tradition, prejudice in the growth of institutions; and it was not supported by historical evidence...[and] the contract theory assumed the logical priority of the obligation to keep a promise'.

However, Mabbott (1958, p.14) defends the Hobbesian contract, arguing it must be seen as a philosophical construct and that such criticisms fail to recognise this:

'The contract theory, however, does not lose its value by losing its historical accuracy. Hobbes' story is a myth, and a myth may be a good one even if its dates are wrong...Hobbes is really aware that his story is a myth...We must therefore restate Hobbes' myth, as modern theology restates Genesis, and as Hobbes himself really intended'.

This defence however, still fails to reveal the process by which communities are formed by a contract. Hart (1961) argues that the form of legal obligations required by the contract simply cannot exist in primitive communities, where legal rules are indistinguishable from social ones, and are only binding to the extent of their social acceptance. This issue of the contract in practice is a fundamental problem. Eccles (1995) for example draws attention to the problems of students entering university education who sign a virtual social contract covering their education, whilst in reality having no idea as to what they are agreeing to. Similar problems affect the application of social contract theory to the environmental responsibility of organizations. By inference, it would appear that organizations are latecomers to the Contract and must, therefore, accept the agreement as it exists. Since organizations do not exist in the State of Nature and are created by people, then those individuals would have to agree to run their business in the manner that they have personally agreed to. Since this is a theoretical construct, such a position is open to criticism; one cannot claim that a Contract is philosophical for individuals (there was no

State of Nature and no actual historical signing) and yet concrete for organizations. It seems reasonable, then, to allow organizations the same rights to negotiate for the content of the Contract, as for individuals. Hart's concerns become more important when one considers that the Contract must then engage in technical negotiations for business participation within the negotiations. Not only does this include more actors, but also far more complex issues concerning the purpose of business units, their rights and obligations.

Notwithstanding the practical difficulties, social contract theory has been used to explain the nature of organizations within society. Donaldson (1982) sees an organization as an artificial social creation that has its actions guided by an abstract metaphysical social contract. At issue are the terms of this contract, and the responsibilities organizations have to act in a socially responsible manner. As a starting point, Friedman (1970, p.32) outlines the view that organizations have no responsibilities to others, and that:

'there is one and only one social responsibility of business [in a free society]- to use its resources and engage in activities designed to increase its profits so long as it stays within the rules of the game, which is to say, engages in open and free competition without deception and fraud'.

Friedman states that the organizational manager as the agent of the owners, owes them primary responsibility. The manager should not use shareholders funds to act in a socially responsible way, unless such altruistic or 'moral' activities are consistent with the usual goal of maximising profits.

In contrast, Donaldson (1982) highlights how the existence of organizations within society is governed by a 'social contract of business'. Donaldson applies the idea behind the Social Contractualist's *state of nature* to develop the notion of a *state of individual production*. Rational people will only enter into an agreement for co-operative production where it is to their benefit to give up their individuality. Donaldson takes this idea and uses it to develop the terms of the contract that would so encourage group production, and thus explain the existence of productive organizations. Under the terms of this social contract, society provides 'productive corporations' with legal status and grants them the power to own and use natural resources. Society will only surrender these powers on the assumption that the benefits from authorising and empowering the existence of the corporation outweigh the detriments of doing so. In essence, business managers are constrained by contractually obligated laws of morals and ethics to which they freely subscribed by entering the Social Contract.

Donaldson (1982) uses his theory to describe how the view of Friedman (1970) owes its credibility to the sanctity given to voluntary market agreements, over and above those given to the "social business contract". Donaldson (1982, p.34) argues that Friedman's argument is either in error or incomplete:

'It is in error if it is meant to imply that the force of a hypothetical fiduciary agreement between manager and stockholder prevents managers from using the social contract as the yardstick for responsible managerial activity. This is because even the right to make voluntary agreements has been shown to have exceptions; and...there may be overriding moral considerations (such as the social contract). Friedman's argument is incomplete, on the other hand, if it is meant to imply that the existence of a voluntary agreement generates a *prima facie* obligation for the manager to pursue profit. That implication is correct as far as it goes, but it neglects to mention that there may be other responsibilities which are incumbent on the manager stemming from different sources - in this case, from a moral obligation generated through a social contract'.

Within the operation of this social contract, trade-offs have to be made between the various parties. Donaldson provides two approaches for determining such trade-offs. The first is *utilitarian*, aiming for the greatest good for the greatest number, and the second approach is the *non-utilitarian* standard where society's ethical 'rules' determine limit actions. Set in such anthropocentric terms, the *utilitarian* trade-off of the contract would not guarantee environmental protection, since other needs might be given prominence. In contrast, the *non-utilitarian* approach offers more environmental protection, as society will specify a universal set of policies and rules that the actions of productive organizations must comply with (Donaldson, 1982). The *non-utilitarian* approach distinguishes between societal and individual values, allowing a distinction between values as a 'consumer' and values as a 'citizen'.

Schweiker (1993) describes how claims regarding the social responsibility of organizations are confused because one cannot speak of an artificial and legally created organization as a moral agent. However, Schweiker (1993) attacks the fundamentalist theory of Friedman by showing the contradiction of how an organization can exhibit the same self-interested 'moral' behaviour that modern economic theory defines as human agency:

'On one hand, the corporation is not called a moral agent by Friedman and others because it is driven by the profit motive, and ought to be so driven within the context of the marketplace. On the other hand, human agents are defined as moral agents by just such self interested behaviour. In fact, economists claimed this is how persons do act and how they *ought* to act as well (Schweiker, 1993, p.235)'.

Thus, the argument against social accountability by organizations hinges on:

'the consciousness persons have of being agents who enter contractual agreements subject to moral criterion, like a principle of justice'. (ibid, p.236)

French (1979) provides the notion of a 'Corporate moral agency', independent from the individual human agents within the company. The organization is distinguishable from the individuals who act as its agents, and it can be seen as a 'conglomerate collective' maintaining its identity even when its membership changes. For French (1970), a corporation, just like a human agent, can perform voluntary, intentional and deliberate acts, and its internal decision making structure is analogous to human agency.

Ladd (1984) critiques French by comparing corporations with nations. Ladd argues that moral concepts, such as responsibilities, apply to nations, because their individual constituents share goals that provide the basis for the ethical dimension of national action. However, corporations, as organizations of people fulfilling contracts of employment, cannot possess moral concepts that apply in the same sense. Schweiker (1993) *inter alia* also critiques French's concept of corporate moral agency, stressing that humans are the only 'true' moral agents. Theorists of this persuasion identify corporate managers as the moral agents who are ethically and morally responsible to society. Thus, the directors of the company are charged with upholding the moral responsibilities of the firm. Schweiker (1993) explores a similar way of thinking about corporate moral agency by removing the need for consciousness within the moral agent. Schweiker (1993, p.237) identifies how the complex and discursive act of giving an account is one way in which moral identity is rendered visible and intelligible:

'There is an analogous fiduciary and temporal structure entailed in giving an account of the identity of persons and that of corporations'.

Schweiker argues that the activity of giving an account enacts a 'doubleness' crucial to the moral complexity of identity. This is because it evokes some awareness of pre-given fiduciary relations to others, relations subject to claims about what is good and evil. Schweiker's approach allows a form of corporate moral agency, especially if the organization gives an account of its actions and outcomes:

'the interdependent and temporal shape of accountable identity means that the scope of responsibility extends in time and social reality. To demand the right of private good over the needs and goods of the wider community is self-contradictory. It destroys the agent as constituted through the social interdependence in time enacted in giving an account. Any theory of corporate behaviour as atomistic and purely profit driven is thereby counterfactual, since in the very act of giving the account of that behaviour the theory instantiates the social identity of corporate forces. In this respect social responsibility is unavoidable in as much as a corporation seeks to give an account of its own identity. It fails to do so at the cost of its own identity. The issue, then, is not if one is socially responsible, but how that responsibility is exercised or neglected by the corporation'. (Schweiker, 1993, p.246)

Although Schweiker does recognise that corporate agents, by giving an account, are members of the moral community, he clearly states that they are not equal to human members. There is an important analogy at work in exploring the activity of giving an account of personal and corporate identity, for companies, unlike people, need to have an accountant at the core of their identity. This 'accountant' is needed to prepare accounts that serve to legitimate and explain corporate actions to both 'internal' and 'external' parties.

One final perspective of the philosophy of the social contract is Rawls' (1971) concept of the justice ethic, based upon the process by which justice is created in the social contract. The principle is a simple one. At the time of creating the social contract, all of the parties to the discussions are equalised and informed that their position within the society being formulated will be determined randomly. This ensures that the contract is drawn up fairly because all of the parties must ensure that their random role in the future will be a fair one. Lehman (1995) uses this idea to explain the obligations placed upon organizations to report on the sustainable use of resources. Whilst Lehman was only concerned with explaining the publication of environmental information in accounting reports, Rawl's principle can be applied towards the actual utilisation of environmental resources.

These philosophical propositions of corporate social responsibility and the social contract can be seen as largely abstract discussions, but are immensely valuable when applied towards explaining the notion of the 'externally' constrained and influenced firm. The organization cannot simply react to market incentives and pressures in a manner predicted by neoclassical economic theory, but must also consider the way that its activities are constrained by wider forces and pressures within society. If neoclassical theory established the boundaries on 'non-greening' in response to 'external' pressures, then philosophical theory can be seen as establishing the upper boundaries on 'pro-greening' responses. Despite their abstract nature, philosophical theories appear to have validity predicting greening responses by UK firms. UK firms are expected to acknowledge the environment in all their actions, resulting from the social contract between society and the firm. It has been enlarged to encompass environmental issues, since no longer is 'pure' economic performance in the market sufficient to satisfy the social contract.

Application might prove difficult, but the basic idea is clear. In return for their freedom, productive organizations have an obligation to react to environmental and other social

concerns. Where a firm must simply accede to an existing Contract in which these concerns are a given, then there is an obvious upper boundary. However, even where a business negotiates as a member in the creation of a Contract, then this approach recognises powerful external constraints. Particular practical problems will arise when considering organizations with competing social concerns to balance. How, for example, does an organization choose to rank environmental issues against the need to provide secure and fair jobs for members of society? Although organizations will be guided by the preferences apparent within the society, the possibility for short-term inappropriate rankings and corporate actions exists. Where terms are dictated, firms may be 'out of balance' with societal concerns, although the contract should ensure that long-run equilibrium is achieved in order to guarantee the survival of the firm.

Despite some potential drawbacks, the philosophical theory of the social contract provides a strong theoretical rationale for explaining why firms should react to 'external' green pressures in society in manner exceeding that traditionally associated with neoclassical economic theory. Taken together, the philosophical and neoclassical economic theories can be said to predict and explain the upper and lower 'boundaries' of organizational responses to 'external' greening pressures. The first predicts 'greening' to occur whilst the other does not see it as anything special.

4.4 Exploring the 'Middle Ground' of Greening Theory

Taken together, social contract theory and neoclassical economic theory provide upper and lower boundaries of corporate reaction to 'external' greening constraints. What is missing is the 'middle ground' between these two extremes. Each firm may face, as well as *influence*, a unique constellation of greening forces. Corporate greening cannot be simply explained by the market, and neither is it determined by the terms of an external, and largely abstract, notion of the social contract. These are important, but they implicitly ignore the potential of the organization itself to influence greening. This potential could materialise in two different ways. Firstly, firms influence 'external' pressures through either direct lobbying or by developing structures and systems that become accepted as socially legitimate. Secondly, the 'internal' organizational context of the firm impacts on the way 'external' pressures are both interpreted and ultimately dealt with. Such potentials have been heavily researched in the organizational behaviour literature, and are implicit

and explicit themes throughout this thesis. These 'internal' potentials are developed in chapter 5, and without their appreciation it would be impossible to develop a 'middle ground' theory on greening.

In order to develop the 'middle ground' of greening, the following theoretical perspectives will be used:

1. Legitimacy Theory
2. Resource dependency theory
3. Contingency theory (including the notion of strategic choice)
4. Population Ecology theory

The four theoretical perspectives have been selected from a variety of different literatures. They were selected using two criteria: their ability to model corporate response to 'external' pressures; and by the extent to which each theory allowed the firm and its 'internal' context to influence the response taken to such pressures. By adopting such criteria, one tried to theory build using a bi-directional, rather than a simplistic unidirectional approach to greening pressure. Such a theory explicitly acknowledges that corporate 'greening' is determined through interaction between 'internal' corporate pressures, as well as 'external' social ones. Each model selected is grounded in organizational theory, making them an ideal platform upon which to build a 'middle ground' theory of corporate 'greening'. However, what needs to be established is whether the models can explain corporate greening. Each theory will be discussed and critiqued in order to establish this fact, starting with legitimacy theory.

4.4.1 An Institutional 'Legitimacy' Theory of Greening

'Institutional' (sometimes called 'legitimacy') theory is a theoretical perspective that has been widely used across many fields of research, but rarely applied to the study of corporate greening, for which it seems perfectly suited. Although this present discussion refers to institutional *theory*, there are clear differences in the underlying approach taken by researchers in the area. These tensions will be highlighted in the following analysis, although the main aim is to focus on those issues most useful for predicting the role of management accounting with organizational greening.

Institutional theories of organizational analysis predict that organizations evolve in order to align themselves with the changing norms and expectations of the institutional environment. Dowling & Pfeffer (1975), DiMaggio & Powell (1983), Meyer & Rowan (1977), Zucker (1988) and Meyer & Scott (1983) have provided theories of why, and empirical evidence of how, organizations are seen to search for 'isomorphism' with public opinion, educational systems, professions, regulatory structures and acceptable practice.

For Meyer & Rowan (1977) and Dowling & Pfeffer (1975), the notion of organizational legitimacy predicts that firms are driven to incorporate and undertake certain practices and procedures by the prevailing rationalised concepts of organizational action institutionalised within society. Ultimately, the degree of legitimacy the organization achieves depends on the extent to which its activities correspond with the views of acceptable behaviour held by external social actors. Organizations behaving in a manner desired by 'external' social actors should achieve greater status and legitimacy, increase their survival prospects, and thus receive less 'external' questioning of their activities, actions and motives. Alternatively, if the activities of an organization cause it to be viewed as 'illegitimate' to institutional pressures, then it may face greater demands for accountability and explanation of its actions. Thus institutional theory can be seen as a process of conformity with the expectations from society.

DiMaggio & Powell (1983) extend the basic institutional model further and suggest that isomorphic pressures can also originate within the organization's own industry or competitors. Hence, over time, firms will tend to adopt those structures, systems, practices and strategies which have been adopted by those organizations which are seen to be both the most successful and the most legitimate. Competitive pressures serve to eliminate

organizations that deviate from the expected social norms for actions.

DiMaggio and Powell (1983) divide institutional isomorphism into three distinct categories. They argue that firms are propelled into adopting certain modes of practice by an interplay of coercive, mimetic and normative isomorphic pressures. DiMaggio & Powell (1983:67) state that coercive isomorphism "results from both formal and informal pressures exerted on organizations by other organizations upon which they are dependent and by cultural expectations in the society within the which organizations function". Thus organizational change may be as a direct result of the need to reflect rules institutionalised and legitimated by and within society.

DiMaggio & Powell (1983) see mimetic isomorphism as arising from uncertainty. When organizational goals and technologies are poorly understood, or external uncertainty is high, organizations may model themselves on other organizations. If an organization perceives itself to be either under interrogation from external pressures, or uncertain of how to act, the simplest solution is for it to copy the practices of the *perceived industry leader*, even if such practices are now redundant (in the eyes of the leader). Furthermore, the success of these 'adopted' practices may be organizational specific, and may not function efficiently in an entirely different organizational context.

The third of DiMaggio & Powell's (1983) three isomorphic pressures is called normative pressure, and arises from the process of professionalisation. Professional and trade associations serve to define and promulgate the normative rules about organizational and professional behaviour and create:

'a pool of almost interchangeable individuals who occupy similar positions across a range of organizations and possess a similarity of orientation and disposition that may override variations in tradition and control that might otherwise shape organizational behaviour'. (ibid, p.71)

Thus the employment of professional expertise by the organization may lead to organizational actions and behaviour being shaped by the norms of the professions involved. DiMaggio & Powell predict that the greater the level of professionalisation in a field, the greater the amount of institutional isomorphic change. An organization can increase its legitimacy by adopting those practices and procedures legitimised by 'legitimate' superordinate collectives, professional standards or guidelines.

Institutional theory appears to provide a compelling model with which to explain and

predict organizational responses towards all types of 'external' pressures. Organizations will attempt to respond by adopting practices and actions that are perceived as legitimate. New formal structures and systems will develop to reflect such demands. In a bid to attain legitimacy, organizations attempt to copy systems and practices from firms who are viewed as legitimate. Organizations employ 'legitimate' professionals and adopt professional standards and codes in an effort to gain legitimacy.

Despite this initial appeal, two important issues still remain unclear in the discussions so far. Firstly, do these 'isomorphic' developments proceed in the absence of evidence that they increase organizational efficiency? This remains unclear and depends on examining the specific context in which they operate, but DiMaggio & Powell (1983), explicitly, and Meyer *et al* (1981), implicitly, assume that organizations undertake changes to achieve legitimacy even when they do not necessarily increase internal organizational efficiency. Meyer & Rowan (1977) go further and argue that the reality of any 'perceived' legitimacy is sometimes dubious, especially in situations where the actions and procedures acquired by the firm are not to the benefit of society at large. This is a very important point, especially for the study of greening, and will be returned to later in the discussion.

If attaining greater degrees of legitimacy does not automatically result in organizational efficiency gains, it leads on to a second related issue, of whether such changes *actually affect* the actions and design processes, or just remain as a ceremony or ritual. Newly adopted practices, introduced to achieve legitimacy, may effectively be shut away from, or loosely coupled with, decision making processes. Weick (1979) developed the ideas of de-coupling and loose coupling in his empirical research in educational establishments. Meyer *et al* (1981) also used the idea of coupling within their investigation of United States education establishments, observing that the organizational structures of schools reflect 'externally' created institutional rules concerning education. In practice, these organizational structures were effectively de-coupled from the actual technical work of education and many of its associated problems. In these empirical examples, large amounts of organizational effort is directed towards simply maintaining conformity with the socially standardised categories of the educational system, while little effort is expended in the control and co-ordination of the actual teaching activities. In effect, an organization must be seen to have certain rational calculative techniques available to it in order to appear legitimate. For example, Earl & Hopwood (1980) showed how an organization possessed

the 'legitimate' ability to apply and use the net present value (NPV) technique, even though actual decisions were undertaken with little reference to either it, or the calculations it ultimately produced. Only after decisions were made was NPV used, and then only as a method of *ex post* justification. In essence, such legitimating structures and systems are only loosely coupled with other organizational systems and are effectively 'insulated' from everyday decision making within the firm, whilst still appearing in use to outside bodies. This loose coupling provides a method of securing external legitimacy whilst maintaining the organizational effectiveness of a firm.

A criticism of de-coupling stems directly from its prediction that such 'legitimising' systems and structures are effectively kept separate from decision making. If this was the case, especially in the long-run, then such systems would no longer grant legitimacy as one would expect society to 'see through' the deception. In addition, it is probable that even initially de-coupled systems may eventually be 'fully' incorporated into decision making, especially where they prove unexpectedly useful, and serve to reveal new 'visibilities' on either organizational performance.

What remains is to discuss how the theory of institutional 'environments' fits alongside the normal technical and market-based environments that most organizations have to respond to. Galbraith (1973) argues that organizations operating in environments of high task and technological uncertainty need management systems that control and co-ordinate *technical* work. However, what happens if the same firm also operates in an institutionally elaborate social context, and requires a management structure that conforms to the dominant institutional rules? The solution lies in integrating the external constraints of the technical and institutional together as one. Meyer *et al* (1981) sees the two types of constraints as interrelated concepts, as technologies can also become institutionalised in their own right. Organizations are made to adopt certain technologies, as they become regarded as the 'right' way to do the job. These socially rationalised and institutionalised arrangements come to define and enforce (either objectively or socially) the appropriate technologies of action. Institutional environments thus may not always lead to a loose coupling of organizational structure from technical activities. For example, Meyer *et al* (1981) show how specific medical technologies become institutionalised, entering the hospital as both an available technology and as an institution to which conformity is demanded by certain societal actors. Pressures to utilise them may come from both the need to retain

professional appearances and from a technical need to enhance performance. This highlights the ambiguity within institutional theory because it is often difficult to establish the degree of coupling between the technical and the institutional; which one is dominant and where within the organization? Meyer *et al* (1981) identify a number of research questions that must be answered before one can truly understand the interactions between institutional and technical environments:

1. What is the degree of external specification of organizational work, namely the *structure*, technical work *processes* and *outputs*?
2. At what level of the organization does the 'external' environment specify the proper structures, technical work processes and outputs?
3. How are the three elements of structure, technical work processes and outputs supposed to be linked?
4. How does the number of external institutional pressures facing the same organization affect its work?
5. Will the adaptation possibilities be higher for an organization facing a technical environment, than for an organization facing an institutional environment?

Whilst these questions can only be answered in an empirical setting, they set a framework to examine the technical and the institutional impact on the firm.

Institutional theory provides a very strong theoretical model to explain the way firms respond in highly institutional environments. It can also be used alongside other type of theoretical models to jointly explain the phenomena under investigation.

In the UK, businesses perceive a whole array of 'external' institutional pressures demanding corporate 'greening'. UK organizations are clearly reacting to environmental demands in different ways. Companies undertake publicity campaigns to establish green identities and to defend themselves from attack by green pressure groups. Firms are adopting 'legitimate' forms of EMS. Government influences the terms of 'legitimate' environmental behaviour through its mandate leading manufacturers to adopt new pollution control technologies (Dimaggio & Powell, 1983).

Larger and more *environmentally visible* organizations actively promote their green credentials, supporting the expectations of Dowling & Pfeffer (1975, p.133):

'Organizations that are larger, and organizations that receive more political and social benefits would tend to engage more heavily in legitimating behaviour'.

'Environmental visibility' is explicitly developed in chapter 5, but refers to how much pressure the firm faces from 'external' greening pressures. The higher the 'visibility' the greater the pressure, and *vice versa*. Thus, although the values of society determine the ground rules for securing 'green' legitimacy, certain organizations will be deemed more

'problematic' to society because of their high environmental 'visibility'. For example, firms in the UK chemical industry face greater challenges to achieve 'external' legitimacy due to their environmental impact than, say, educational organizations.

In another effort to achieve environmental legitimacy and reduce individual environmental visibility, organizations are joining together in order to establish industry wide environmental codes of conduct. For example, the Chemical Industries Association (CIA), whose membership includes the majority of the British chemical industry, launched its 'Responsible Care' programme in 1989. The responsible care programme states that member companies are obliged to:

'manage their activities so that they present an acceptably high level of protection for the health and safety of employees, customers, the public and the environment' (Simmons & Wynne, 1993, p.209).

Such programmes can be classified as an institutional response to social concerns with the environmental performance of industry. By adopting this institutional mechanism the chemical industry seems to be attempting to regain or maintain the trust and legitimacy of society. Zucker (1988, p.112) suggests that organizations can use three types of mechanisms for exhibiting legitimacy to external actors:

1. Possessing individual or firm specific characteristics that signal a commitment to conform to societal and constitutive expectations.
2. Having regulations or formalised rules governing behaviour.
3. Through the use of third party intermediaries, to provide a form of guarantee that an accepted set of rules or system is being followed.

Simmons & Wynne (1993) used these three legitimacy mechanisms to test the Responsible Care Programme of the CIA. They found that it clearly acted as a signal to 'external' parties of the positive actions CIA members were taking to environmental demands. Despite this, however, the legitimacy gained by being a programme member was undermined by both the confused aims of the programme and the way it reported environmental performance data. Furthermore, members of the programme do not have their systems independently audited by third-party intermediaries, although most had plans to have them certified under the BSI's EMS standard. This empirical evidence perfectly illustrates the way institutional theory can be used to explain the development of corporate greening. The implementation and use of seemingly technical innovations in EMS can only be fully explained by reference to institutional theory.

The UK development of corporate EMS perfectly illustrates the power of legitimacy theory

to explain corporate greening. During the last fifteen years, many different kinds of corporations, professional bodies and governmental agencies have involved themselves in immense public discourse on the approaches corporations should adopt to manage their environmental impacts. Cynically, one might immediately argue that the main aim of such discussions, at least for certain corporations, was to be seen to be doing something 'legitimate' about environmental management. By being seen to be acting on such issues, it may also prevent the need for further and more punitive environmental legislation and greater adverse reaction from the general public. However, from this public discourse on environmental management, desire emerged for the development of a voluntary national standard to outline how a 'good' EMS should be structured. The first standard on EMS was issued as BS7750 by the BSI, but this was soon followed by a competing program issued by the European Union (EU) in its *Eco Management and Audit Scheme* (EMAS). In 1991 the BSI standard was subsumed within the ISO 14000 series of standards issued by the International Organization for Standardisation (ISO). The ISO 14000 series of standards defines the core EMS itself, and the auditing procedures necessary for verification. ISO 14000 standards do not, however, define the specific environmental performance goals that an organization should attain. These are left up to the organization itself.

These developments can be seen within an institutional framework as the structural responses of organizations and towards external demands for greening. Typical of the espoused claims of possessing such systems is the view of The International Institute for Sustainable Development (IISD):

'ISO 14000 is designed to provide customers with a reasonable assurance that the performance claims of a company are accurate. Companies often have to demonstrate that their products and services meet certain conditions. This is exactly what standards do efficiently, especially when combined with third party conformity assessment programs. They reduce or eliminate the need of companies to individually inspect each supplier's products and services with its own auditors'. (IISD 1996: p.3)

The claimed benefits of possessing an ISO 14000 EMS go even further than that, although they remain unproven:

'Regulators may begin to recognise the assurance provided by ISO 14000 and offer some sort of regulatory relief, such as easier permitting, fewer inspections and streamlined reporting requirements, to those who implement EMS. By using ISO 14000 to systematically identify and manage environmental risk and liability, the courts, investors and lenders, and regulators may all use it as a sign of due diligence and commitment to good environmental management' (ibid.)

Alternatively, EMS developments might be viewed as a simple attempt to enhance the internal efficiency and overall profitability of the firm. What is clear, however, is that ISO 14000 certification is seen as a way of guaranteeing the perceived 'legitimacy' of an

organizational EMS. As such, it is a technical practice that is becoming institutionalised. What is worrying about this attitude is that the ISO 14000 series of standards are simply an 'empty box' that ensures that what is done by the firm in the name of environmental management is conducted through a quality system. This encourages the adoption of the system 'certification' or ISO14000 'label' rather than the system itself. Equally those who audit ISO14000 systems are faced with the issue of legitimising their ability to do so. This illustrates the power of institutional theory to explain corporate adoption of EMS. To reinforce this institutional explanation of the increased use of ISO 14000 certified EMS still further, many firms regard such systems as a logical extension of their ISO 9000 certified quality management systems. What previously demonstrated 'legitimate' product quality now seems to 'legitimate' quality of environmental stewardship.

Another clear example of isomorphic behaviour in the context of environmental management comes from organizations that observe and react to *best practice* by more 'environmentally' aware firms. Firms seem eager to learn about the experiences of the industry leaders, as evident by the growth in the number of environmental management conferences during the 1990s. The mimicking of industry leaders appears to be especially enhanced where 'being green' may have either financial or strategic benefits. Newly introduced technical systems of environmental management may render 'visible' important linkages about cost that were previously hidden. On the other hand firms who are successful in their 'greening' may put indirect and direct pressure on the worst performers to change by shifting the public opinion on acceptable levels of green performance. A fundamental issue here, especially with regards to environmental management techniques, is that these industry leaders may, as Dowling & Pfeffer (1975) and Spender (1993) indicate, actually forge, shape and limit the definitions of social legitimacy within society, thereby matching it with current organizational actions and structures.

Meyer & Rowan (1977) indicate that legitimacy is not synonymous with economic success or compliance with legislation, and can be challenged by legal, political or social developments. This is a very important aspect for organizational greening, in terms of its effects on financial performance and with other parts of the institutional environment. Actions conducted with the aim of appearing legitimate may be economically inefficient. Thus institutional theory will obviously conflict with the neoclassical economic view as applied to greening. As indicated earlier, institutional environments may be multi-

dimensional with many different demands, all of which may conflict and will have to be managed by the firm.

Institutional theory is a powerful tool for investigating the external constraints and demands for organizational greening. Such constraints can strike at organizational structure, technical work processes and output, of which accounting information systems clearly are part. Coupled with the philosophical social contract arguments outlined earlier, it provides a theory explaining greening beyond legally imposed minimum levels. In contrast though, institutional theory gives a theory that is grounded in the study of organizations and less abstract in nature. Furthermore, the institutional theory of greening allows the firm to determine its own actions, and what types of legitimacy it seeks. Finally, institutional theory allows for firms influencing what is perceived as legitimate behaviour, thus enacting their institutional pressures.

Institutional theory suggests that management information systems, such as accounting and EMS, can provide the organization with 'external' legitimacy. Certain elements of the technical practice of accounting are currently needed for an organization to appear legitimate, but accounting itself operates in an institutional environment (Hopwood, 1987). Will institutionalised 'greening' systems and structures, such as EMS, be included as part of technical work processes or will they remain loosely coupled to technical imperatives, such as accounting, and simply act as a green institutional 'veneer'? The power of an institutionally influenced theory of 'greening' is its predictions for the role of both accounting and EMS. Such systems supply legitimacy, but the interactions between them are crucial for understanding the whole greening process. Evidence from the empirical work in chapter 8 suggests that EMS are only loosely coupled to the technical functioning of management accounting, and this appears to validate the existence of an institutional theory of corporate greening.

Institutional theory has been used to develop the notion of the 'middle ground' of greening between the boundaries established by social contract and neoclassical economic theory. The next step is to enrich this 'middle ground' analysis by applying the alternative theories of resource dependency, contingency theory and population ecology theory.

4.4.2 A Resource Dependency Theory of Greening

Resource dependency theory (RDT) appears to provide a theory that is closely linked to the ideas provided by institutional theory, stressing the importance of 'external' factors and institutions in influencing corporate actions:

'it is the fact of the organization's dependence on the environment that makes the external constraint and control of organizational behaviour both possible and almost inevitable'. (Pfeffer & Salancik, 1978, p.44)

As with institutional theory, RDT is not just one theory, but a series of slightly different theories each accepting that firms are resource dependent on 'external' institutions. Under RDT, an organization must meet the demands of institutions that provide the resources necessary for survival. In essence, an organization is seen as one part of an "organizational set" of institutions (Evans, 1966), within which it transacts and receives role pressures. Resource dependency theory differs from institutional theory because it predicts a more direct, deterministic and observable nature to the 'external' pressures being placed upon organizations. Within RDT, organizations cannot ever be totally self-sufficient, and will always require certain resources from its 'external' environment. Because of this reliance on external resources, the organization becomes interdependent with those elements of the 'external' environment it transacts with. In contrast to these RDT ideas, institutional theory expects the source and origin of the 'external' demands to come from a vast array of social and cultural actors, often with no observable direct link to the target organization in either resource and or transaction reliance terms. In conclusion then, RDT is a less abstract and more tangible form of institutional theory. However, this specificity also makes it less applicable to all types of firms and 'external' environments.

Pfeffer & Salancik (1978) see RDT as comprising two different elements. The first tackles the issue of external constraints and argues that organizations will (and should) respond to the 'external' demands of those organizations or groups in the environment that control its critical resources. Within this, Pfeffer & Salancik stress the importance of inter-organizational power and argue that this can affect the actions of organizations. The second element of their theory argues that managers will attempt to manage their exposure to 'external' dependency, both to ensure the survival of the organization and to acquire more autonomy and freedom from external constraint. This second part of RDT stresses the importance of organizational strategies to reduce exposure to resource dependence.

Pfeffer & Salancik (1978) identify ten conditions within RDT that determine the level of compliance by the 'focal' organization to 'external' demands from other social actors:

1. The focal organization is aware of the demands.
2. The focal organization obtains resources from the social actor making the demands.
3. The resource is a critical part of the focal organization's operations.
4. The social actor controls the allocation, access, or use of the resource; alternatives are not available.
5. The focal organization does not control resources critical to the social actor's operations or survival.
6. The actions of the focal organization are visible and can be assessed by the social actor to judge compliance.
7. The focal organization's satisfaction of the social actor's requests are not in conflict with the satisfaction of demands from other parties with which it is interdependent.
8. The focal organization does not control the determination or expression of the social actor's demands.
9. The focal organization is capable of developing actions that will satisfy the external demands.
10. The focal organization desires to survive.

The extent to which these ten compliance conditions are satisfied will ultimately determine the level of dependence upon an organization from 'external' parties. However, Pfeffer & Salancik (1978) acknowledge that the organization may actually enact and influence the demands it faces from 'external' social actors. Condition 8 acknowledges that the focal organization may shape the demands made upon it by other organizations. As institutional theory also predicted, certain corporate environmental management developments can be seen as attempts by firms to influence the 'external' green pressures that they face. The development and adoption of voluntary environmental improvement and management programmes by organizations can be seen as a way for them to prevent greater demands from government and other parties. Organizations rely on governments for free access to economic markets, but as a result they have to accept certain demands from government, including environmental legislation. By developing voluntary environmental programmes, organizations may influence how government views the need for regulation on green issues.

There appear to be a number of problems in using RDT to explain the way 'external' greening pressures are responded to by firms. The main overriding concern is that RDT seems to predict a mechanical approach to 'external' demands. This does not match currently observed responses of firms to green pressures. 'Greening' seems to be an 'emergent' process that does not fit easily into a theory as deterministic as RDT. More specifically, the operation of Condition 7 of RDT seems very important when applying RDT to the study of greening. An organization may face an array of demands from a variety of social actors who could each constrain access to resources. Condition 7 can be criticised because it seems potentially impossible for an organization to get a perfect

'balance' between the demands of social actors. Condition 1 suggests that organizations have the ability to scan the external environment and recognise the need to respond the demands. This is fine, but there is a large difference between recognising demands and acting on them. Resource-supplying bodies may make demands that ultimately conflict or be impossible to achieve in the short-term. 'External' greening demands are not simple economic-type demands, such as increased profitability and employment levels. In the short term, economic-type demands may even directly conflict with greening demands making it impossible to truly achieve equilibrium or 'balance' between the demands made by resource-supplying parties. Pfeffer & Salancik (1978, p.45) indicate that organizations are faced with numerous demands from different social actors that must be recognised, balanced and acted upon. Strategic choice by the organization must then determine exactly which resource-supplying parties should be satisfied first.

RDT explicitly recognises the role of strategic choice with an organization, in as much as the organization may well choose to reduce dependency. However, RDT does not appear to allow corporate strategic choice to be used to play interest groups off against one another in an attempt to please the most powerful resource supplying parties. This is a major drawback of the theory. For the study greening, condition 7 of RDT has to be altered. Condition 7 must allow for the possibility of unresolved conflict between the demands of resource supplying parties, especially as there is clear evidence to suggest that 'greening' and 'economic' demands seem to be mutually exclusive at times, especially in the short-run. If one alters condition 7 of the RDT model it appears to have considerable merit in being applied towards explaining greening response to 'external' pressures.

The empirical evidence of research based on RDT has tended to focus on the internal affects of social actor demands, and not tackled the applicability in practice of Pfeffer & Salancik's (1978) ten conditions of compliance. Pfeffer (1972) looked at the degree to which the actions of 141 plant managers in Israel were constrained by their dependence on government orders. He identified three sources of government interdependence: the sales of each plant to the government; the financial stability of each plant and likely need for government backing; and, the extent of their foreign ownership and need for government approval. Pfeffer found a specific correlation between the willingness of each plant manager to comply with government programmes and the plant's dependence on the government. Salancik (1979) also found a positive correlation between the actions of US

defence firms to comply with governmental equal rights employment policies and their individual reliance on government sales.

The ability of an organization to reduce the 'external' dependence on resources has also been the subject of empirical investigation. Aldrich (1979) stresses that the ability to reduce dependence is a characteristic of large sized organizations. In contrast, Pfeffer (1982) found groups of small organizations banding together to restrict the power of large organizations to influence action. Pfeffer (1982) cites the evidence of small retailers in the US during the 1930s who were able to obtain the passage of resale price maintenance legislation, effectively preventing price competition from large competitors. In addition, research into strategy has observed strategies to reduce resource dependence. Research conducted by Pfeffer & Salancik (1978), Thompson (1967), Edstrom & Galbraith (1977) *inter alia*, has covered issues of inter-firm co-ordination, buyer-seller co-operation and linkages across economic sectors. Such empirical work tends to support RDT, observing a close relationship between resource dependence considerations and patterns of inter-firm linkage and co-ordination. A key proposition from these studies was the fact that the degree of interdependence and resource dependence would influence power distribution within the focal organization. Pfeffer (1974) found that a firm's capital structure, specifically its debt/equity ratio, predicted the proportion of bankers or others from financial institutions on its board. Such findings have been disputed by other work, including Allen (1974), who failed to find any relationship between financial structure and the composition of management boards. Despite the limited nature of empirical work into RDT, however, it seems that the model does have predictive ability.

RDT provides a model explaining how 'external' conditions will impact on an organization. Whilst its focus is on the effects of external contingencies on the firm, it does partially consider the role of internal power, political processes and strategic choice. These internal processes will determine the response to 'external' environmental demands, in agreement with certain dimensions of institutional theory. Both describe a contrasting reality to that expected in neoclassical economic theory. 'External' environmental demands (in the broadest non-green sense) impact on the power relationships and political processes within the organization. This power distribution, in turn, affects the selection of administrative positions and controls decision making, thereby influencing the organizational actions towards that expected by the external demands.

There are critical aspects of RDT that must be considered before it can be applied to study 'greening'. Little attention is given to how the organization can itself shape the demands from resource providers. For example, industry leaders can influence the way that external social actors put demands on the organization; this is not possible in RDT. The second criticism of RDT is that little formal attention is given to how institutionally based actions, systems and structures prevent or enhance the need for an organization to *comply* with external demands. Institutionally legitimate actions and views may shape the perceptions of the social actors, altering their potential to ask for their own desires to be taken into account by the focal organization. Furthermore, structural change brought about by the demands from social actors may be loosely coupled from the organization's actual work processes.

RDT has value in explaining the process of organizational greening. In the UK large organizations, such as B&Q, are requiring that suppliers improve the environmental performance of the products they are buying. Further evidence comes from the pressures exerted by public purchasing bodies on supplying firms to be certified as having an ISO 14001 EMS. RDT also raises important implications for analysing how the organization chooses which resource dependency threats to respond to. The organization faces demands for greening, but is also urged to provide profits, employ workers, make social actions and respond to financial dependence. Such inter-organizational demands have to be interpreted by the organization, which raises an important research question of just whom does this, and with the aid of which information systems. Hopefully, this issue will be revealed in the case studies in chapter 8.

RDT has considerable merit in explaining greening response to 'external' pressures. Although RDT adopts a 'mechanical' approach to the study of 'external' demands, the model is an advance on the neoclassical economic model of greening. RDT allows for strategic choice, and it also acknowledges that organizations can face competing demands for economic and environmental performance. At the very least, the RDT of greening provides an extension of 'middle ground' greening theory that seems to explain certain greening responses in a better manner than institutional theory. Together, RDT and institutional theory provide 'middle ground' theories that bridge the gap between the boundaries of the neoclassical economic and social contract theory perspectives. RDT

appears to extend neoclassical economic theory, whilst institutional theory predicts a greening response similar to that provided by social contract theory. The next section builds up this 'middle ground' modelling by using contingency theory as a third method for explaining corporate greening in response to environmental pressures.

4.4.3 A Contingency Theory of 'External' Greening Demands

Contingency theory acknowledges that different environments (in their non-green sense) and relationships with outside bodies require specific types of structural accommodation in order to secure a high level of organizational effectiveness. Burns and Stalker (1961) were among the first to consider that different environmental conditions made different organizational structures more or less appropriate. They found that a 'mechanistic' structure was appropriate for more stable and certain environments, whilst an organic, less formalised and centralised structure was more successful in rapidly changing environments.

Lawrence and Lorsch (1967) found that different parts of the organization faced different sub environments and that, for example, the environment of a production department was very different from that faced by a marketing or research and development department. They argued this would lead each different organizational sub-unit to adopt a structure matched to its own unique sub-environment, leading to highly differentiated internal organizational structures. These internal differences cause a second design problem of how to integrate the diverse departments into an organizational whole. Lawrence and Lorsch (1967) argued, and found in a study of ten firms, that the most effective organizations were those that had the required level of internal differentiation for the different types of environments faced, but at the same time being able to integrate these diverse departments effectively.

Both of the above studies discussed the environment in terms of its uncertainty, but such a dimension is very difficult to define. Environmental uncertainty can vary across the organization, be dependent upon perceptions by organizational managers, and differ in its complexity and variability over time. The work of Lawrence and Lorsch (1967) has been helpful in breaking down environmental uncertainty into sub unit environments, an idea clearly having merit for large diversified organizations. Studies by Khanwalla (1972) *inter alia* advanced the principle, by attempting to focus on certain elements of the environment

within a contingency analysis.

Khanwalla (1972) took competition as the key determinant on the presence of managerial controls within the organization, but using price, marketing and product competition as proxies for the level of external competition affecting the use and sophistication of such managerial controls. Staw & Sz wajkowski (1975) used the degree of resource availability as the key control variable for the environment, and found that firms facing more hostile environments committed a larger number of illegal acts. Both studies show the power of the environment as a contingent variable on the organization.

The above discussion has demonstrated how the environment (in a non-green sense) acts as a constraint, and only those organizations which are in some form of alignment with this environment will achieve an acceptable level of performance. At this point contingency theory has obvious application to the study of the external green pressures forming part of the contingent environment that the organization faces. Clearly the nature of *green uncertainty*, arising as it does from a variety of different actors and arenas (these will be identified and discussed in the model presented later in the chapter), will be a contingent variable on organizational effectiveness. In contingency theory terms, pressures for 'greening' form part of the 'external context' of the organization, a context that helps to shape the optimal organizational structure determining overall effectiveness. Despite this, however, these green dimensions of the organizational environment must be considered alongside other forms of environmental uncertainty, such as the degree of competition. How the green and non-green dimensions interact to form the 'key' issues of the environment, and what the role the organization plays in shaping and enacting these dimensions must be anticipated. The key dimensions of the environment appear to shift with public perceptions. Green issues appear at the forefront of public opinion at times, whilst at other times, green issues are overpowered by issues such as national competitiveness and employment prospects. In fact, the social arguments for the green responsibility of firms are attacked for the effect that these initiatives have on the financial performance and competitiveness of firms. The role of an organization in selecting its response to the environment forms the major critique of contingency theory itself and will now be discussed along with the other problems of contingency theory.

A fundamental problem with contingency theory is the degree to which strategic choice and

perceptions of the managers are ignored (Otley, 1980; Hopwood, 1989). Child (1972) critiques contingency theory by demonstrating how the views and actions of managers may influence organizational structure. Managers do not simply react to the contingencies they face, but actually select them by choosing their markets, organizational structures and systems. Indeed, this critique offers valid criticism into institutional theory, resource dependence theory and population ecology theory, and was supported by the empirical case study work here (see chapter 8).

Definition and measurement is a further cause for concern within contingency theory models. Doubts surround the objective measurement of certain contingent variables (Weick, 1979; Cooper, 1981), and whether it is possible to measure organization-wide relationships between environments and structure (Lawrence & Lorsch, 1967). In addition to these measurement problems, the results of contingency theory empirical work remain less than definitive (Dent, 1986). Such concerns may be answered by further empirical work that introduces greater empirical rigour and definition (Otley, 1980; 1999), but an alternative explanation is that the model is either under-specified or just not valid (Hopwood, 1989; Chapman, 1997).

Furthermore, if the organization is only loosely coupled to its environment the appropriate choice of action will not be preordained (Weick, 1979). Research has shown that strategy rather than context may be the crucial factor determining organizational effectiveness (Miles & Snow, 1978; Hambrick, 1983). Dent & Ezzamel (1986) identify the high cost of adaptation to environmental contingencies, both in financial costs and in terms of survival risks. Thus, if an organization senses a mismatch between environment and structure, the relevant participants in organizations may use their discretion instead to manage contingencies such that existing structural arrangements become acceptable. Dent & Ezzamel (1986) and Pfeffer & Salancik (1978) argue further that effectiveness may *a priori* enable particular structures, as an effective organization may have greater opportunities and choices from which to choose their responses. Dent & Ezzamel (1986) see causality between elements as reciprocal, with the ultimate flow determined by an interplay of elements within the context and boundaries of the organization. These issues will be discussed again below, but must be recognised here in order to appreciate the limitations inherent in the majority of the contingency theory based work.

In summary, are contingency theory ideas useful for exploring corporate greening? The research on the relationship between the environment (in its widest sense) and organizational structure and control processes has been widely documented. External green demands, however, are only one element of an organizational environment as discussed above, and it appears difficult to isolate how these greening pressures affect organizational change. Despite this, more evidence is being collected which highlights the way that organizations are attempting to *manage* environmental issues by, for instance, setting up environmental management control systems and adding environmental departments to their organizational structure. Porter (1991a) *inter alia* suggests that being green can secure a firm competitive advantage, and Hillary (1993) *inter alia* argues that by responding to green demands, firms can actually improve organizational effectiveness in the longer term. Within a contingency framework, green issues and external demands can be seen as the independent variable, with the organizational structure and systems as the dependent variable. This view, however, fails to acknowledge the key role of managerial perceptions, actions and discretion in shaping the organizational response to external greening demands; similar organizations in similar industries respond to environmental issues in different ways. How a manager's perceptions are shaped and informed remains largely 'invisible' and unexplored by research. The level of managerial discretion, however, would be limited by each organizations *environmental visibility* (see chapter 5 for a full explanation of this concept), which is shaped, in turn by public perception of the firm. Furthermore, Dent & Ezzamel (1986) would expect the most effective and high performing organizations to have the greatest opportunities and choices from which to select their greening response. In fact, the notion of effectiveness can be divided into two parts; profitability and environmental performance. Dent & Ezzamel argue that organizations with high profitability will be able to respond towards green issues more effectively. Alternatively, an organization with low financial and environmental performance will be in a poor equilibrium with its environment, calling its survival into question and at the same time increases the external demands for greening. Table 4-1 shows the two dimensions of effectiveness, giving four categories of overall effectiveness.

Table 4-1 Two Dimensions of Effectiveness for a Contingency Theory of Greening

| | | Financial Performance | |
|-------------------|------|-----------------------|------------|
| | | Low | High |
| Green Performance | Low | Stinker | Tank |
| | High | Green Angel | Lean Green |

By Dent & Ezzamel's (1986) argument, a firm with a high financial performance has a greater opportunity to change its structures and other variables. This argument can be extended by recognising social demands for green performance. If an organization has high financial performance, as interpreted by both internal and external actors, the firm may have slack resources to devote towards green improvements. The decision to undertake such improvements may be voluntarily taken, or could be forced upon it by the expectations of society. If society views the organization's high financial performance to be at the expense of environmental impact, i.e. the tank position, the organization can be compelled to change by society. Alternatively, if the firm is perceived as having low financial performance and having a high environmental performance, i.e. a green Angel, this might lead to demands to improve its financial performance. The analysis identifies the importance in identifying how the reality of organizational performance is constructed by society and the organization, and which dimension of performance is the most important to both groups of actors. Each set of perceptions is interdependent and vary according to context.

For contingency theory to be applied to greening the notion of effectiveness must become more contested. Contingent notions of the firm must acknowledge that changes in response to 'external' green pressures may increase environmental performance at the expense of economic efficiency. The level of economic efficiency directly acts as a contingent variable on the level of environmental effectiveness that a firm can achieve.

The discussion of contingency theory's contribution to explain greening concludes the review of three theoretical models used in this thesis to theorise about response to 'external' greening pressures. However, the next section reviews a final theoretical idea, that of population ecology theory, that appears to explain long term greening. In the long-term, whole populations of firms may fail because they do not change their organizational form in response to external 'green' issues. Population Ecology Theory studies this process, providing a long-term orientation to the 'middle ground' of greening theory being

developed in this chapter.

4.4.4 A Population Ecology Theory of Greening

Population ecology theory (PET) is similar to institutional theory, resource dependency theory and contingency theory in that all four theories recognise that organizational structures and survival are dependent upon 'external' pressures, and these pressures vary among different environments. In contrast to the other three theories, however, the focus of PET is not on the choice and problems of the individual firm, but rather on the form and variety of entire populations of organizations. Whilst this makes PET largely useless for studying the responses of individual firms and management, it does give a theory that explains how organizational change is determined solely by activity within the whole population of firms. In essence, PET presents a way to give a 'long-term' explanation of changes in organizational form and survival ability.

Seen in PET terms, organizational survival is the result of 'external' pressures that select the most appropriate organizational form to be adopted in the population. Within each population, firms only survive if they adopt the appropriate forms of systems and structure. PET theory downplays the role of managerial action in facilitating organizational change, suggesting that change is limited by the presence of strong inertia pressures (see Hannan & Freeman, 1977). These pressures include both internal and external constraints on organizational adaptability:

'The internal constraints are investment in plant, equipment, and specialised personnel; limits on the internal information received by decision makers; internal political constraints supportive of vested interests; and organizational history, which justifies past action and prevents consideration of alternative strategies. The external pressures for stability are legal and economic barriers to entry into new areas of activity; constraints on the external information gathered by decision makers; legitimacy considerations; and the problems of collective rationality'. (Haveman, 1992, p.19)

If these internal and external constraints prevent adaptation, selection processes become important mechanisms through which the characteristics of populations of organizations change over time, leading to deaths, survival and births of organizational forms. The retention of organizational form is a key part of PET. This results in resistance to change, business failure and threats of competition by new organizational forms with fresh ideas. Thus within the PET perspective the identification of distinct organizational forms is a critical feature. Organizational form shapes the way that firms operate, and can be inferred from the organization's structures and patterns of activity. Within PET, 'form' is defined

with respect to the subject population under investigation and tends to focus on the structural attributes of the organization. Forms differ between the 'specialist' organization, which does one activity more intensively, and 'generalist' organizations that offer many different product ranges. Each 'form' emerges to operate within certain niches of external resources and constraints. Within PET, 'specialist' organizations maximise their exploitation of the 'external' environmental conditions and have little slack or excess capacity. In contrast, 'generalist' forms of organization can survive across a wider range of 'external' environmental conditions and markets, but are not optimally suited to surviving against any single set of conditions.

Within PET external environments differ across three dimensions: the uncertainty of the environment; the compatibility of different resource states; and the degree of change within the environment states (Pfeffer, 1982). PET assumes that there will always be an appropriate kind of organizational form to correctly match the type of 'external' organizational environment that currently prevails and a natural selection 'adaptation' process determines the appropriate organizational form for each population of organizations. Under PET, the 'natural' environmental selection process selects the types of organizational form that are best suited to survive and exploit the resource base of the environment. Competition between different organizational forms will decide the outcome of the selection process.

There are a number of conceptual problems with PET surrounding its applicability and measurement of different organizational forms. Freeman (1981) argues that the PET selection process is applicable to large and small firms, assuming that large organizations disappear less frequently than small organizations. Disappearance and selection are not easy concepts to capture empirically. Firms may change form and be taken over, even when they are successful. Hannan & Freeman (1977) base their argument for the importance of selection processes largely on considerations of organizational inertia. Thus, a firm changing form without prerequisite failure would go against their model. Chandler (1972) found evidence of firms changing from functional forms to multi-divisional forms and surviving. Pfeffer (1982) sees a resolution to this problem by applying PET to populations of small-sized organizations that can be proven empirically to fail and be replaced by new forms within the population.

Despite these major conceptual problems, PET has the considerable advantage that its selection processes and the competition amongst forms is not determined by market mechanisms alone, but is mediated by political mechanisms and social legitimacy. Furthermore, PET offers long-term insights into how organizational forms shift over time in certain populations. This appears very useful in helping to explain the extent to which green pressures become a key selection mechanism within populations of firms, and helps describe the constraint effect of green issues on populations of organizations. As green issues become part of the selection criterion by which organizational forms will either fail or survive, PET suggests that the majority of organizations will have strong inertia positions towards tackling green issues. This suggests that organizational responses to green issues will lag behind external demands for greening since responding to such pressures now will effect a change from the appropriate type of organizational form. Under PET inappropriate 'greening' changes to organizational form causes the firm to be out of balance with what is needed to survive in the current population of firms. Under PET, it is the 'external' environment, and not management, that determines the level of greenness in the organizational form needed in each corporate population. It is also this external environment that allows form variations to survive in each population.

If green selection criteria are proven to exist in the 'external' environment, firms who fail present and future green selection criteria should not survive in the current population, unless they adopt a new form of organization. From the environmental literature it is clear that any existing green criteria present in UK 'external' environments are not powerful enough to cause large adaptations to organizational form (see chapter 2). At most, firms are slowly adapting to green issues and adopting EMS. This is not a change in organizational 'form', which suggests that PET is unhelpful within the given green paradigm. If green external pressures were extant, then some serious change in form within the population would be expected. Since this does not seem to be occurring from the evidence within this thesis, PET infers that green 'external' pressures are irrelevant, and fails to recognise or usefully describe the features of de-coupling mentioned earlier. However, the life span on present 'greening' selection criteria might have proven too short to allow a proper test of a PET applied directly towards explaining 'greening' at this time. Gladwin (1993) offers some evidence to validate PET, in that consumers view certain activities as 'environmentally unacceptable' and select the greenest products and producers

from within the population of those available. However, evidence to support such views is weak.

PET does focus attention on the variety of organizational approaches towards green issues. It also shows the importance of identifying the selection mechanisms whereby specific organizational 'greening' responses are chosen. There are variations in response to green issues that have been noted within a given population, but no research has attempted to see how these differences affect selection and survival within a PET framework. All that can be said in the short-term is that the adoption of green structures and systems does not seem to enhance or reduce the chances of organizational failure or disappearance.

PET helps to explain the existence of variations in response towards greening and the role of external constraints in shaping the selection processes. Thus it helps to add to our understanding of greening as an external constraint by de-emphasising the role of managerial selection. It is a useful addition to the armoury of theories to support the existence of external constraints on organizational greening. However, PET is designed to investigate changes within whole populations of organizations, not just one organization. Furthermore, it presupposes that change is largely influenced by what is taking place within the population as a whole. Whilst in greening this influence seems to have a role, it will be hypothesised that change is also brought about by interactions between elements of organizational context in isolation from outside forces. These criticisms largely relegate PET to the long-term study of 'greening' change at the level of the whole population, not the individual firm.

The next section draws together all the theories reviewed in this chapter and positions them within a theoretical 'envelope' of greening responses.

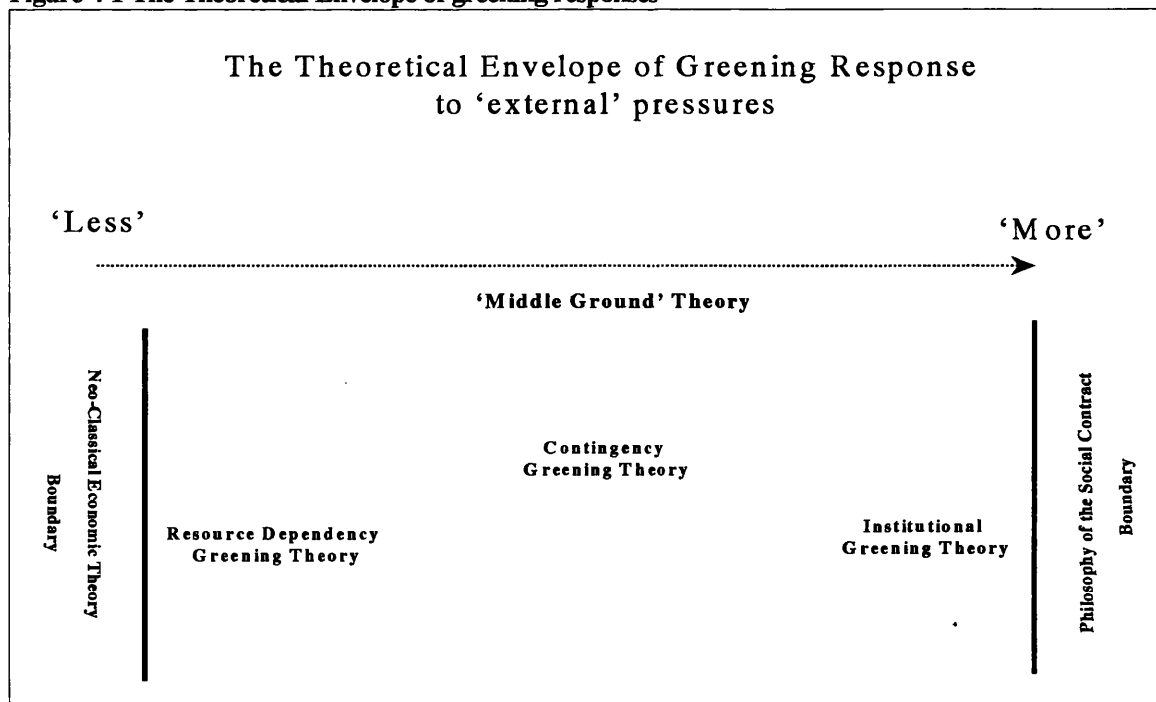
4.5 Developing A Theoretical 'Envelope' of Greening

This chapter has used a variety of theories to construct the upper, lower and 'middle ground' boundaries of corporate response to 'external' greening pressures. Together, they form a theoretical 'envelope' of greening responses that will be used as theoretical basis for the thesis. Figure 4-1 shows a diagrammatical representation of this theoretical 'envelope'. Neoclassical theory provides the lower boundary on predicted greening level in response to 'external' green pressures; the firm rationally manages its environmental impact within a

paradigm of economic efficiency. The upper boundary is developed from the philosophy of social contract theory, where firms are socially contracted to respond to environmental responsibilities legally dictated by the Contract. Between these upper and lower boundaries, the organizational response predicted will be largely determined by the type of 'external' pressure faced and the extent to which it impacts on either the technical or institutional. If the pressure is enshrined in institution discourse and debate, the firm can respond by adopting a 'legitimate' form of greening response. If the issue results directly in impacts on organizational efficiency or prevents the firm getting the resources it needs, then the firm has to go beyond the institutional and adopt technical system and structural responses that guarantee efficiency and resource supply.

In figure 4-1, the use of the terms "less" and "more" in the diagram along with the arrow is provided to give an expectation on the level of response to all 'external' green pressures. These are not essential to the theoretical 'envelope' and it could have been provided without them. The diagram is just used to provide an understanding of how one could predict that firms respond to 'external' pressures using the 'envelope' of theoretical response approaches.

Figure 4-1 The Theoretical Envelope of greening responses



The little empirical data available on the impact of 'external' green demands suggests a

fluid and emergent, rather than a mechanistic corporate response (see Gray *et al.*, 1995; Larrinaga-Gonzalez, 2001). The 'middle ground' of the envelope includes a range of both mechanistic and deterministic theoretical models as well as those allowing for an emergent and firm-enacted theory of greening response. Adoption of both emergent and mechanistic responses to green pressures is also recognised. Within the envelope, firms can also enact the 'external' greening pressures they face, as well as merely mechanically respond to them. Also greening responses do not always result in efficiency gains for the organization adopting them. This is critical for any theory studying greening. Environmental 'effectiveness' does not always correspond with economic effectiveness. This dilemma is taken into account within the envelope in the 'middle ground' theory of corporate greening.

The aim of developing this theoretical 'envelope' of greening is to give the researcher a lens through which to make sense of the literature and to analyse the empirical case study material in chapter 8. It is clear that no one theory is rich enough to describe the observed practices of firms. The theoretical 'envelope' of greening provides a continuum of theoretical ideas that may explain how greening response might be predicted based upon the firm and the type of pressure faced. Each firm is different and its response to green pressures will be different. The theoretical envelope cannot hope to take this organizational specificity into account, and it is not its function to do so. The envelope merely seeks to predict the responses expected of firms to *certain* types of 'external' pressures. A further model of how the specific organizational context of the firm may aid or prevent greening is presented in chapter 5. This subsequent model supplements the theoretical envelope and the theorising deeper within the organization itself. Together, the two models will be self-supporting and will generate the hypotheses that are developed in the rest of the thesis about the role of management accounting within environmental management innovations.

4.6 'External' pressures Influencing Organizational Environmental Behaviour

The above discussions developed a theoretical 'envelope' of theories that model an organization's responses to 'external' greening pressures. The theoretical 'envelope' supports the proposition that external social pressures are creating the need for organizations to become greener. Tomer (1992) *inter alia* argues that organizational managers are facing "new environmental realities" which are impacting upon their

operations. Such new realities obviously include governments introducing stringent environmental regulation, but behind this development is a fundamental change in public opinion towards environmental degradation and the prevention of further environmental disasters (see chapter 2). This change in public opinion has been fuelled by scientific evidence and debate, increased technical understanding of environmental problems and the growth and increased public acceptance of environmental lobbying groups. In essence then, increased social concern for the environment has led to an array of 'external' pressures for the greening of UK manufacturing organizations.

The remainder of this chapter models the pressures for greening that an UK organization may face. Although this appears to be a relatively simple process, the pressures for greening are often interlinked or interdependent with other green pressures, arise from non-green pressures, and may be balanced against other concerns within the social domain. Burchell *et al* (1980) argue that organizations operate within a 'constellation' of social pressures, within which new demands for action can be created and old demands can evaporate. Thus one can envisage organizations facing their own distinct *greening constellation* within which their greening response is shaped and emerges. Certain greening pressures may require careful monitoring and immediate response i.e. legislation, whilst for many organizations, other pressures can be largely ignored i.e. pressure groups.

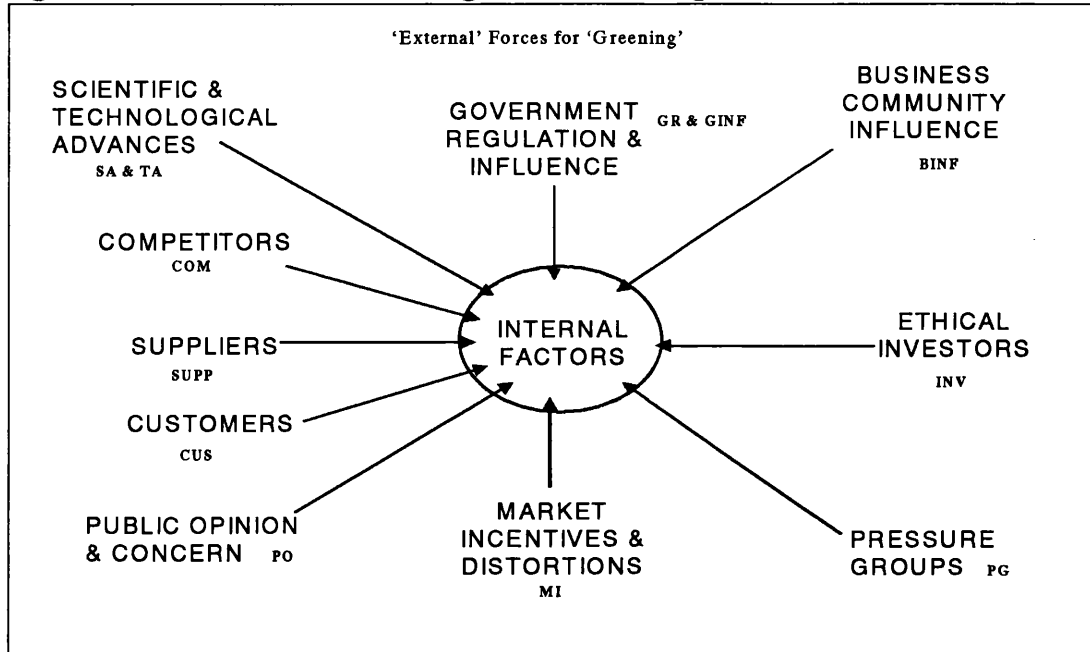
4.6.1 Modelling 'External' Social demands in the UK

The chapter will now model the array of 'external' green demands that permeate the organization and create imperatives for change. The model explains why firms must seek to position themselves against 'green' pressures, and is similar to Porter's (1985) model of competitive forces. In order to secure any 'green' competitive advantage or minimise 'compliance' costs, firms must scan the array of 'external' green pressures and then decide on the appropriate position to take towards the forces. The factors shaping such organizational 'positioning' are explored in chapter 5.

The model of UK external greening pressures is shown in figure 4-2. Each 'external' greening pressure will vary in strength and impact depending upon the organization facing them. Some pressures may not even affect certain organizations, or industries, at all. Furthermore, certain pressures may disrupt and conflict with each other, resulting in some

pressures being interdependent and interrelated with others. As such, each pressure is not mutually exclusive as they can potential impinge on other pressures.

Figure 4-2 The External Demands for Organizational Greening



Each of these pressures will be discussed, seeking to tentatively describe their possible impact on organizations and highlight their coupling with other pressures.

4.6.1.1 Government Legislation & Regulation (GR)

It is beyond the scope of this thesis to provide a detailed review of the UK regulatory structures and current legislation requirements on the environment (for such reviews see Ball *et al*, 2000; Short, 2003; Tromans & Poustie, 2003; Short, 2004). Instead, this section simply outlines the current approach of environmental regulation in the UK.

One of goals of the case studies in chapter 8 was to discover organizational attitude towards compliance with UK environment legislation, and whether legislation was a major driver of greening. From the analysis of the case material in chapter 8, company managers specifically identified certain pieces of environmental legislation as being especially problematic to their current business operations. For example, the Environmental Manager at Cobe Laboratories documented how the proposed introduction of the Producer Responsibility Obligations (Packaging Waste) Regulations was the original impetus for the

company to implement an EMS. This is a complete contrast with the experiences of Netlon Ltd, which introduced an EMS in response to customer demands for environmental information.

All of the manufacturing organizations studied in this thesis had their manufacturing facilities located in England. Within this jurisdiction, the relevant regulatory body is the Environment Agency for England and Wales. The Environment Agency for England and Wales was formed in 1996 as a result of the Environmental Protection Act 1995, and is responsible for legal enforcement and disseminating information about current regulations and obligations. Supporting the Environment Agency is the Department of the Environment, Fisheries and Rural Affairs (DEFRA), which issues policy and discussion documents about environmental issues and potential new regulation.

The majority of UK environmental legislation is based on the idea of 'command and control', where legislation sets an environmental standard for particular organizational operations and prohibits others (see Hillary, 1993; Short, 2004). However, since joining the European Union (EU), UK environmental regulation has undergone a dramatic change through the implementation of EU law. The EU developed its Fifth Action Programme on the Environment entitled 'Towards sustainability' from 1993-2000. This programme outlined the current agenda for EU environmental action, and adopted a 'market-based' approach for securing environmental protection (see Bebbington 1993, 2001; Hillary, 1993). The Sixth Action Programme on the Environment entitled 'Environment 2010: Our Future, Our Choice' continued this tradition (see Short, 2004). The market-based approach to environmental regulation focuses on the agents and activities that deplete natural resources and cause environmental damage. The approach seeks to encourage environmental responsibility from all of society by moving behaviour towards the integration of environmental and social costs into economic activities, so that prices will appropriately reflect relative scarcity, total value of resources and contribute towards the prevention of environmental degradation.

The 'market-based' approach to environmental legislation seeks to avoid conflict over setting specific environmental targets or standards by national regulatory bodies (Tomer, 1992). Despite the antagonism of certain industrialists towards environmental protection, the managerial perceptions of organizations appear to be changing, with some

organizations even leading the requirements of the environmental legislation, often at a short-term financial cost to themselves. However, these 'legislation leaders' are rare, as organizations may be afraid to over achieve environmental targets:

'Companies are usually concerned that over-achieving with respect to emission standards will cause the regulatory authorities to continually increase the limits. Avoiding this so called 'ratchet' effect has been a major barrier to innovation in the past'. (Department of Trade and Industry, 1991, p.94)

This fear is what 'market-based' legislation hopes to overcome (Hillary, 1993). It seeks to do this by consulting with business at all levels of the legal process, fostering an atmosphere of co-operation between the regulator and regulatee. However, even with this new legislative approach, legal compulsion still seems to be the biggest driver of corporate action on the environment, especially for UK SMEs. Such regulation is the 'external' greening force that imposes the most direct penalties on organizations that ignores its rules.

A fundamental cornerstone of the 'market-based' EU policy that requires specific mention is the development of the Eco-Management and Audit Scheme standard for EMS (EMAS). This voluntary scheme, similar in scope to the ISO 14000 series of standards on EMS, encourages organizations to implement EMS in order to control and regulate their own environmental performance. EMAS outlines the fundamental elements of expected of such a system, but leaves detailed industrial sector prescription to the participating organizations. The EMAS scheme is virtually identical to the alternative ISO 14001 EMS standard, although EMAS includes a formal requirement for the public provision, every three years, of an environmental statement that provides details of the operation of the EMS and the environmental impacts of the firm (see CEC 2001a, 2001b). The alternative BSI/ISO EMS standards will be discussed in section 4.6.1.3.

In conclusion, environmental legislation is obviously a key 'external' pressure on UK manufacturing organizations. It seeks to reduce harmful actions and improve overall corporate attitudes towards the natural environment.

4.6.1.2 Government Influence (GINF)

As well as legislation, governmental bodies provide a further stimulus/pressure for corporate greening by fostering environmental discussion and debate within society. For example, The Department of the Environment (DOE), a predecessor to DEFRA, was actively involved in discussions surrounding the development of the BSI's BS7750

voluntary standard on EMS. The Environment Agency is actively involved in promoting and supporting green business networks (GBN) in order to disseminate information and promote environmental discussion between businesses.

Government action can also directly and indirectly alter the boundaries of public thinking surrounding environmental issues. For example, the government commissions scientific research whose findings affect the way societal groups views the environmental performance of certain industry, thereby promoting or removing visibilities for environmental action.

UK Government discussions in other areas can also impinge on the importance of environmental issues. For example, the Deregulation Task force (DTF), the predecessor to the Better Regulation Task Force (BRTF), believed environmental regulators were frequently putting forward proposals that:

‘marginally improve the environment but at only at quite disproportionate cost to business and, as a result, to the community as a whole’. (DTF, 1995, p.18)

The DTF recommended that the Environment Agency should focus on the compliance costs for each of its new proposals, and this is now part of UK regulatory policy. The DTF also suggested that regulators should assist business to comply through friendly advice, rather than moving straight to prosecution. More recent comments on environmental regulation by the BRTF (see BRTF, 2004), illustrate the contested importance of environmental concerns within UK government.

4.6.1.3 Business Community Influence (BINF)

Business community associations, trade bodies and GBN are important influences on corporate attitudes towards the environment, as they serve to disseminate environmental information for both businesses and the wider public.

UK business associations, such as the CBI, have issued some environmental based guidance or position statements, either to encourage their members to think ‘green’ or to demonstrate their environmental legitimacy to external parties. However, these publications are often criticised as attempts to legitimise environmental destruction (see Gray & Collinson, 1992; Eccles, 1994). In a UK context, the CBI (1994, 2004) and the Chemical

Industry Association (CIA) (1999), have both issued environmental codes of conduct for their respective memberships. These same business associations have also defended their membership from further environmental pressure by issuing a verdict on the business impact of current environmental legislation. For example, the CBI (2004) claim that UK environmental regulation needs to be better devised as compliance is currently costing UK business £4 billion a year, and harming global competitiveness.

More fundamental is the role of BSI, the National Standards Body of the UK, responsible for facilitating and drafting British Standards. BSI provides UK industry with their major access to and influence on standardisation, both in the European arena and internationally (with ISO). The BSI was the first body to issue a standard on devising voluntary EMS (see BSI, 1992). However, the BSI's original BS7750 standard has since been subsumed within the development of the ISO's 14000 series of standards on EMS (BSI, 2004). The present ISO14000 standards provide a non-governmental alternative to the EU's EMAS scheme on EMS. The information generated by such systems will be discussed in chapter 7.

In addition to mainstream business associations, there exists a number of GBN (see Sustainability, 1994). Examples include: the Advisory Committee on Business and Environment (ACBE), Groundwork and Envirowise (for further details see Sustainability, 1994; Envirowise, 2004). Membership of individual GBN's tends to be polarised into companies of relatively the same size and similar manufacturing operations, but in totality are dominated by large organizations operating within industries traditionally seen as environmentally damaging.

The precise impact of a GBN on individual corporate behaviour is difficult to ascertain. Being part of a GBN provides the organization with an influential source of environmental information and advice. For example, the author was able to experience a series of meetings and events organised by the Gloucestershire Green Business Club (GGBC) and the Gloucestershire Environmental Business Forum (GEBF). The GGBC was organised by Gloucestershire University, and provided local businesses with up-to-date information on environmental management matters, and ran a series of monthly evening seminars providing updates on environmental legislation and undertaking site visits to local businesses. All of the companies featured in the case studies in chapter 8 were corporate members of the GGBC, and two had shown the club members round their facilities on

open evenings. The GEBF was a consortium of key regional business and environment organisations, including the Environment Agency, which organised specific initiatives. Overall, the GGBC and GEBF provided an essential source of environmental information for businesses in the area. In response to questioning, many admitted that without access to such information, many SMEs would not have considered managing their environmental impacts.

These business associations and GBN are attacked for being “specialists without vision”, as they tackle environmental issues using existing methods and mindsets (Power, 1994, p.369). However, this may be preferable to using ‘visionaries without speciality’ (Power 1994, p.369) to aid companies with their environmental problems.

4.6.1.4 ‘Green’ Customers (CUS)

The environmental literature is full of accounts about the rise of the ‘green consumer’ as a major factor in inducing changes within the environmental behaviour of organizations (see Elkington & Hailes, 1989; Sethi, 1990). However, the existence of a large body of consumers who both demand and pay extra for environmentally friendly products remains difficult to prove (Larsson *et al*, 1992; Gosling, 1996). Gosling (1996, p.7) suggests that the number of ardent ‘green consumers’ may be declining:

‘The green consumer that apparently healthy species that revolutionised shopping in the late 1980s, is at risk of extinction. Sales of green products have fallen so dramatically over the past five years that Sainsbury's and Asda have reduced their product ranges, Tesco's is thinking of doing the same, and the Co-op has completely abandoned its own-label green brand’.

The Body Shop's recent financial troubles may further support this view (see Body Shop, 2003). Why might the number of green consumers be dwindling? The UK National Consumer Council (NCC) (1996, p.1) suggests that consumers are confused by the environmental claims, which are generally:

‘woolly, meaningless, unverifiable, open to multiple interpretations, confusing, of no real benefit, or even downright dishonest, leaving consumers cynical and confused’.

The NCC report suggests that such vague environmental claims stop UK consumers buying ‘green’. In addition to the problem in actually ‘buying green’, consumer attitudes may change according to the importance attached to environmental relative to other issues. Research studies have found only a weak relationship between consumers' behaviour and their environmental attitudes (Hutton & Ahtola, 1991; Uusitalo, 1990). Such results are not

surprising, especially when one considers the methodological problems of trying to measure individual attitudes, as individuals who see themselves as 'environmentally friendly' may act differently in specific contexts (Olander & Thøgersen, 1995).

Further empirical research is required, but it appears that UK public concern for the environment is primarily manifesting itself within new environmental legislation for companies, which is seen to guarantee that all products are produced and operate in an acceptable 'environmental' manner. These imposed environmental standards leave most consumers free to choose products based on price alone. It is only the small body of 'deep green' consumers that demand products with environmental standards far beyond those demanded by legislation. At most, these 'true' green consumers may aid the creation of small volume niche markets for certain environmental products, and could also provide the catalyst for greater environmental awareness within traditional markets. However, the impact of such consumers on UK manufacturing organizations appears negligible.

Porter (1991a) suggests that environmental quality could be a source of sustainable competitive advantage, but only if the focus is on developing clean production technologies. This would obviously interest firms that are currently in advance of legislative requirements, or those that could obtain environmental protection as a by-product of investments in new manufacturing technology. Securing competitive advantage through the development of 'green' characteristics in products remains empirically unproven, but may require an organization to develop a system of strategic cost analysis similar to SMA. Whilst evidence suggests that organizations are trying to highlight the environmental quality of their products on packaging and in press releases, this seems to be an attempt to exhibit 'legitimacy' rather than a serious attempt to compete on 'greenness'. Furthermore, none of the companies in the case studies in chapter 8 mentioned 'greenness' of individual product as a major competitive issue in the industry.

Public procurement by government authorities is one area where 'green' issues are becoming a key component of the buying decision. UK legislation on public procurement is heavily influenced by the current EU Procurement Directives on works (EU Directive 93/37), services (Directive 92/50) and supplies contracts (Directive 93/96). Under the terms of these directives a contracting authority may commit itself to choosing the lowest priced tender or the 'most economically advantageous'. The concept of 'most economically

advantageous' is fleshed out by various criteria such as price, quality and technical merit that are listed in the Procurement Directives. However, neither the Directives nor the UK domestic regulations made under them make any reference to environmental criteria. However, the verdict of the *Gebroeders Beentjes v. Netherlands* C-31/87 [1988] ECR 4635 in the European Court of Justice allowed social issues to be given due consideration in public tendering decisions. The *Beentjes* case has slowly lead to the increased use of environmental criteria when awarding public procurement contracts in both the EU and the UK. In 1999 compulsory competitive tendering (CCT) for UK local government was abolished and replaced under the Local Government (Best Value Principles) Act. Best Value Principles requires that authorities be accountable for their expenditure and obtain value for money in the delivery of services. Following the judgement of *Beentjes*, the concept of 'best value' has been interpreted as allowing for the inclusion of environmental criteria (Department of Finance and Personnel, 2004). The environmental criteria vary between authorities and contracted item, but suppliers may be asked for information on their environmental policy, whether they possess ISO14001 or EMAS EMS and their corporate record on pollution.

To further codify the inclusion of environmental criteria in public procurement, the new EU Procurement Directive (Directive 2004/18/EC), adopted in March 2004, allows that the conditions governing the performance of the contract may, makes reference to environmental considerations in its list of contract award criteria (see Euractiv, 2004; Hooper, 2004). The new Procurement Directive must be implemented into UK law by 31 January 2006.

The increasing inclusion of environmental criteria in public procurement decisions represents a major shift in the environmental pressure placed on many UK companies. If they do not act on the environment, they will seriously reduce their chance of winning tenders. However, empirical evidence as to the relative importance of environmental criteria within public procurement decisions does not currently exist.

4.6.1.5 Competitors (COM)

The market presence of 'green' competitors or 'green' substitute products may well force competing organizations into costly environmentally improvement (Porter, 1991a). If

products are priced identically, but differ in their apparent 'greenness', organizations adopting a 'legislative push' environmental strategy may lose out in the market place to 'leading-edge' environmental competitors (Porter, 1991b; Porter & van der Linde, 1995). The impact of 'leading-edge' competitors depends upon the type of industry, as some sectors offer only limited scope to really compete on environmental grounds.

4.6.1.6 Suppliers (SUPP)

Suppliers can be a major influence in the level of environmental change within UK manufacturers. UK manufacturers may be able to pass environmental pressure up the supply chain to their supplies by building on established links between supply chain elements (e.g. just in time supply agreements). Such a process will enhance the environmental quality of manufacturing from the instant that raw materials are procured. If suppliers in an industry are environmentally proactive, having EMS and over achieving environmental legislation standards, it can be a positive factor in the value chain of their customers (Macve & Carey, 1992). However, if suppliers are environmentally irresponsible, their customers may have to deal with increased environmental related issues. Porter (1985) suggests that the long term interests of suppliers and purchasers are identical, so the environmental initiatives of each will cause opposing costs and benefits, and encourage process change in each other. An organization should examine its value chain and eliminate non-value-added activities. This analysis of the value chain should include the value chain of suppliers, as many environmentally-related costs are incurred during the purchasing of production inputs. As a result, a number of UK organizations, including BT and B&Q, have introduced 'environmental audits' of suppliers, and only purchase from those that meet a predetermined set of environmental criteria.

4.6.1.7 Market Incentives/Distortions (MI)

Government legislation and regulation could indirectly/directly promote market activities that have a damaging affect on the environment, and vice versa (see Hardin, 1968). For example, EU subsidies to farmers for leaving ground fallow were originally paid on the basis of the size of the field, which led to farmers destroying hedge rows in order to expand their acreage. Market incentives can also be used to protect the environment, (e.g. land fill tax), but must be used carefully as they can have unintended economic consequences.

4.6.1.8 Public Opinion (PO) & Pressure Groups (PG)

Environmental pressure groups can have powerfully lobbying affects on the organization, both directly and indirectly by affecting its customers. For example, Greenpeace are powerful lobbyists of organizations with a bad environmental performance record. Apart from direct action, it is difficult to assess current impact of pressure group activity on UK manufacturing organizations. However, pressure groups also help to raise public awareness of 'improper' organizational actions. Unless this public awareness is translated through political pressure into new legislation or produces 'green consumers', it remains doubtful whether this pressure can actually lead to more than cosmetic behavioural change within the organization. Furthermore, organizations can often defend themselves against such environmental claims by emphasising the economic benefits that they provide. In doing so, they create public support for their continued activities. In conclusion, environmental pressure groups may affect organizations, but only through direct action or if they succeed in raising public concern to a level that demands further UK regulation.

4.6.1.9 Ethical Investing (INV)

The number of socially responsible and ethical investment funds has grown rapidly during the last thirty years (Rockness & Williams 1988; Herremans *et al*, 1993). In June 2003 there were a total of 54 UK ethical funds, with 448,000 unit and policyholders, worth an estimated £4 billion (Ethical Investment Research Centre, 2003). Despite the comparatively small amounts invested in such 'ethical' funds, they have helped to raise ethical awareness within society (Spiller, 2000).

The growth in ethical investing has led to considerable debate surrounding the links between social responsibility and stock market performance (Shane & Spicer 1983; Herremans *et al* 1993). Friedman (1970) suggests that companies who pursue social responsibility objectives, beyond those required by law, incur significant private costs that prevent profit maximisation. Thus, investors who make their investment decision based on social responsibility criteria, do so at the expense of economic returns. Empirical research has not conclusively rejected such a hypothesis. Theoretical predictions of the relationship between economic and ethical performance are mixed, supporting a negative relationship (Ullman, 1976), a positive relationship (Bruyn, 1987), and even a neutral relationship

(Parket & Eibert, 1975). Empirical results have shown a positive relationship between social responsibility and economic measures of performance (Staw & Szwajkowski 1975; Herremans *et al*, 1993; Russo & Fouts, 1997). However, much of this research is hampered by methodological problems, such as failing to control for firm size and industry effects, and also adopting inappropriate proxies for reputation, such as using business community reputation as a proxy for good social responsibility. In spite of these methodological reservations, there does appear to be a weak relationship between ‘good’ corporate social responsibility and higher profitability. Investors also seem to be aware of the differences in ethical reputation among companies, as evidenced by positive abnormal returns accruing to stocks of companies with superior reputations, particularly in industries encountering high levels of social conflict (Herremans *et al* 1993). This evidence supports the notion that management must acknowledge environmental issues, not only to ensure constant access to stock market funding, but also to achieve higher profitability.

4.6.1.10 Scientific & Technological Advances (SA & TA)

The conflicting scientific evidence about the environment was discussed in chapter 2. This evidence and scientific advances in environmental knowledge provide a powerful external influence on corporate greening. Greening may be equally influenced by the availability of technological advances in production technology. The motivation for implementing new production technology is often to provide greater productive efficiency and flexibility, but it may also indirectly reduce environmental impacts and compliance costs (Kunes, 2001). The main pressure for adopting ‘cleaner’ technology comes from environmental legislation. For example, the Pollution Prevention and Control Regulations 2000 require industrial organizations to use a system of Integrated Pollution Prevention and Control (IPPC) which considers the whole impact of processes on the environment. The IPPC system is designed to encourage higher technological solutions, as it encourages the development of the best available techniques (BAT) rather than end-of-pipe technologies (e.g. those dealing with the waste *after* it is created). Thus, organizational implementation of BAT will require expertise in environmental technology, and changes in the production process. Such changes could even promote a ‘green’ understanding within organizational participants.

Voluntary adoption of ‘cleaner’ technologies appears to be uncommon, especially for organizations that lack the necessary environmental information or financial resources:

'It is evident that there is a limited adoption of such cleaner technologies by many firms, especially small firms. This is due to their reluctance to alter their production process so as to reduce pollution emissions; the costs, and their lack of awareness and knowledge about available more efficient production and pollution control techniques'. (The European Foundation for the Improvement of Living and Working Conditions, 1992, p.9)

In order to encourage the diffusion of such technologies, there are a plethora of governmental and GBN publications encouraging adoption of environmentally friendly manufacturing technology (see for example DTI, 1991; United Nations Environment Programme (UNEP), 1991a; Envirowise, 2004). Although information is widely available about the success of end-of-pipe technologies, the same is not true for developments in cleaner technologies. Organizations may shroud such technological advances with great secrecy, and therefore, companies may find it difficult to obtain information about relevant cleaner technologies:

'This is a particular problem in the chemicals sector - one organization interviewed was even reluctant to apply for government funding for a development programme because of the competitive edge to be gained by keeping the process secret. In contrast, process changes or improvements in the metal manufacturing sector are very widely communicated'. (DTI, 1991, p.95)

In conclusion, the dissemination of environmentally friendly technology may be influenced by a number of constraints, including lack of information. The pressure on organizations to adopt such technology seems to come from legislation, but may also be influenced by customer requirements. Pressures to adopt may emerge within the organization; environmental improvements often occur as a by-product of technological improvements designed to increase product quality.

4.7 Conclusion

This chapter highlights the importance of 'external' social pressures in shaping the environmental initiatives of UK manufacturing organizations contexts. It develops a theoretical envelope of greening to explain why UK manufacturing firms respond to 'external' pressures for greening, and outlined an array of 'external' environmental pressures that facilitate the greening.

Partly as a response to these 'external' pressures, environmental management is emerging as a distinct function within many UK organizations:

'environmental management is beginning to be recognised as an important new functional management area that is taking its place alongside the traditional areas such as marketing, finance, R&D, and manufacturing. Now even service and consumer goods companies are appointing senior executives to newly established environmental policy positions, to ensure that environmental impacts are considered in all aspects of a company's operations'. (Tomer, 1992, p.123)

Often arising in an organization as a 'natural' extension to the existing health and safety function, these environmental management functions are often accompanied by the implementation of an EMS. These new systems of information must work alongside existing systems (such as management accounting) to measure the environmental dimension of operations. The introduction of EMS and the formation of an environmental management unit are increasingly seen as the appropriate corporate 'recipe' (Spender, 1993) for UK manufacturing firms to follow when dealing with 'external' environmental pressures. However, it is clear that not every firm has adopted such a systematic approach to tackling environmental issues. Furthermore, EMS and environmental units may be given different levels depending on the organizational context.

Chapter 5 focuses on how the unique organizational context of the firm may influence the response to the 'external' greening pressure. Management accounting systems are part of organizational context, and their role in greening will also be further explored.

Chapter 5: Organizational Responses to Greening

5.0 Constructing The Notion of Organizational Environmental 'Visibility'

Chapter 4 developed a range of theoretical models to explain the process by which organizations face 'external' pressures for 'greening'. These green pressures will not affect all organizations in the same manner over time. The strength and range of 'external' green issues affecting an organization will be determined, at least in part, by the specific organizational context and prior actions of the organization under consideration. This chapter investigates how the specific nature and context of each organization can affect the demands it faces and how it responds to them.

As highlighted in Chapter 4, certain 'external' greening demands seem to affect certain economic sectors more forcibly than others. For example, the financial sector, by the nature of its products, has to deal with relatively fewer direct environmental legislation requirements than the chemical industry. Table 5-1 shows the results of an analysis into the different effects on various UK industrial sectors of the external greening demands described in the chapter 4 model. The analysis was conducted by surveying the UK Newsstand online database between 1995-2003 looking for articles that described a greening demand on a specific sector of the UK economy. From this survey the relative strengths of each external 'green' demand on each sector was assessed by the relative volume of written accounts observed. A 'low impact' was noted when there were less than 10 articles dealing with a green pressure in relation to a specific industrial sector. A 'medium impact' was awarded for between 11 and 30 citations, and a high impact was awarded for over 30 citations. Whilst there is no doubting the limitations of such an inaccurate research method, the analysis illustrates how greening demands vary between industries. The results of the analysis provide clear evidence that greening demands affect industrial sectors in different ways. For example, pressure group and public opinion greening demands seem to be concentrated on organizations operating in the petrochemical and water industry sectors, although supermarket plans to build on so called 'green field' sites have begun to receive more attention. In conclusion, this analysis suggests that environmentally 'visible' organizations may face greater pressure to modify their activities.

Table 5-1 Analysis of External Green Pressures on Industrial Sectors

| | Chemical Industry | Water Industry | Car Producers | Supermarket Sector |
|------------------------|-------------------|----------------|---------------|--------------------|
| Legislation | H | H | H | H |
| Government Influence | H | H | M | L |
| Suppliers | M | L | M | L |
| Customers | M | H | M | M |
| Competitors | H | L | M/H | M |
| Market Distortions | H | H | H | H |
| Public Opinion | M | H | M | L |
| Pressure Groups | H | H | L | M/H |
| Investors | L/M/H | M/L | L | L |
| Scientific Evidence | L/M/H | H | L | L |
| Technological Advances | H | M | L | L |
| Business Community | M/L | M | L | L |

L=Low impact, M=Medium impact, H=High impact

The notion of 'environmental visibility' represents the method by which society deconstructs the importance and reality of a green dimension to organizational activities. An organization that exhibits a high level of 'environmental visibility' will face greater demands for it to become 'greener'. Seen in these terms, the Body Shop has a low 'environmental visibility'. 'Environmental visibility' represents the reality constructed by the interactions between members of society. Berger & Luckmann (1967) and Weick (1979) *inter alia* have identified that social realities are constructed through interactions within society. Weick (1979, p. 164) explains this process:

'reality is selectively perceived, rearranged cognitively, and negotiated interpersonally. Analysis of the social construction of reality emphasise that actors attain at least a partial consensus on the meaning of their behaviour and that they look for patterns that underlie appearances, actions, events. These patterns are assumed to have an existence independent of the interpretation procedures'.

Thus 'environmental visibility', like any social reality, is constructed in both social and organizational contexts. It varies over time and as conditions within society change. If 'external' social groups view an organization as exhibiting high levels of 'environmental visibility', that organization may well experience greater 'external' demands for it to change its attitude towards green issues. Alternatively, an organization deemed to possess a low 'environmental visibility' should experience less 'external' pressure to adopt greener modes of operation. When concerned with green issues, the definition of an

‘environmentally visible’ organization not only includes the obvious large scale entities, but will also include any entity involved in areas of production and manufacturing which are thought of, and seen, as having a negative impact on the environment in some way. Social perceptions, expectations and realities help to create what I term the ‘environmental visibility’ of each organization. Such visibility helps to shape and attract the initial demands for organizational change, demands which may be open to enactment and interpretation by the organization itself. As a simple example of the notion of visibility, one can see that organizations operating in the chemical industry have a high level of green visibility, for this industry’s unique products and services are viewed by the majority of society as having a great potential for harming the environment. This high visibility of chemical producers has helped, and is helping, to attract to them greater, and shifting, demands and standards of performance from societal groups and the government.

A fundamental characteristic not highlighted above, however, is that the ‘environmental visibility’ each firm embodies is unique, although similarities can be observed between organizations. This is formed by the interactions between each business’ own corporate characteristics and changing social expectations. The notion of ‘environmental visibility’ is difficult to break down into constituent parts, since it is formed through these *ad hoc* interactions in society and the organization. However, it is vital to attempt this and analyse “environmental visibility” in order to identify its major influences.

5.1 The Corporate Construction of Environmental ‘Visibility’

The overall “environmental visibility” of the organization is influenced, informed and balanced by many different and interrelated dimensions. These include the following: its size, the perception of its current green image, its type of products and services, the media attention focused on it, the social importance of its non-environmentally related characteristics and finally by its past record on environmental issues. These organizational characteristics are important constituents in the construction of ‘environmental visibility’. However, they do not act in complete isolation from each other, and do not represent the full range of issues that make up the overall visibility of the organization. Each of the identified characteristics will be discussed in turn, hypothesising about the role each could play in creating the ‘environmental visibility’ that serves to influence the ‘external’ pressures for greening:

Hypothesis 1: Organizational size will affect the likelihood of an organization facing demands for, and actually engaging in, environmental change.

Organizational size may influence the level of corporate environmental change. Large organizational size may provide the slack resources needed to facilitate change (Thompson, 1967, Pfeffer, 1982). Alternatively, size may be positively associated with structural inertia, and, therefore point to a low ability to effect organizational change.

Hypothesis 2: The type of organizational products and/or services and the processes by which they are created will affect the demands for environmental change

If organizational activities are observed, or thought, to have a large negative impact on the natural environment it will serve to increase the overall 'environmental visibility' of the firm within society, resulting in increased pressure for change. Alternatively, if the products are claimed to have little negative impact on the environment, the firm will experience less external pressure for greening.

Hypothesis 3: The level of adverse media attention on the organization will affect the level of demands for that firm to undertake environmental change.

The media can play a major role in enhancing and eroding the social legitimacy of an organization (Elsbach & Sutton, 1992):

'The media play a major role in assigning importance to issues and exposing gaps between business practices and society's expectations. Media bias and effects have been shown to shape societal values and attitudes'. (Greening & Gray, 1994, p.475)

As well as promoting the negative aspects of the organization, the media can be used as an arena in which disreputable firms can regain their legitimacy (see the discussion of institutional theory within chapter 4). The information reported by both the organization and other parties, along with that supplied from the general media, can play an important role in the social construction of 'environmental visibility':

'What is reported and disclosed has an important influence on social consciousness and action'. (Hopwood, 1978, p.60)

Thus, the firm can also use information in order to enact its own environmental 'visibility', say for example, by issuing its own environmental reports.

Hypothesis 4: The social importance of non-environmentally related characteristics of the firm will affect the external pressures for 'greening' upon the firm.

Demands for greening may be moderated by the relative importance society places on the non-environmental benefits of the firm. If demands for environmental performance threaten the competitive position and continued survival of an organization in the market, such demands may be reduced in order to preserve the economic benefits that the firm provides (see Gould, 1994). Thus the overall 'environmental visibility' of an organization may be reduced in direct relation to the social importance of its non-green activities.

Hypothesis 5: Organizations can enact their own environmental 'visibility'

Through its past, present and planned actions, an organization will enact the construction of its own 'environmental visibility'. For example, the past environmental performance record of the organization plays a major role in shaping its 'environmental visibility' within society. If this record is considered poor the organization may experience greater demands to improve it. Alternatively, if the past record is considered adequate, the organization may encounter fewer demands for additional greening. Environmental performance is not an objective concept. Different bodies within society may set different levels of acceptable environmental performance upon organizations. For example, ARC, a quarrying company, complied with relevant environmental regulations, but was still subject to direct action from environmental groups (Nuttall, 1995).

In addition to environmental performance, the past and present organizational programmes to enhance green performance may also affect the 'environmental visibility' of an organization. If social actors within society view organizational greening programmes as indicative of 'good management' it may reduce the external demands for future organizational greening. As an example of this, one can see the development of environmental management systems in these terms. Organizations who are seen to be adopting an EMS conforming to ISO14001 may well appear more legitimate to some groups within society, particularly those in the business sphere. As shown in chapter 4, organizations adopting institutionally 'legitimate' EMS may experience fewer demands for greening. Hypothesis 5 highlights this potential for organizations to enact their own 'environmental visibility', reducing it and experiencing less external turbulence. In fact, organizations could go further, and enact their visibility by divesting in subsidiaries that

operate in negative environmental impact industries, and in a US context, purchase additional pollution allowance permits so their environmental emissions remain within regulatory limits.

5.2 The Overall Environmental Context of the Firm

The above analysis has attempted to identify some of the constituent factors that together help to form the 'environmental visibility' that an organization exhibits within society. The overall force for change the organization faces from environmental demands is a function of this visibility. Organizations with the greatest 'environmental visibility' will face greater demands for environmental change from a wider range of societal groups and pressures.

The 'environmental imperative' faced by organizations can be modelled as a "pattern of relations" (Morgan, 1997, p. 249) between and within a 'constellation' (Burchell *et al*, 1985) of 'external' pressures surrounding the organization. In turn, the power of these pressures upon each individual organization may vary to some extent according to a number of interrelated characteristics of organizational 'environmental visibility'. This hypothesis can be expressed mathematically using the following equations:

$$\text{'External' Green Pressures (EP)} = f(\text{GR, GINF, BINF, MI, PO, PG, CUS, SUPP, COM, INV, SA, TA})$$

$$\text{'Environmental Visibility'} = f(\text{S, T, G, P, EC, MED})$$

$$\text{Overall Environmental Context (OEC)} = f(\text{EV, EP})$$

Key:

S= size

G= Green Image

EC= Importance of non-green issues

EP= Environmental pressures

OEC= Organizational environmental Context

GINF= Government influence

MI= Market Incentives,

PG=Pressure groups,

SUPP=Supplier pressure,

INV=Investors,

TA=Technological advances

T= type of products,

P= Past Record

MED= Bad Media coverage

EV= 'environmental visibility'

GR= Governmental regulation,

BINF= Business community influence,

PO=Public opinion,

CUS=Customer pressure,

COM=Green Actions by Competitors,

SA=Scientific evidence and advances,

From the basic equation, the 'external' environmental pressure within society (EP) is a function of the twelve interrelated 'external' pressures identified in chapter 4. The power and effect of each of these pressures on an organization seems dependent on the 'environmental visibility' (EV) it exhibits to society; a visibility that the organization enacts

and changes through its actions. The interactions between the EP and EV are theorised to form the unique organizational environmental context (OEC) of the organization. This OEC theoretical determines the basis for what the organization needs to consider, monitor and respond to, if it is to tackle its environmental issues in a manner desired by society. However, organizations do not approach environmental management in an identical manner. The next section of the model will focus on explaining how organizations might internally respond to their unique OEC, and theorise upon 'internal' characteristics of the firm implicated in shaping greening responses.

5.3 Modelling Organizational Responses to External Greening Pressures

The model of 'external' green forces in chapter 4 suggests that organizations are facing a diverse range of environmental pressures. However, these 'green' pressures do not result in 'mechanistic' change since the 'environmental visibility' of the firm will influence the pressures it faces and the responses it adopts. Analysis of the greening process will now extend inside the organization, exploring how organizational characteristics, including the nature and role of management accounting, can influence the 'greening' process.

Although the majority of the environmental literature views momentum for the greening of organizations as originating from outside the organization (i.e. legislation), such momentum does not always flow fluidly through organizational boundaries. It may be diluted, influenced, translated and enacted by organizational processes. The context from which 'greening' emerges is multidimensional. One major dimension is the confines of the organization itself (intra), and the other interactions within wider society (inter).

The theoretical models developed in chapter 4 analysed the environmental pressures originating from 'outside' the organization, but explicitly recognised the way that an organization may enact its own context. This chapter develops this idea and models how organizational characteristics influence the internal responses to environmentalism.

5.4 The Construction of 'Dominant' Responsiveness Towards 'Green' Pressures

This section explores the dynamic processes by which an organization's dominant attitude towards the environment may be built up within the organization and how external green

pressures may either lead to change or be prevented from doing so. The range of environmental pressures identified in chapter 4 are, in the main, very different in nature to traditional factors that are thought to impinge on business practice. This difference between the 'green' environment and the normal economic environment provides fertile ground for exploring why and how pressures permeate and even change organizational boundaries, how they are acted upon, and how they cause an organization to change, through study of the environment as a case study.

It is clear that external environmental pressures are just one of the competing pressures that an organization faces within its "wider context" (Morgan (1997, p. 244). Green demands are only one in a spectrum that the firm may have to adapt and respond to. In certain situations, an organization interprets the environment as a low priority in its hierarchy of pressures, with for example, increasing profitability and survival playing a more vital role. This 'interpreted hierarchy' of pressures is viewed by the organization in different ways at different times. Contrary to neoclassical economic theory, firms facing identical operating environments adopt different strategic approaches towards tackling key areas for success (Tomer, 1992; Carroll, 1993; Czarniawska-Joerges, 1992), an observation highlighting the potential role of internal characteristics in shaping the dynamics for organizational action. The interpreted hierarchy of pressures changes as a function of the methods in which the organization views itself internally and externally, its interpretative mechanisms, change. Environmental pressures can be filtered out when organizations decide on the stimuli they need to react to, or can be seen as organizationally important because of the existence of internal catalysts for greening within the organization. This process of perception and interpretation is unlikely to be a conscious decision by any individual or organizational group, but will emerge as a pattern of interactions between many conflicting, supporting and technical elements within the organization. These internal *catalysts* and *filters* for change are embodied in the values, ideologies, attributes, management structures and systems present in any organization. Such organizational characteristics can influence the progress of 'environmentalism' at all stages of the organizational adaptation process (Argyris & Schon, 1978). Thus, they may play a role not just in the anticipatory phase where environmental external stimuli are interpreted, but also during the responsive phase where the primary impacts of change are being absorbed, and the readjustment phase after the greening demands have subsided.

5.5 Modelling the Internal Catalysts and Filters for Greening

This section develops the concepts of internal catalysts and filters. It hypothesises which internal organizational characteristics could be claimed to be important internal catalysts and filters for organizational greening. Perhaps primary amongst the internal filters that can prevent and limit the 'greening potential' of an organization will be the accounting function - a function providing a key role in controlling many organizations in the UK. The pattern of interactions that emerge between the internal elements of the organization forms the organization's 'dominant attitude' towards external green issues. This dominant attitude shapes the context in which greening succeeds or fails.

If one accepts the potential of organizational characteristics and attributes to act as catalysts and filters for greening, it now remains to hypothesise *a priori* about the range of internal attributes that act as either catalysts or filters and in affecting the penetration of greening within the firm. This model explicitly recognises the dynamism of post-modern capitalist enterprises, expecting the nature and influence of internal characteristics to vary across firms, in contrast to the neo-classical model of firm behaviour, which expects rational firms to possess identical internal structures and systems (Cole *et al*, 1983). Key within this model is the presence of organizational catalysts and filters for greening. These theoretical constructs are defined as follows:

An internal catalyst is an element or characteristic of the firm that can be observed to encourage green issues to permeate organizational boundaries and become part of the organization.

An internal filter is an element or characteristic of the firm that can be observed to actively, or unobtrusively, hinder or prevent green issues from permeating organizational boundaries.

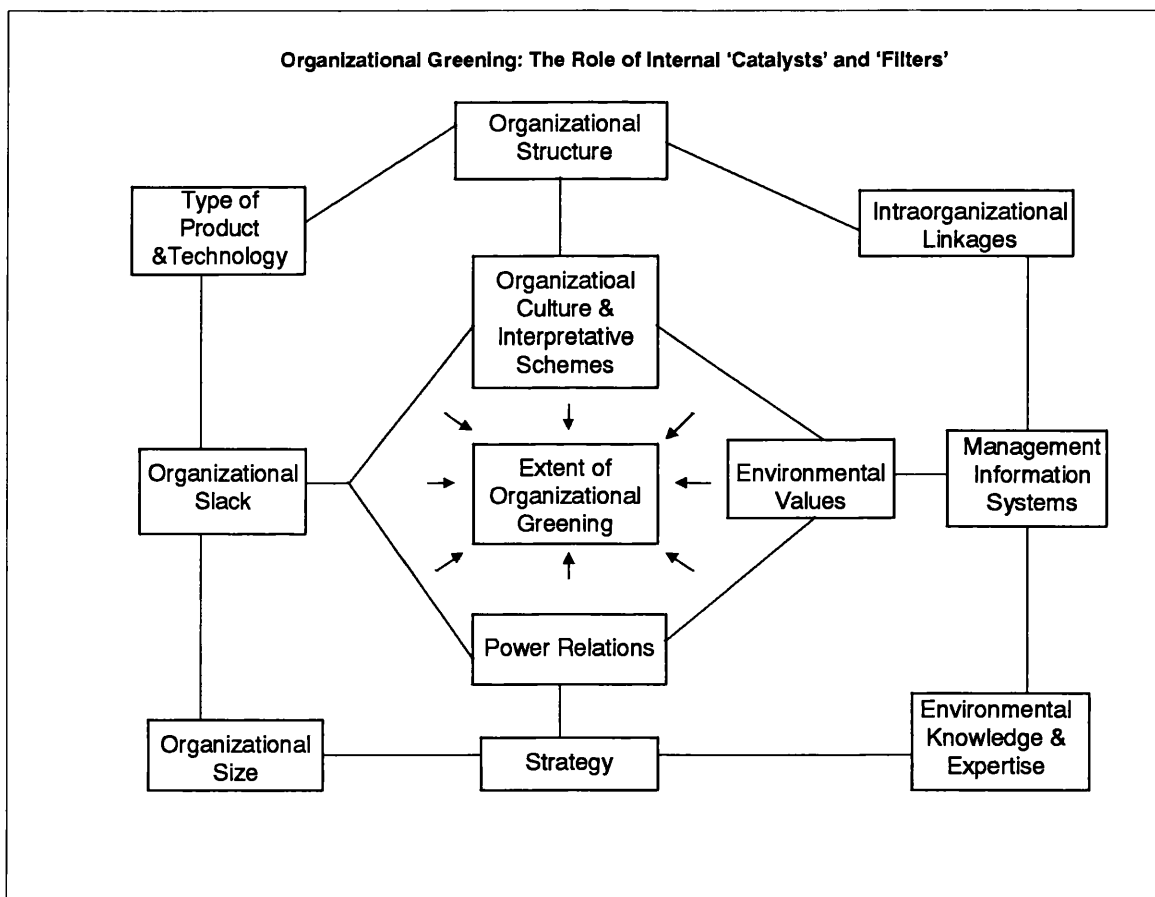
Little is currently known about how green issues are encouraged or prevented from entering the firm by the existing organizational context. Each of the internal characteristics identified are discussed individually below, but they are not independent. All aspects of the existing organizational context are interrelated and bound together. Thus, it is difficult to identify the individual role each will play in organizational greening, although it is possible to discuss their likely importance. The firm case study analysis provided in chapter 8 offers empirical substance. However, the following hypothesis can be added to the ones posed earlier:

Hypothesis 6: The internal catalysts and filters for greening within the organization will differ:

- a) between organizations where individual personnel, firm hierarchies and managerial styles will create differences;
- b) and across industries where individual business differences are accentuated and where product characteristics and manufacturing techniques may create new differences.

The aspects of organizational context that may affect the process of organizational greening as either catalysts or filters to change are shown in figure 5-1. Each of these will now be discussed in turn.

Figure 5-1 Internal Characteristics that may influence Environmental Attitude



5.5.1 Organizational Size

The potential of size to act as an internal 'filter' for greening is apparent in the attitude of small and medium-sized enterprises (SMEs). SMEs together account for more than half of the employment (58.2 per cent) and turnover (52.4 per cent) in the UK (Small Business Service, 2003). Despite this importance, there is little hard evidence on their collective

environmental impacts, or on their response to environmental issues. A survey by Smith & Kemp (1998, p.2) found UK SMEs ignoring environmental issues, unless threatened by prosecution or customers:

"A typical SME is ill-informed and unwilling to take action unless threatened by strong external forces such as prosecution or customer demands. Worse still, many foresee no threats or advantages to their companies from the environment. As one MD [managing director] of a small service company summed up when asked what benefits could be gained from pursuing positive environmental action he replied 'bugger all'."

These results were similar to those found in other studies (Ledgerwood & Winter, 1994; Gibbon & Holland, 1995; Revell & Blackburn, 2004). Smith & Kemp (1998, p.3) found SME awareness of environmental issues to be "appallingly low", with only one in five aware of relevant environmental regulations. Compliance with tax and employment regulations was deemed much more important to the business than environmental compliance. Critically, SMEs are inspected by the Environment Agency regulator on a constant basis, helping to further reduce the perceived importance of environmental regulations (Gibbon & Holland, 1995). Thus, the level of regulatory *enforcement* may be just as important an influence on the behaviour of SMEs as the legislation itself (Environmental Data Services, 1995). This evidence on SMEs validates the theoretical notion of 'environmental visibility' developed in this chapter. Using this, one can hypothesise that regulatory bodies view most SMEs as possessing a low 'environmental visibility', and thus require less enforcement. This low level of perceived 'environmental visibility' in smaller organizations may shift following any large-scale reported breaches of regulatory requirements. Such breaches are typically reported in the environmental press helping to increase the 'environmental visibility' of the SME in question, thereby creating the potential for increased regulatory enforcement.

If the impact of regulatory pressure is not sufficient to promote greening within small sized organizations, other 'external' pressures may do so. SMEs are only experiencing the very start of supply chain greening pressures from their customers. Smith & Kemp (1998) found that 20% of the SMEs surveyed had been questioned by customers about their environmental record, but only one firm that perceived a link between customer satisfaction and environmental record. However, in an interview conducted by the author with a manager of Netlon Ltd, the possession of an accredited EMS became a prerequisite for the firm to deal with certain customers, such as British Airways. Thus, the customer greening pressure on SMEs may grow over time.

In terms of the links between business efficiency and environmental improvements, the Smith & Kemp (1998) survey found that many firms remain ignorant of the financial benefits of improving environmental performance. Only 20% of firms were convinced that positive environmental action would generate cost savings.

Gibbon & Holland (1995, p.92) did find certain SMEs who saw a connection between environmental impacts and business efficiency:

‘[certain SMEs] include in the budgets and management accounts areas for energy, waste and water etc as a control mechanism with the aim of reducing cost’.

At the same time, SME managers viewed developments in internal environmental accounting as more suited to larger organizations with the time and resources to do so:

‘those companies that do use management accounts and see the relevance of budgeting for and controlling energy, waste, water etc, do not see the inclusion of this level of detail in the internal accounting systems as a priority to the running of the business’. (ibid)

One alternative explanation for such lack of development in environmental accounting is that the required information to manage efficiency issues need not require such a formalised system. As the author found in his interview with the manager of Netlon, the firm made cost savings simply through the use of informal systems of information and direct observation. For example, Netlon made cost savings of approximately £200,000 pounds by simply observing where waste came from (including the automatic flushing of the toilets during the weekend) and through increased dialogue between production managers.

The evidence suggests that SMEs experience weaker demands for greening, even from regulatory authorities, and do not possess the resources or motivation to become greener. In terms of internal catalysts and filters, size influences corporate greening. However, this conclusion is only valid in isolation from other aspects of organizational context; other characteristics might easily be more dominant.

The potential of size to act as a filter against greening is important, since it suggests that SMEs offer less opportunity for studying the introduction of environmental accounting and information systems alongside traditional management systems. Thus, large UK manufacturing organizations must be used for empirical work studying the role of management accounting within corporate greening.

5.5.2 Organizational Structure

Chapter 4 reviewed a range of literature highlighting the importance of organizational structure in influencing and limiting effective corporate actions. In terms of greening, existing organizational structure acts as a force to oppose, or promote greening. For example, Epstein (1995) found instances where decentralised organizational structures (acting as a 'filter' for greening) prevented the effective implementation of new environmental performance measurement systems across the whole organization. Thus, the positioning of new environment structures within the firm may hinder their power or increase their ability to foster an environmental awareness within the firm. Obviously, the mere existence of an environmental department does not indicate a green organization.

The integration and coupling of environmental management structures with more traditional managerial operations is critically important to organizational greening (Weick, 1979; Meyer & Rowan, 1977; Meyer & Scott, 1981). Environmental management structures can be introduced for the purpose of obtaining social 'legitimacy', and be loosely coupled with the established working structures of the organization. Thus, the environmental structures may remain relatively isolated from the rest of the organizational structures guiding the company.

A number of UK manufacturers are implementing EMS certified to ISO 14001 or EMAS specifications. These systems are often designed as an extension of existing functional structures on health and safety or total quality management, and might subordinate their power to change existing organizational posture towards the environment.

5.5.3 Management Information and Control Systems

The importance of organizational management information and control systems within corporate greening has been highlighted throughout the thesis. How an organization collects and uses information will affect its perception of, and responses to, demands for greening. Existing systems of management accounting influence debate and decision making within the firm. Management accounting systems concentrate on the internal cost effectiveness of operations, a focus that renders many environmental impacts 'invisible' within estimates of cost. Both existing and new management information systems actively

shape perceptions within the organization (Hopwood, 1987), and influence organizational discourses and imperatives for action. As discussed in section 5.5.2, many UK manufacturers are implementing EMS that provide environmental information that can potentially change existing organizational 'visibilities'. This information has the power to challenge or be challenged by data from existing management information and control systems (such as management accounting). In this way, traditional management accounting systems could function as a major internal filter for greening initiatives. Unless environmental issues themselves can become part of what is measured by such powerful management systems, they could become obscured and subsumed within the financial and economic dimensions of organizational life. Such issues are paramount to this thesis, and will be explored in later chapters.

5.5.4 Type of Products & Manufacturing Technology

Organizations involved in certain operations and production processes may have fewer possibilities to adapt and change in response to external environmental pressures. For example, an organization within the chemical industry will justify its behaviour, due to the nature of its products such that it can only improve its environmental performance by undertaking costly research and development or fundamental process improvements. Such firms, however, would be seen as having a greater 'environmental visibility', and thus need to react in some way. The technology level available to the firm, a contingent factor prioritised by Woodward (1965), can also prevent the organization adopting fundamental responses towards addressing green pressures, as in the case of a quarrying company that can do little to address forces for greater sustainable use of natural resources.

5.5.5 Corporate Culture/Ideologies

The culture of the organization guides and shapes the prevailing conceptions of what the organization should be doing towards tackling 'green' pressures, how it should be doing it and of how it should be judged (see Feldman, 1986; Feldman & March, 1987; Ledgerwood, 1997). The expectations and goals of the organization are derived through bargaining between organizational groups or coalitions (Cyert & March 1992). This bargaining forms the culture basis of the organization, which is then embedded within the

current structure of the organization. The existence of sub-cultures within the organization may allow the acceptance of greening within certain parts of the organization, say within one of the production departments, and prevent it in others, say another production department with older technology (Feldman, 1986).

5.5.6 Power - Leadership and Individuals

The power distribution within the organization affect its dominant attitude towards environmental issues (Hambrick, 1981). If the majority of power resides in one area of the organization, this area will determine corporate wide responses to 'green issues'. Alternatively, if power is distributed evenly through individual units, such as small profit centres, this better enables individual centres to determine their individual attitude towards environmental issues. Once established within the organization, environmental issues can shift established power relations within organizations. For example, if the environmental dimensions of divisional performance start to be monitored, this information could become a powerful new tool in determining resource distribution and activities.

5.5.7 Environmental Values and ideologies of individuals

The process of greening is influenced by, and influences, the established power relationships present within the organization. 'Green issues' may make problematic that which was previously not, or be regarded as unimportant side issues. In addition, individual attitudes of organizational members and decision-makers towards 'green issues' can be fundamental in securing organizational response to such issues.

5.5.8 The Presence of Organizational Slack and Spare Resources

Organizational slack seems to have an ambiguous relationship with corporate greening. On the one hand, excess resources can be used to experiment with new environmental innovations, or potential green market segments. On the other, excess resources can be used to build corporate buffers against pressures for environmental improvement, such as large corporate environmental departments or environmental lobbying activity, and resist changes to the core of the organization (see Bowen, 2002). The absence of slack resources can cause organizations to ignore external green demands until they become too great.

5.5.9 Strategy

Environmental attitudes may exist in isolation from strategic concerns; alternatively, they can be seen as emerging from the traditional strategic posture. A third alternative could see environmental concerns shaping and influencing the emergence of new corporate strategies (Shrivastava & Scott, 1992). The linkages between strategy, accounting and the environment were explored in chapter 3, and it was apparent that the type of strategic posture can directly influence many other organizational characteristics, including greening.

5.5.10 Environmental Knowledge, Experience and Learning

The level of environmental knowledge or expertise within the organization will affect the effectiveness and direction of its environmental programme. Whilst decisions in the neo-classical model of decision making are assumed to be rational, many actual decisions are only 'boundedly' rational, with knowledge limited by the amount of expertise present within the organization (see March & Simon, 1958; Lindblom, 1959; Brunsson, 1989). 'Bounded rationality' will deter organizations from undertaking investments in cleaner technology programmes:

'The extent of these [Clean Technology] developments is constrained by a general lack of the broad ranging skills and expertise which are required to make more fundamental process changes'. (DTI, 1991, p.95)

Previous organizational attempts to minimise environmental impact may also have an affect on the progress of environmentalism through the organization. If previous attempts to set up EMS were viewed as successful, then the organization may attempt to build on this and extend such systems throughout the whole organization. Alternatively, if previous attempts were viewed as costly failure by top management, past developments and experience could act as an internal filter, preventing new environmental initiatives.

A fundamental organizational capability of socio-behaviourial frameworks is the ability for the firm to learn (see Hedberg & Jonsson, 1978; Hedberg, 1981). Organizations with high learning capabilities have the benefit of allowing an emergent environmental strategy to evolve over time (see Mintzberg, 1978). Environmental strategy develops, mistakes are resolved and further environmental learning accrues. An organization with limited learning capabilities has a more difficult time coping with the diverse range of environmental issues.

5.5.11 Intra-organizational Linkages

Thompson (1967) argues that the extent of an organization's external linkages will often protect it from external pressures, and termed this 'buffering'. Buffering can take two forms, resource buffering, where the linkages enables the organization to gain access to additional funds, and institutional buffering where linkages protect and insulate against other threats. No empirical evidence is currently available on how the degree of intra-organizational linkages can affect the level of greening change that occurs within the organization. It can be hypothesised that organizations who supply through established intra-organizational linkages may well not need to respond to 'external pressures'. Alternatively, one can argue that greening pressures can originate because of concerns with the supply chain affect of greening.

5.6 Conclusions on Internal Catalysts and Filters

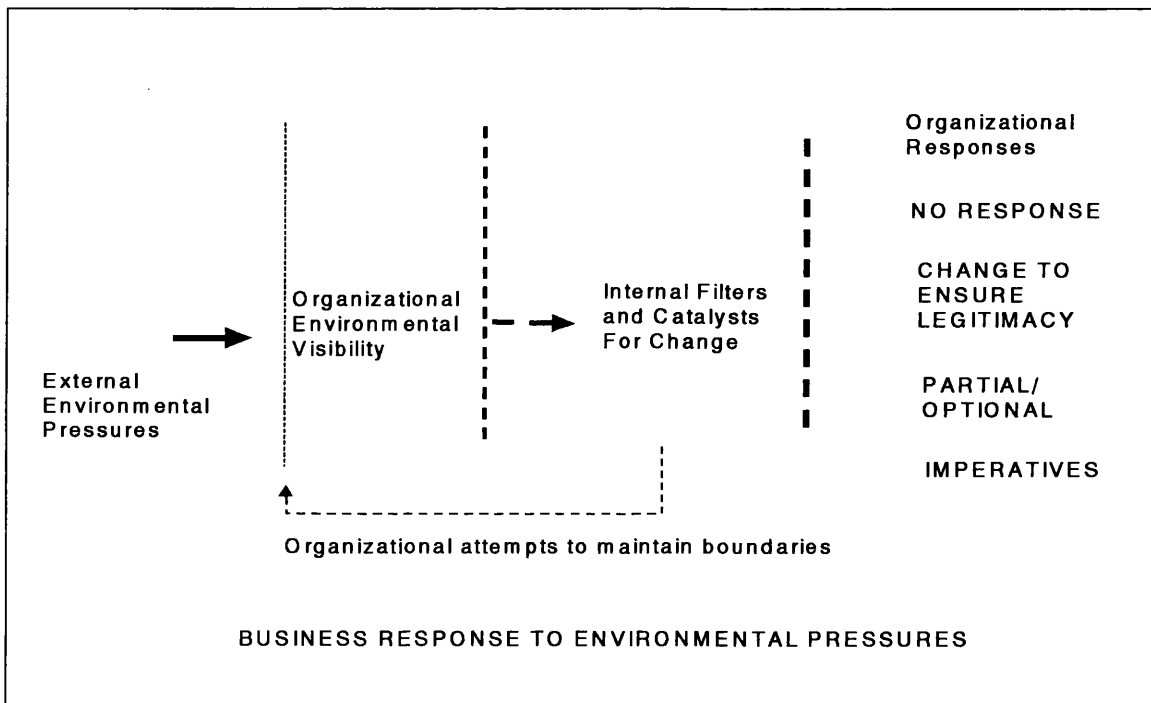
The concept of internal catalysts and filters highlights the complex context through which an organization adapts towards 'external' green pressures. Changing 'green' demands have to be interpreted and given meaning within the organization. This interpretation, traditionally seen as being performed by powerful managers with the aid of institutionalised information flows (such as management accounting), may be derived from the values and ideologies espoused within the organization. In addition, the pace and direction of organizational greening could also be affected by a number of other inherent organizational attributes, which can act as either powerful catalysts or filters, depending on the type of pressure faced. These catalysts and filters can be regarded as a constellation of forces, shown in figure 5-1. This constellation illustrates the potential interplay of organizational characteristics that create a dominant organizational attitude towards 'green' issues.

5.7 Combining 'Internal' & 'External': Overall Business Response to Greening

The models developed so far show that organizational environmental behaviour change arises from a complex interplay between the 'external' green pressures from chapter 4, the notion of organizational 'environmental visibility' and the constellation of internal catalysts and filters within the organizational context. 'External' green pressures may be interpreted differently by different types of organization. Figure 5-2 draws together the model. It explains how external green pressures originate from society, become attached to specific

organizational types due to their 'environmental visibility', and then permeate the organizational boundary through interaction between individual organizational characteristics which can act as either catalysts and or filters. Figure 5-2 allows the organization to enact its 'environmental visibility' by its past and present developments of environmental responses, which serve to reduce social demands for corporate change. In addition, the model also allows for the genesis for environmental change to emerge internally in the firm, and eventually impact on societal demands, even increasing them for other companies to have to follow.

Figure 5-2 Business Response to Environmental Pressures



This theoretical model, figure 5-2, will be applied to the empirical case studies in chapter 8. The final part of this chapter further develops the idea of internal characteristics alluded to in the model, by providing a specific typology of organizational responses to environmental pressures.

5.8 Types of 'Dominant' Organizational Attitude Towards Environmentalism

The concept of internal filters and catalysts suggests that firms will exhibit different dominant attitudes towards tackling 'green' issues. UK organizations act and react to 'environmental imperatives' in different ways, with environmental change residing in different dimensions and areas of the organization.

Figure 5-2 shows the complete theoretical model of organizational greening used within this thesis. It moulds the theoretical envelope of greening response developed in chapter 4 (see figure 4-1) with the concepts of environmental visibility and internal catalysts and filters. The result is a theoretical model of greening that captures its full complexity. It avoids a simple mechanistic or contingent theory of greening by seeing 'external' and 'internal' issues as bound with each other. Figure 5-2 shows that 'green' pressures can originate both within and outside the organization, act independently or together with other issues, can be enacted or 'filtered' by the organization, or act as a catalyst for further constitutive or reflective change. Whilst the model is extremely complex it must be in order to explain the current progress of corporate environmentalism.

Now that a complete theoretical model of organizational greening has been devised all that remains is to briefly explore the predominate types of organizational response that UK manufacturers are using to counter environmentalism. This analysis will help to outline the present and future results of corporate greening.

5.8.1 Typologies of Organizational Environmental Response

Within the literature there are variety of typologies of organizational environmental attitude response (see Ford, 1992; Larsson *et al*, 1992; Roome, 1992; Stikker, 1992; Bansal, 1993; Tilt, 1994). Six such typologies are summarised in table 5-2 using headings devised in this present thesis.

Table 5-2 Typologies of Business Response to the Environment

| | Inertia | Reactor | Defender | Experimenter | Mediator | Reparator |
|----------------|----------------|--------------------------------|---|-------------------------------|----------------------------|----------------------|
| Larsson (1992) | | Eco Compliance | Eco Image | Eco Professionalism | Eco Adaptation | Eco Advancement |
| Ford (1992) | Inactive | Reactive | Proactive | | Hyperactive | |
| Roome (1992) | Non-compliance | Compliance and Compliance Plus | | Commercial & Green Excellence | Leading Edge | |
| Stikker (1992) | | End of Pipe | Environmental Care & Environmental Auditing | | Cradle to Grave | Sustainable Business |
| Bansal (1993) | | Follower | Manager | Leader | | |
| Gray (1993) | Inertia | Rebuttal/Reorientation | | | Colonisation and Evolution | |

A criticism of many of these environment-business response frameworks is they implicitly see 'environmentalism' as the mobilisation of one large contingency which is reacted to in one universal manner across the whole organization. For example, Roome (1992) provides a simple typology of environmental strategies that may be adopted. Roome implicitly suggests that firms adopt one overall, company wide, strategy to deal with all environmental demands. This appears unlikely, as shown in the model in figure 5-2, strategic attitude towards the environment is more emergent, with certain functional areas of the organization reacting differently to certain green issues. For example, imagine a multi-divisional firm making a diverse range of products in different production locations. Each specific division and production centre of this fictional company will experience different demands for greening, have different abilities to change and have different perceptions of 'green issues'. Even if this company did have a global environmental strategy, it may quickly appear unworkable and adapted to suit internal situations. Another criticism of Roome's typology is that the distinctions concentrate on the differences between the *formal* systems and techniques used to tackle environmental issues. No attention is paid, for example, to the way that bodies of knowledge used in the generation of such systems can significantly alter their meaning and power within the organization (Power, 1994). For example, Roome (1992, p.21) identifies that a compliance plus strategy would result in the firm implementing an "integrated total environmental management system". However, under the model of greening in figure 5-2, implementation of an EMS may not even indicate 'compliance', as the systems can be solely for securing 'legitimacy', and may only be loosely coupled with organizational decision making. One final criticism of Roome's strategic types is that he does not consider the full range of the strategic options, ignoring the strategy of becoming a truly green firm.

Gray *et al* (1993) derive their model from the work of Laughlin (1991), and concentrate on tracing the types of change within firms. A criticism of this work is that Gray *et al* do not identify the internal characteristics that help to shape organizational change, relying on the results of interviews to draw conclusions about the type of change. Gray's model aims to discover whether 'greening' takes place at a partial, or overall level within the organization. Gray's analysis views change occurring uniformly throughout the organization, but acknowledges that the pathways of change can alter over time. This model will be discussed more fully in chapter 6 when examining the dynamics of the

change process.

Advancing the work of Roome, Bansal (1993) sees organizational management responses towards the environment as divisible into a series of strategic decisions, whose pattern forms the overall organizational strategy towards the environment. Bansal (1993) found in her analysis of the food retailing industry three unique 'patterns' of strategic approach towards the environment – the follower, the manager and the leader. Bansal's work is useful as it provides support for the idea of a 'dominant' attitude towards the environment.

The next section defines my own typology of attitudes towards greening, drawing on both the model portrayed in figure 5-2 and also the criticisms and findings from earlier classifications of type within the literature.

5.8.2 A New Typology of Dominant Attitudes towards the Environment

This section generates a complete typology of 'dominant' organizational attitude towards 'green' pressures. This typology agrees with the basic idea of Bansal's (1993) emerging strategic types. Demands for 'environmentalism' affect organizations through a diverse series of both independent and interdependent pressures, many of which will require different organizational responses, if any. From figure 5-2 the environment can be seen to affect organizations in a dynamic way through a number of different, variable strength, individual, or often interlinked pressures, all of which may have to be monitored and reacted to in some way by the organization. This organizational adaptation process is governed and influenced by the internal organizational characteristics of the business. Seen in these terms, the development of a 'dominant' or overall organizational strategy and attitude towards the environment is increasingly an emergent, slowly developing process. Environmental pressures closely linked to traditional business issues (green customer demand and waste reduction) may be interpreted and acted upon quickly. In contrast, firms may largely ignore other pressures, for example those of interest groups, for being outside traditional organizational agendas. Only when pressure groups are viewed as a threat to business performance and success might a firm view the need to act. The spectrum of organizational environmental attitudes at one end consists of the organization viewing 'green issues' as unimportant and limiting any organizational response to the setting up of a decoupled information system and management department. At the other end of the

spectrum, and as a polar alternative to the 'negative' attitude, existing internal characteristics could act as a catalyst for greening.

The typology explicitly acknowledges the key role of the organizational context in defining the overall pattern in corporate reactions to 'environmentalism'. Although a firm may possess certified EMS, in terms of organizational discourses, meaning and power, such developments may have little actual control or influence on organizational participants, decision making and overall strategic direction within the firm. What is equally important in the topology are the type of professional managers chosen to operate the EMS (i.e. chemists instead of professional accountants), and also the way such systems are viewed and used throughout the organization. It is not the mere presence of EMS that indicates the corporate approach towards environmental issues, rather, one must equally focus on the way organizational participants view, discuss, use, talk the language of, and use the environmental systems, techniques and initiatives.

My typology uses the notion of a dominant organizational attitude towards the environment, an attitude which fundamentally influences organizational actions in response to environmental pressures. The dominant attitude can be defined as the pattern which emerges from all the organizational responses towards green issues. Each of these responses is shaped by the internal catalysts and filters for greening present within the firm. The dominant attitude effectively controls the main organizational agenda with regards to the environment. Despite this presence of a dominant organizational view, however, my model recognises that certain areas of organizational response to green pressures may diverge from this dominant view. Some 'green' pressures may become intertwined with normal business agendas, leading to change that follows an entirely different pathway. Alternatively, environmental pressures may be tackled from a different ideological perspective in different areas of the enterprise. The model thereby recognises the multi-dimensional and contested nature of organizational attitude towards the environment.

Table 5-3 (below) presents a new typology of organizational attitudes towards the environment. The dominant attitude, forms the 'centre of gravity' recognised by Galbriath (1988), as the main influence in dealing with the environmental pressures faced by the organization. This typology does not mean that firms in one category will react to all environmental pressures in the same manner, but rather that reactions will dominantly be

of the manner and magnitude shown. Each of the firm categories within the typology are mutually exclusive, and together represent a spectrum of dominant attitudes ranging from the least environmentally active and responsive organizations to the best.

Table 5-3 Typology of prevailing "dominant" strategies or attitudes towards 'greening'

| Typology of prevailing "dominant" strategies or attitudes towards 'greening' | |
|--|--|
| Type of Firm | Description of strategy |
| Inertia | Do nothing |
| Reactor | Follow letter of the law |
| Defender | Follow letter/spirit of the law, respond to other pressures when critical |
| Experimenter | Follow spirit of law and seek public approval, seek to partially link green with business imperatives, identify win-win situations |
| Mediator | "Green Firm" - incorporate environment into all business decisions |
| Reparator | Environment and sustainability before profit and business imperatives |

The problem is to distinguish between each type of environmental response. How can the attitudes be distinguished within the typology in an empirical setting? Firstly, the way existing organizational characteristics, such as strategy, management accounting, culture and structure relate to environmental developments can give an indication of the meaning attached to such developments. Such characteristics may influence responses to environmental issues. Furthermore, the way the organization reacts and works to insulate itself against 'external' greening demands is an indicator of change. Another important indicator is the form of internal communication used to highlight green issues throughout the organization. Quite clearly though, the presence of a formal EMS within an organization does not indicate the dominant attitude towards environmental issues. As was discussed in chapter 4 using institutional theory, formal EMS and structures may only be loosely coupled with the actual tasks and work of the organization. Thus it is vital to discover the meaning that organizational members attach to such environmental structures, and establish how the systems relate to organizational decision-making. Clearly, whilst the *provision* of technical environmental measurement information is suggestive of attitude, the way it is *used* alongside traditional accounting information systems is a more important barometer of greening. There will be further discussion of such issues in chapter 7.

The topology of dominant attitudes may need to be refined after empirical testing, but it does provide a normative guide within which to frame case study investigations. Each

dominant attitude will now be briefly discussed.

5.8.2.1 The Inertia Type of Firm

The inertia attitude reflects the organizational view that the environment is something largely outside the boundaries of the organizational agenda. The inertia attitude is typically seen in the firm which perceives little need to recognise green issues, due to its product, small size, strategic considerations, and, lack of ability to scan society to perceive environmental demands. Such a dominant attitude can typically be seen in many UK SMEs (see above). SMEs are typically characterised as experiencing little, or no, pressure for them to become 'greener'. In terms of the earlier section that develops the notion of 'environmental visibility', these SMEs would have a low visibility, due in part to their small size, low press coverage and high importance the local community attaches to their non-green issues, especially employment.

Another characteristic of the inertia attitude is that it may lobby the most powerful environmental agencies in an effort to promote economic concerns above environmental ones. Inertia firms could actually use environmental information to defend its attitude against environmental demands. Thus, the simple presence of green management information within the firm could indicate little about the actual attitude of the firm. Equally, simple formal policy statements on the environment offer no indication of a positive dominant attitude towards such issues.

5.8.2.2 The Reactor Type of Firm

In contrast to the inertia position, reactors see a need to follow pro-actively the letter of environmental law, at which point organizational responsibility stops. At no stage, unless as an indirect or joint product of strategic initiatives, does the firm go beyond the law, unless green pressures emanate from, or threaten, key markets (by which time environmental legislation is likely to be imminent). The reactor typically adopts an ad hoc and reactive approach to environmental management. Such attitudes are also heavily reliant on traditional business practice and bodies of knowledge, such as management accounting.

5.8.2.3 The Defender Type of Firm

Organizational Defenders adopt a dominantly defensive strategy towards environmental pressures, but acknowledge the need to respond to green issues. Defensive activities can be broken down into those that preserve markets, and those that maintain organizational boundaries. The defender gives consideration to the indirect costs and benefits of having a 'green image' rather than focusing on the direct costs. Thus defenders analyse their environmental situation, seeking to achieve public approval of its environmental impact.

5.8.2.4 The Experimenter Type of Firm

The Experimenter adopts a more structured and organized environmental response. Within such an attitude, the organization partially links green and business imperatives seeking to identify opportunities where environmental performance can be gained at little or no cost, or where environmental improvements programmes can be identified that also result in financial savings. The 'experimenter' seeks to follow the 'spirit of the law', especially where such an attitude may anticipate future and tougher legislation, leading to smaller overall cost burdens in adjusting operating processes.

5.8.2.5 The Mediator Type of Firm

The mediator attitude is where an organization seeks to fully incorporate the 'environmental imperative' within all organizational agendas. The organization tries to balance all business decisions with their environmental impact, typically including the 'environmentalism' dimensions within all decision-making situations. This type goes far beyond the simple setting up of formal systems to monitor environmental impact, but includes the environment within everyday and strategic decision making. It is currently difficult to find any large UK organizations that exhibit the Mediator type of attitude. For example, even The Body Shop finds it difficult to balance economic and environmental dimensions of performance.

5.8.2.6 The Repairator Type of Firm

The final type within the typology is the repairator, which represents the true green organization. The repairator seeks to put the environment and sustainable use of scarce resources before business priorities. Examples of this type are rare indeed.

5.9 Conclusions on the Typology of Dominant Organizational Attitudes

The typology in table 5-3 presents a spectrum of 'dominant' organizational attitudes towards the environment. This typology allows for the complexity of the 'environmental imperative', as it allows organizational 'greening' change to vary depending on which area of the organization the pressure affects and the internal context of the area involved. Greening may have a substantial impact in certain organizational areas, but may be initially ignored in other areas of the firm. As a result, this dominant attitude of the organization allows for management accounting practice to remain unchanged despite the introduction of EMS within certain functional areas of the organization.

Whilst chapters 4 & 5 provide a range of theoretical models with which to understand organizational greening, they only provide partial evidence of the potential of management accounting within such change. Chapter 6 locates the potential role for management accounting within organizational greening.

Chapter 6: Modelling Environmental Change within Organizations

6.0 Introduction

Chapters 4 and 5 developed a topology of 'dominant attitudes' towards environmental demands, along with models outlining the roles played by internal 'filters and catalysts' and the 'external' greening demands in shaping and influencing organizational greening. This chapter expands these ideas by modelling how organizations change once environmental pressures pass through organizational boundaries. The model draws on the organizational change literature, and specifically applies it towards exploring the role for management accounting and EMS systems within the 'greening' process. This analysis will provide a theoretical explanation for why (and how) some organizations evolve in response to environmental pressures, allowing such pressures to permeate through to their ideology and decision making systems, whilst other organizations remain unchanged. Such an analysis also lays the foundation for the chapter 7 discussion about the rationale for the introduction of, and potential role of, environmental information within organizations.

6.1 Literature on Organizational Change

The literature on organizational change includes research and conceptual analysis from many related research traditions. The mainstream literature presents a broad spectrum of views. At one end of the spectrum are the contingency theorists (such as Lawrence & Lorsch, 1967; Woodward, 1965; Chandler, 1962; Thompson, 1967), who assume a 'mechanistic' relationship between organizational systems and the contingencies that each organization faces. In contrast to this 'pure' contingency literature, the other end of the spectrum includes the strategic choice theorists (Child, 1972; Weick, 1979), who emphasise the role of managerial interpretation and decision making in shaping organizational change, allowing the organization to partially 'enact' the contingencies it. More recent research has focused on exploring interactions between these two distinct views, by researching and conceptualising the actual dynamics of the organizational change process (Miles & Snow, 1978; Greenwood & Hinings, 1988; Hinings & Greenwood, 1988; Ranson *et al*, 1980; Miller & Friesen, 1980, 1984; Levy, 1986; Morgan, 1986; Laughlin, 1991; Gray *et al*, 1993a; 1995).

The change models within the literature arise from pure conceptual imagining, empirical

investigation or a mixture of both approaches. Such models provide either a descriptive account of specific types of change (Pettigrew, 1985) or an analytical framework for understanding and characterising organizational change (Hinings & Greenwood, 1988; Laughlin, 1991). Both approaches to the study of change have been critiqued for ignoring the true dynamics of organizational change:

'They allow us to develop theories about how organizations can respond to different types of change, but they provide no indication as to how organizations can begin to influence the nature of the change that they encounter'." (Morgan, 1986, p.267)

Despite such criticism, the generic theoretical models of change causality have helped to develop understanding of the change process, even if such understandings are skeletal in nature. Whilst such change models may not encompass the entire dynamic of the change process, they do provide insights into how and why an organization may change. The models in this thesis guide the research by providing a theoretical understanding of the change process from which testable notions can be derived. The results of such empirical testing can then revise and strengthen the original theoretical models. However, Morgan's critique is implicitly recognised within this theoretical modelling of change, and is highlighted during the discussions of the model and its later application to the empirical work in chapter 8.

6.2 The Nature of Organizational Change

The literature on organizational change is vast, and covers many different fields of study. Despite this, however, much of the literature models the same process using different terminology (for reviews see Dunphy & Stace, 1988; Dent, 1990). The literature favours a two-tier characterisation of change, of either a *secondary* or *primary* level. Secondary level change only affects the structures and systems of the organization, leaving culture and attitude unchanged. In contrast, primary level change strikes to the core of the organization. Table 6-1 illustrates the existing models of organizational change within the literature. This existing literature was reviewed to help devise a model of change appropriate for studying greening change. The elements of this new model are discussed below, and its change categories (including the new 'intermediate' level of change) are used in table 6-1 to compare the existing model of change within the literature.

Table 6-1 Models of Organizational Change

| AUTHOR | SECONDARY | INTERMEDIATE | PRIMARY |
|----------------------------|---|--|---|
| Argis & Schon (1978) | Single Loop Learning | | Double loop learning |
| Lindblom (1959) | Branch Change | | Root Change |
| Hedberg (1981) | Adjustment Learning | Turnover Learning | Turnaround Learning |
| Miller (1982) | Evolutionary: Incremental Change | | Revolutionary: Quantum Change |
| Miller and Friesen (1984) | Incremental Change: Piecemeal change | | Multi-faceted Change: Concerted Change |
| Smith (1982) | Morphogenesis | | Morphostasis |
| Hinings & Greenwood (1988) | Changes in design Archetype | Changes in design Archetype and Interpretative Schemes | |
| Levy (1986) | First Order | | Second Order |
| Dunphy & Stace (1988) | Incremental | | Transformatic Change |
| Laughlin (1991) | First Order | | Second Order |

6.3 Greening Change – A Need for an Intermediate Level?

The main problem in exploring environmental induced organizational change is that the traditional 'two-type' characterisation of change appears insufficient. From the analysis in previous chapters, it appears that most UK organizational 'greening' is simply secondary level change (e.g. implementation of an EMS). It is almost impossible to identify UK examples of manufacturers undergoing primary level shifts in their core values and culture towards the environment. Primary change only occurs when an organization views environmental management as an equally essential goal as, say, profit maximisation. The mere organizational presence of formal EMS systems, environmental units and announcements on environmental strategy *do not* provide conclusive evidence of primary change. It is the actions, discussions and the way 'green' issues and systems are *actually used* within strategic and other decision making that reveal the extent of organizational change.

Despite the apparent lack of primary level greening, the small amount of empirical evidence investigating corporate greening (see Gray *et al*, 1995; Larrinaga-Gonzalez, 2001) reveals that certain organizations appear to be undergoing some sort of 'partial' change in their dominant attitude towards the environment. This 'emergent' change seems

to arise and develop over time, and may be caused by a number of different factors, including the introduction of environmental information within the firm. This 'intermediate' change goes beyond the simple development of EMS and structures (secondary change), but stops short of a fundamental shift in corporate culture (primary change).

Thus, a model of greening change requires a third category of change, which I term 'intermediate' change. Intermediate change is an emergent level of change, and has the potential to develop into either secondary or primary change, depending on the specific organizational context. Empirical and theoretical support for such an approach is derived from the work of Hedberg (1981), Gray *et al* (1993a; 1995) and Larrinaga-Gonzalez (2001). Intermediate change describes the middle ground of change, where the organization is in a state of inner conflict. Intermediate level change emerges to challenge dominant values, actions and goals of the organization in certain areas of the organization. Following further changes or organizational wide acceptance of these competing values, intermediate level change may develop into primary level change. Alternatively, intermediate change may revert to secondary level change, if competing organizational realities remain isolated and without legitimacy. Intermediate change provides the model of change with a more discordant, emergent category which may crystallise into change of either a primary or secondary level as further changes and organizational disturbances happen. In terms of greening, an example of intermediate change is an organization that seeks to minimise its impact on the environment, but only where the cost of doing so is not deemed excessive. This change in attitude does not threaten existing culture (primary change), but is more than the simple development of an environmental function within the firm (secondary change). Such intermediate change may prove unstable, and may revert into secondary or primary change levels over time.

Now that an intermediate level of greening has been defined, attention will be turned towards describing the upper and lower boundaries of greening change.

6.3.1 Secondary Level 'Greening' Change

Secondary change is of an incremental and 'mundane' nature. Such change can occur frequently, impacting on a few, but not all "branches" of the organization (Lindblom,

1959). Levy (1986, p.10) describes secondary change as "those minor improvements and adjustments that do not change the system's core, and that occur as the system naturally grows and develops". Smith (1982, p.318) suggests that secondary changes can also act to "make things look different while remaining basically as they have always been". In terms of greening, secondary change would include the implementation of an EMS or the setting up of an environmental function within the firm. What is important in these examples is that the changes are seen as relatively mundane, and do not threaten the existing mission and culture of the business organization.

6.3.2 Primary Level Greening

Primary change is change that alters the behavioural paradigm of the organization in such a way as to alter all future actions and operations. Smith (1982, p.318) describes this as change "that penetrates so deeply into the 'genetic code' that all future generations acquire and reflect those changes". Primary change is revolutionary, and results in a new ethos for the organization. By its very nature, this change may be difficult to achieve (Hannan & Freeman, 1977). Even where an organization's world-view is outdated, trust and support may be kept in strategies that have worked in the past (Cyert & March, 1963; Starbuck, 1983), and it may require a change in top management to facilitate the acceptance of the new ideas and methods of operation that primary change supports (Simons, 1994). In terms of greening, an example of primary change would be an organization that shifts its emphasis from capitalist production at lowest monetary cost towards sustainable production.

6.3.3 The Three Levels of Greening: Distinctions

Table 6-2 adapts the work of Levy (1986) to highlight the distinctions between the three types of 'greening' change, although it must be recognised that such distinctions may be blurred in practice. For example, secondary level changes may include many of the elements of primary changes and vice versa.

The first line of table 6-2 highlights how each level of change can affect organizational context (e.g. systems and structures) and context (e.g. culture, actions and attitude). For example, secondary change only involves change in organizational content, but

intermediate greening involves a similar change in content *and* a partial shift in context.

Table 6-2 Distinctions between the Three 'Levels' of Greening

| SECONDARY | INTERMEDIATE | PRIMARY |
|--|---|---|
| Change in Content e.g. structure and systems | Change in content and partial shift in context (e.g. culture and attitude) | change in context (leading to content change) |
| Minor change in one or two behavioural variables | Development of conflicting and competing behavioural variables | Change in dominant behavioural variables |
| Reversible Changes | Semi-Reversible | Irreversible Changes (except by further primary change) |
| Rational developments | Rational developments with questioning and seeds of new rationality | New rationality |
| Continuity in same overall directions | Continuity, but with development possibilities tested | Discontinuity |
| Change in one or few levels or components | Change in few levels, with new visibilities found. New power relationships formed | Multi dimensional Multi Component |
| Change within world view | Change within world view , but new quasi-world view developed | New world view |

The second line of table 6-2 highlights the fact that each change type may affect behavioural aspects of the organization in different ways. For example, intermediate level greening results in the development of new competing attitudes and behaviour within *certain areas* of the firm, whilst primary change *affects* all of the dominant behaviour programmes within the organization.

The third line of Table 6-2 envisages secondary level greening as reversible, since organizational systems and structures can be altered if the necessary resources are available. As was highlighted in chapter 4, RDT and institutional theorists might argue that such changes in structure are not possible, since once implemented, they play a vital for securing legitimacy with outside parties (Pfeffer & Salancik, 1978; Meyer & Rowan (1977); Dowling & Pfeffer, 1975). However, Galbraith (1973) argues that variations in organizational structure and systems can be an important means of responding to uncertainty.

In contrast to the hypothesised reversibility of secondary level change, primary changes are virtually permanent. Apart from small variations in management systems, primary level change can only be overcome by further fundamental changes. Primary change forms a

new organizational 'rationality', whilst secondary change only results in changes which can be described as rational developments within the terms of the established organizational rationality. Intermediate change results in the emergence of a relatively weak, competing rationality located in certain areas of the firm which, coupled with other change 'potentials', may plant the seeds for initiating future primary change.

Primary level change results in short term discontinuity within the organization, whilst secondary level change results in adjustments designed to follow the same overall direction in corporate strategy. Intermediate change ensures progress in the same direction, but serves to explore the feasibility of alternative and competing directions for the organization to follow. Secondary level greening only affects a few components or areas of the organization, i.e. a simple reorganization of production departments. Primary level change will result in multi-dimensional, fundamental shifts in action and processes at all levels in the firm. Intermediate change, like secondary change, affects a relatively small part of the organization, but in contrast, causes new 'visibilities' and power relationships to be formed, often in small portions of the firm, which can then expand to other areas.

Primary change represents *fundamental shifts* in the world view of all organizational participants. Secondary level change causes changes *within the existing* organizational world view or culture. Intermediate level change is also change within the existing world view, but a new quasi-world view is developed by certain organizational participants that could serve to question long established corporate strategies and actions.

In summary, this three-tier model of change has been developed to specifically model organizational greening. A key feature of the model is that it responds to the earlier criticisms of Morgan (1986), and recognises the existence of slowly developing and 'emergent' type of organizational change.

This new model of organizational greening change can now be compared to the existing models shown in table 6-1. As highlighted earlier, the majority of the models define organizational change in two levels. Of the models in Table 6-1 only Hedberg (1981) provides a three-tier model of change, and his 'turnover' learning (of small, but fundamental learning activities) is very similar to the 'intermediate' level of greening. Apart from Hedberg, none of the research in table 6-1 explicitly considers the formation of

a third level of change. This approach appears insufficient to model the greening process within UK organizations. Green issues have traditionally been excluded from the strategic thinking of an organization. As 'external' pressures for greening alter, so will the demands for organizations to become greener, a process that does not appear to fit within crude two-tier change models.

6.4 Conceptualising The Organization: A Model For Studying 'Greening'

The model of greening change must now be applied to a workable model of an organization. Such a model, once developed, will help to hypothesise how elements of an organization may change under each of the three levels of greening, thereby distinguishing between the change levels in future empirical work on organizations. More importantly, however, is that this organizational model allows an exploration of the role of EMS and management accounting systems in each level of change.

Within the organizational research literature there are different conceptual views of the organization. However, there is a general consensus that organizations are a 'holistic' amalgam of two main elements, representing the systems, structures and activities (the design archetype), and the values, culture, beliefs and dominant ideology that underpin the first element (the interpretative schemes). Taken as a coherent whole, the interactions between these two elements represent the overall orientation of the organization (see for example Miller & Friesen, 1982, 1984; Daft & Macintosh, 1984; Hinings & Greenwood, 1988; Levy, 1986; Laughlin, 1991).

Within this model of the organization it is important to implicitly recognise the existence of 'emergent' systems, structures and behaviours as well as the prescribed formal systems and values (see Laughlin, 1991). Emergent systems and behaviours arise and decline over time, but may eventually become part of prescribed organizational systems and behaviours. For example, the existence of green attitudes within certain managers may create an emergent desire for environmental information and action that creates a gradual impetus for implementing an EMS.

The two elements of the theoretical model of the organization will now be explored.

6.4.1 The Design Archetype

The term 'design archetype' refers to the prescribed and emergent forms of organizational structure, management structures, accounting systems, communication systems, day-to-day interactions and decision-making systems within the organization (Greenwood & Hinings, 1988; Miller & Friesen, 1980; Laughlin, 1991; Ranson *et al*, 1980). These structures, systems and norms of behaviour are given coherence and orientation by an underlying set of values and beliefs.

6.4.2 Interpretative Schemes

The interpretative schemes represent the values, culture and beliefs of the organization (Giddens, 1979; Ranson *et al*, 1980; Hinings & Greenwood, 1988). Bartunek (1984, p.355) see interpretative schemes as operating as:

'as shared, fundamental (though often implicit) assumptions about why events happen as they do and how people are to act in different situations'.

It is difficult to conceptualise the 'interpretative schemes' of an organization, since they are largely invisible and intangible elements. Levy (1986) sees the 'guiding force' of an organization as composed of three interrelated levels. The outermost level of the interpretative schemes represents the culture of the organization. This culture level includes the organizational values and norms. The next level inwards is the mission level, which includes the organization's strategies for action. The innermost level of the interpretative scheme is the paradigm level, which contains the 'metarules' and organizational view of the world. This level guides and controls the rest of the interpretative schemes, and thereby guiding the design archetype of the organization.

Shared interpretative schemes are the primary way that organization members are drawn together and given a shared sense of belonging (Pfeffer, 1981; Sproull, 1981). They shape the problems organizational members will and *will not* address (Benson, 1983), and also control organizational actions (Brown, 1978). However, Ranson *et al* (1980, p.4) suggest that competing interpretative schemes may be present within the same organization:

'Since interpretative schemes can be the basis of cleavage as much as of consensus, it is often appropriate to consider an organization as composed of alternative interpretative schemes, value preferences, and sectional interests, the resolution of which is determined by dependencies of power and domination'.

Thus, within certain areas of the organization, individuals may attach different meanings to

organizational actions and have different views on the success of design archetype. This is an important point for corporate greening, as competing interpretative schemes suggest a potential for different environmental attitudes within organizational participants.

Whilst competing interpretative schemes may exist, Bartunek (1980) suggests that organizational leaders have the main influence over whether alternative interpretative schemes, actions and structural changes are adopted. Although leaders *may not propose* alternative perspectives themselves, they do shape the possibility and course of change by legitimising particular perspectives. From her empirical work in a Roman Catholic religious order, Bartunek (1984) found that following an external 'disturbance' the desire and action for change originated from order members, not provincial leaders. Provincial leaders simply allowed the different interpretative schemes to be expressed and actions based upon these to be taken. This suggests that competing interpretative schemes can originate from lower regions of the organization and can receive support from organizational leadership. This finding appears useful in the context of greening, as 'green values and culture' could develop within certain areas of the organization, for example the production department, receive some support from top management, and then spread throughout the organization.

Dent (1991) shows how a change in interpretative schemes was caused by the recruitment of new bodies of professional expertise within a firm. Following an 'external' disturbance caused by government concern with the efficiency of management, top management saw the appointment of 'modern' business managers as a way to defend itself from government concern. The introduction of business managers was seen as way to bring in new expertise to cope with the external pressures without disrupting the existing business. The business managers were "just told to see what they could do" (Dent 1991:716). These business managers and their use of management accounting led to fundamental change in organizational culture. Dent's study suggests that these specific elements of organizational context provided the potential for primary level change, although the 'external' social context played an equally essential role in shaping organizational change:

'subsequent events were not independent of changes in the social and political climate during the decade'. (Dent, op cit., p.716)

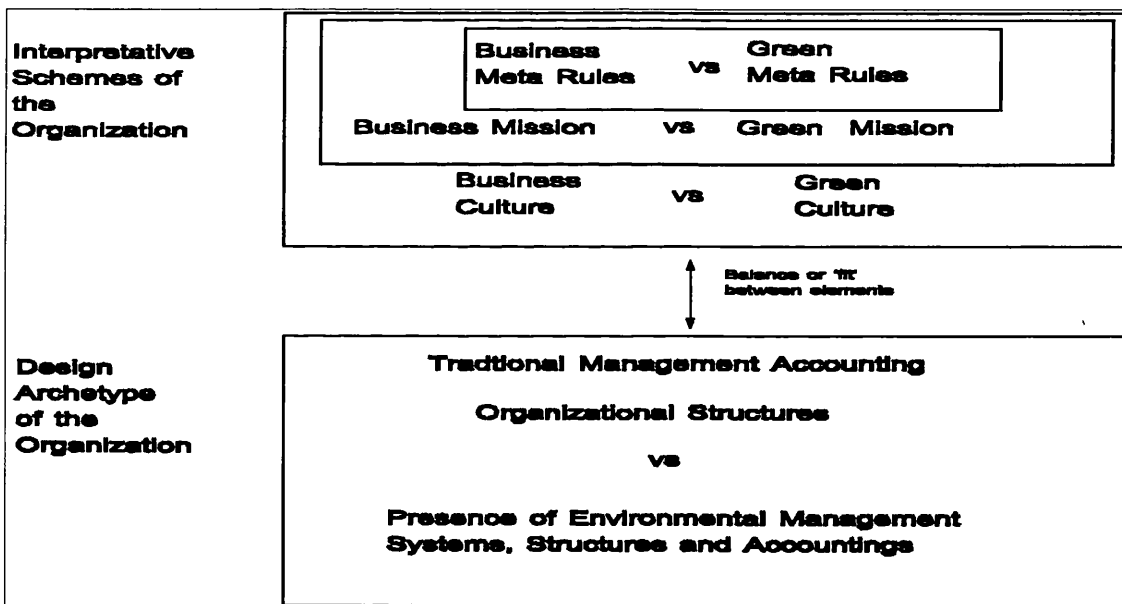
Dent's empirical evidence appears to provide a number of important conclusions relevant to the study of greening. Firstly, he sees the importance of the social context in shaping

changes in the interpretative schemes of the organization. Secondly, he demonstrates how the senior management *allowed* the recruitment of new organizational participants with alternative interpretative schemes. Thirdly, Dent's study illustrates how change can originate from developing sub-cultures within the organization. Fourthly, Dent highlights how accounting, acting as a new source of information within the design archetype, eventually lead to changes within the interpretative schemes of the organization.

6.4.3 Locating Environmentalism & Accounting in the Organization

Before applying the empirical evidence of Dent (1991) and Bartunek (1984) *inter alia* to the greening process, it is important to formally locate environmentalism and accounting within the model of the organization just discussed.

Figure 6-1 Locating environmental accounting and values within the organization



Traditional management accounting and any new environment-related forms of accounting are part of the design archetype. For some organizations, accounting can be one of the most influential systems within the design archetype, effectively shaping organizational decision making within the firm (see Goold & Campbell, 1987a; Simons, 1987, 1990; Roberts, 1990). EMS and environmental accounting systems, if present, are also part of the design archetype. 'Green' rules, mission and culture may also be present within the interpretative schemes of the organization, acting to shape the content of a revised 'greener' design archetype to manage environmental issues. What can only be revealed in

an empirical setting is the way that management accounting systems and EMS interact within the design archetype in each organizational context. The same is true of the resolution of potential conflict between 'green' values and 'business' value within the interpretative schemes.

The empirical findings of Dent (discussed in 6.4.2) are suggestive of the processes that may influence the greening of present corporate 'interpretative schemes'. Organizations are now under pressure from social actors to manage their environmental impacts (see chapter 4). As a result of such pressure, the top management of many UK organizations has authorised the development of EMS and the formation of environmental functions (see chapter 5). Such environmental initiatives may require the expertise of 'outside' consultants or environmental experts, people who serve to introduce new views and visibilities within the organization. Thus, developments in EMS evolve over time, and become more than just a loosely coupled structure for demonstrating organizational commitment to environmental issues. Implementation of EMS redefines relationships between functional units and introduces new rules to govern work. The very nature of the system, with its vast potential implications for altering existing modes of behaviour, means its level of specification could be initially limited. At inception within the firm, it seems impossible for new EMS to prescribe and specify appropriate behaviour. This coupled with a lack of experience in managing the environmental issues, and the need to balance the green dimension with established production dimensions, means that EMS would require considerable amounts of exploratory behaviour. Thus, interactions over time should shape the nature and extent of the prescribed frameworks and behaviours for dealing with green issues. This process will be returned to later in this chapter.

Figure 6-2 can also be used to explain the typology of 'dominant' attitudes developed in table 5-3 of the thesis (see chapter 5). Each of the six types of company will possess different arrangements of interpretative schemes and design archetypes to support their environmental attitude. Environmental attitudes arise from interactions between the design archetype and interpretative schemes of the firm. The existence of 'green' values, goals and mission within the most powerful interpretative schemes will effectively shape the dominant attitude towards the environmentalism. Alternatively, if 'green' values are excluded from the dominant interpretative schemes, then direct action on the environment

will be reduced to legislation compliance, at most. For example, if the firm's interpretative schemes see pursuing a cost leadership strategy as the ultimate aim of the organization, then 'green' demands may be viewed as conflicting with such aims. Alternatively, following changes and disturbances in the 'external' greening pressures (as outlined in chapter 4), the firm may evolve and recognise a need to consider the environmental impacts of its products, and appreciate the links between financial costs and environmental costs. This change in interpretative schemes may result in top management allowing the development of environmental accountings, management systems and structures within the design archetype.

6.4.4 The balance between the Organizational elements

The conceptualisation of the organization as comprising a 'design archetype' and 'interpretative schemes' suggests that it is the *use of* the management systems and structures that matters, not their simple *presence* within the organization. As a result, the mere presence of prescribed EMS or environmental-related management accounting systems within the organization does not definitively indicate the green values present within the organization. It is the underlying meaning attached to such systems and the way that they are used which reveals the dominant organizational attitude towards the environment.

The design archetype and interpretative schemes represent the elements of the organization that allow it to function in an 'efficient' manner. The interactions between these elements form the overall orientation of the organization. Empirical work by Miles & Snow (1978) and Miller & Friesen (1982) suggests a coherent balance between the two elements. Alternatively, Weick (1979) and Meyer & Rowan (1977) identify how organizational systems and structures can be loosely coupled with motives for action and work processes. Interactions between the design archetype and the interpretative schemes cause conflict until a relatively stable 'balance' position is reached between the dominant interpretative schemes and design archetype (Laughlin, 1991; Bartunek, 1984; Hinings & Greenwood, 1988). Laughlin (1991, p.213) describes how such a balance is reached:

'at some level, there will be certain characteristics which bind the organization together and make it a coherent whole, albeit with disagreements and conflicts openly or subsumed in its make up. Once such a balance and coherence is achieved at some level (even if many voices and opinions are quashed by this general ethos) 'inertia' around this dominant perspective becomes the norm'.

Once an organization has achieved this 'balance position' it will be relatively stable and naturally change resistant. However, subtle changes may take place as the organization develops *within* its dominant world view (Miller & Friesen, 1984).

The 'balance' position can be disrupted as a result of an organization facing a 'disturbance' of an external or internal origin (see Morgan, 1986; Laughlin, 1991). Green 'disturbance' may arise from interactions in the organizational context (see chapter 4) and the 'external' pressures within the social context (see chapter 4). Following the impact of this green 'disturbance', the 'balance' of the organization may be disrupted, forcing its organizational members to undertake certain changes in order to reach a new dynamic 'balance'. The type of change needed to restore organizational balance following green disturbance will depend on the nature of the pressure and the organization itself, but will be one of three levels shown in table 6-2. Table 6-3 predicts how each of these types of change affects the elements of the organization.

Table 6-3 How the three levels of change may affect the organization

| LEVELS OF ORGANIZATIONAL CHANGE FOR GREENING | |
|--|---|
| Secondary | Subtle changes within existing design archetype, or shift to a new design archetype. |
| Intermediate | Partial Change/Shift in interpretative schemes, leading to a contamination of the organizational world view. Secondary level change within design archetype and tangible elements. |
| Primary | Fundamental change within interpretative schemes, leading to new world view. Secondary level change within design archetype and tangible elements. |

Secondary level greening changes are characterised by simple changes to the design archetype that leave the interpretative schemes of the organization largely unaffected. For example, the introduction of a new environmental function that is responsible for ensuring compliance with environmental law. Another example is the firm that uses its accounting system to manage those 'environmental' costs, which are linked to business efficiency concerns. For example, it may conduct an energy audit throughout the firm - thus saving money and at the same time reducing its environmental impact.

Intermediate level greening affects the design archetype, and should have an impact on the interpretative schemes. Whilst this level of greening does not fundamentally shift the interpretative schemes, it may lead to the emergence of an alternative sub-culture within

certain areas of the organization. This competing culture may eventually result in contamination of the organizational world view. For example, certain parts of a decentralised organization may face greater 'external' demands for greening or have a greater desire for greening than the rest of the organization. These developments may create competing values and meanings, which could potentially compete against established organizational goals, rules and confidence in traditional accounting systems. Thus the intermediate level of greening can be seen as having some impact on the culture of the organization towards environmental issues, demonstrated by more consistent recognition, appreciation and management of environmental impacts.

Primary level greening change causes a fundamental shift in the interpretative schemes world view of the organization. As a result, it should require (or may occur as a result of prior) changes to the design archetype that reflect and support such a greener culture. This type of change may result in the organization possessing a 'Reparator', or, at the very least, a 'Mediator' type of attitude towards green issues. After primary level change, 'green' values should be an essential part of the interpretative schemes that guide the actions and behaviour throughout the whole organization. For this reason, primary level greening will be very rare in present social and organizational contexts.

In summary, this discussion has shown how each level of greening alters the organization. The remaining part of this chapter attempts to specifically model the potential roles of environmental information, EMS, management accounting and environmental-related accounting system within the 'pathways' and 'tracks' of greening change.

6.5 Existing Models of Organizational Change 'Tracks'

The literature investigating the 'tracks' or 'pathways' of organizational change has developed over 20 years (see Miller & Friesen, 1984; Bartunek, 1984; Greenwood & Hinings, 1988; Hinings & Greenwood, 1988; Laughlin, 1991; Gray *et al*, 1995). Drawing on this earlier work, Laughlin (1987, 1991) provides a model of the 'tracks' that organizational secondary and primary (what he terms 'first' and 'second' order change) follow. This model is shown in table 6-4. Laughlin's model of primary level change (what he calls second-order change) modifies Habermas' (1987) critical theory of societal development to function at a micro-organizational level. Habermas' model of societal

development maintains that human discursive practices generate the possibilities for change within society. These discursive practices create technical systems that can potentially overpower the social life world. Such a situation leads to 'colonization', where the technical dominates the social (see Laughlin, 1987; Broadbent *et al*, 1994).

Table 6-4 The Change Tracks of Laughlin (1991)

| LEVEL OF ORGANIZATIONAL CHANGE | CHANGE TRACK FOLLOWED |
|--|-----------------------|
| No Change | Inertia |
| FIRST ORDER CHANGE (*Secondary Change) | Rebuttal |
| | Reorientation |
| SECOND ORDER CHANGE (*Primary Change) | Colonisation |
| | Evolution |

*This is the metaphor used to describe the same level of change in this thesis.

Laughlin's model provides an extremely useful framework for studying the role of management accounting and EMS within change. The first track that change might follow is that of 'rebuttal', where change affects the design archetype for a short time, but is eventually retained. In contrast, 'reorientation' results in a fundamental change to the design archetype, but leaves the interpretative schemes unaffected. The 'colonization' and 'evolution' tracks are primary changes that fundamentally change the dominant interpretative schemes of the organization. The 'evolution' track leads to the emergence of a new organizational world view, which, in turn, feeds through into the design archetype achieving a fundamentally new organizational coherence. 'Colonization' is especially important to greening, as it provides for change where the technical systems of the design archetype disrupt and alter the interpretative schemes of the organization. This technical colonization can be positive or negative, highlighting the uncertainty and destructive nature of the change process.

Laughlin's typology was utilised by Gray *et al* (1995) and Larrinaga-Gonzalez *et al* (2001) to explain the greening of organizations. From interviews with corporate directors, Gray *et al* (1995) found that some organizations expressed views that sounded like 'colonization' and 'evolution', but there did not seem to be an apparent adjustment in priorities away from a 'business-centred' strategy. In an environmental context, Gray *et al* (1995) suggest alterations to Laughlin's model that allow a quasi-primary level of change that involves

significant effects but leaves the essence of the organization intact. For example, change may affect organizational culture but leave the mission of the organization intact. Such change will only cause a partial shift in business activities. For example, Broadbent (1992) investigated change within the National Health Service (NHS) and discovered a modified organizational culture (i.e. how best to provide health care), but unaltered metarules (i.e. health care was still the critical issue) and mission (i.e. the NHS is the vehicle for providing UK health care).

The empirical findings and suggestions of Gray *et al* (1995) and Broadbent (1992) are incorporated within the three level model of greening developed earlier in table 6-2, and this is now used to devise an array of specific 'tracks' that greening may take.

6.6 Greening Change: The Role of Environmental & Accounting Information

Using the three level model of greening from table 6-2, this section extends the work of Laughlin (1991) and Gray *et al* (1995) to construct a model of the 'tracks' that change emerges from. As the primary aim of this model is to highlight the role of accounting and environmental information within greening, the model is additionally enriched by using existing research into the role of management accounting within the change process (Galbraith, 1973; Otley, 1980; Markus & Pfeffer, 1983; Burchell *et al*, 1985; Dent, 1991; Hopwood, 1987, 1990; Miller & O'Leary, 1987, 1990; Loft, 1991; Miller, 1991; Broadbent, 1992).

6.6.1 The Role of Accounting Information Within Change

Traditional management accounting systems are a key element in the organizational communication and information processing system, making certain abstract concepts objective and making visible certain dimensions of organization (Hopwood 1987). Such systems of accountability embody and reflect the values and beliefs within the interpretative schemes of the organization, and as such, operate to force the organization to work within and reflect those interpretative schemes. Management accounting systems serve to construct a particular view of the organization and its environment, thereby helping to shape perceptions and everyday behaviour in line with the interpretative schemes of the organization (Hopwood, 1990).

When organizational greening occurs, accounting systems (and the other parts of the design archetype) may change in isolation from the interpretative schemes (secondary level change), or together with such schemes (intermediate, primary change). New environmental accounting and information systems may create 'new visibilities' within the organization, which lead to additional change which follows a 'track' that leads to change within the interpretative schemes of the organization. Burchell *et al* (1980, p.16) highlight this 'constitutive' role of accounting and its role in the change process within organizations:

'By creating a new pattern of organizational visibility, computational practice (or accounting) can often significantly change organizational participants' perceptions of the problematic and the possible'.

Thus although the accounting system normally reflects the values and beliefs of the 'dominant' interpretative schemes of the organization, accounting change can sometimes be a catalyst for a subsequent questioning and shift within the established interpretative schemes within the organization (Dent, 1986, 1990).

Hopwood (1990) has argued that an appreciation of accounting's involvement in shifting patterns of 'visibility' provides a powerful way of understanding how accounting can be implicated in the processes of organizational change. The organizational groups that share the 'dominant' interpretative schemes of the organization effectively control the design archetype, and with it, the accounting system. With this knowledge in mind, Hopwood (1987, 1990) argues that the organization can use its accounting system to select the 'visibilities' that are, and are not, placed on the organizational agenda. This idea of a selective agenda, partly based upon power within the organization, helps to focus the attention towards looking at what the accounting system is not. Thus the type of accounting and environmental information systems *actually used* to manage green issues may reveal an organization's place on the typology of organizational attitudes developed in table 5-3 of chapter 5. For example, a Defender's environmental 'accounting' system would be expected to monitor environmental costs that impact on the 'bottom line' e.g. compliance costs, and would ignore issues of sustainability. In contrast, a Mediator type would be expected to monitor the social costs of its environmental impacts as well as its own internal environmental costs.

Hopwood (1987) observes that accounting systems can do more than merely reflect the

purpose behind their introduction. He argues how accounting and information systems initiated for one purpose, can become suggestive of new possibilities for organizational action, shaping the trajectory of organizational development. Hopwood's ideas demonstrate how one must also focus on the way that bodies of knowledge and organizational practices create patterns of 'visibility' within the organization. Such dominant 'visibilities', whether coming from the accounting system or other dimensions of the organizational context, must be seen as being contested over time. As a result it is important to see how new 'visibilities', such as environmentalism, are created and established within the organization, and the role that accounting plays in such a process. Rather than being mobilised as a means of encouraging organizations to change in ways that reduce their unsustainability, new systems of environment-related accounting and EMS may 'capture' or 'appropriate' the environmental agenda (see chapter 2; Power, 1994; Larringaga-Gonzalez & Bebbington, 2001) to something more limited in scope.

In terms of the environmental change, accounting systems (seen as part of the design archetype) may change as a direct result of environmental pressures affecting an organization. Extra demands and information may be required from such systems, and established accounting techniques may be 'misapplied' to green issues. Alternatively, new environmental information systems may be devised, and existing management accounting systems left unchanged. Within the context of green pressures on the organization it is important to recognise that:

'the shifting pattern of organizational and economic life can impinge on accounting practices, the uses of which are made of them and the knowledges in which they are embedded'. (Hopwood, 1990, p.8)

Green demands are one form of uncertainty that the organization must respond to. In order to process uncertainty, the organization requires sufficient accounting and non-accounting information (Galbraith, 1973). Thus, organizational greening may lead to changing expectations of, and demands upon, the formal accounting systems of the organization. The intensity of these expectations and demands will depend on the type of organization and the way it copes with environmental change. Such demands may result in fundamental changes within the accounting systems.

Alternatively, accounting change may result in adopting 'bolt-on' additions to the fundamental system, mainly to achieve legitimacy. A second alternative is that the accounting system does not change, but other separate information systems develop to cope

with reporting on environmental issues. Thus accounting need not change prior to, during, or after, the greening of the organization. Any of these accounting system changes may shift established patterns of 'visibility' and result in shifts within the power relations of the organization. These potential developments in accounting systems following environmental change will be made clearer in the next section.

6.6.2 Developing the 'Tracks' of Organizational Change

Organizational change induced by environmental pressures is a relatively unexplored issue generally (Gray *et al*, 1995; Larrinaga-Gonzalez *et al*, 2001; Larrinaga-Gonzalez & Bebbington, 2001), and within this field there has been no structured research into the specific interaction between UK management accounting and EMS. The 'tracks' of organizational change presented below highlight the potential role of management accounting and environmental information in each level of greening. The model provides nine distinct 'tracks' of change, each of which raise fundamental questions regarding the different roles of environmental information and management accounting systems within corporate greening. Technically similar environmental and accounting systems potentially have different influences and roles depending on the interpretative schemes of the company (Dent, 1991; Duncan & Thomson, 1998). Furthermore, the response of firms to green 'disturbances' is influenced by the specific organizational and social contexts of each firm.

Table 6-5 shows the nine change tracks and the level of change they create. These 'tracks' attempt to describe the possibilities of change, but are not mutually exclusive. Change is a dynamic process, and the tracks must be seen in this light. Change is seldom a linear process. Progress along a track may oscillate and shift to a different track as further 'disturbance' occurs (Morgan, 1986). Furthermore, as indicated within the typology of 'dominant' attitudes in chapter 5, various parts of the organization might follow different change tracks, often with contradictory results. This point is especially important in terms of 'external' greening demands outlined in chapter 4, since varied demands affect different parts of the same organization in a different manner. Lawrence and Lorsch (1967) developed this idea when observing certain elements of organizations facing sub-environments unique to their own contexts to which they had to respond.

Table 6-5 The 'Tracks' of change and how they may affect the organization

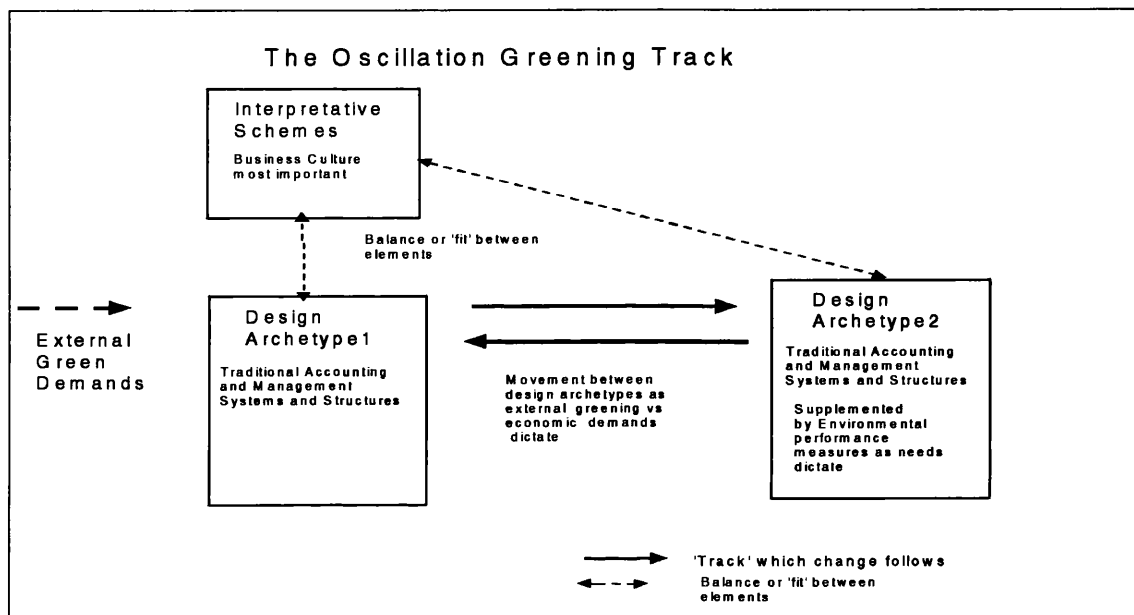
| CHANGE LEVEL | TRACK | LEADING TO CHANGES WITHIN |
|--------------|-------------------|---|
| NONE | RETENTION | No Change, except for very subtle changes |
| SECONDARY | OSCILLATION | Short-term changes in order to cope with 'disturbance'. Once disturbance passed changes will be forced out of the organization. |
| | REORIENTATION | Changes to cope with green pressures |
| | LEGITIMISATION | Changes to cope with green pressures, but only for achieving legitimacy from outside parties |
| INTERMEDIATE | UNSTABLE EMERGENT | Partial challenge to dominant schemes, introduced to compete without 100% agreement (times of crisis) |
| | STABLE EMERGENT | Agreement to introduce certain new views which impact on world view, but not in any fundamental way |
| | CONTAMINATION | Design archetype change which reveals new visibilities which have some impact on world view |
| PRIMARY | COLONIZATION | Design archetype change which reveals new visibilities which causes shift towards fundamental shift in world view |
| | REVOLUTION | New world View reached by discussion |

The first track is *retention*, which signifies that the organization is stable, and sees no need to respond to 'green' external pressures for business change. In certain instances, even 'green' legislation demands for change can be ignored by an organization (see the role of size in chapter 5). The choice to adopt the retention track in response to further 'external' green pressure may be a function of the existing dominant 'attitude' within the firm. Further greening 'disturbances' may cause different levels of change according to whether the firm already possesses an existing Reactor, Defender, Experimenter, Mediator or Reparator form of environmental attitude. This observation applies to all nine tracks of change, since the existing interpretative schemes and design archetypes may be 'green enough' and flexible enough to absorb further greening demands from society.

The secondary level of change is represented by three potential tracks called 'oscillation', 'reorientation', and 'legitimation'. The 'oscillation track' is shown in figure 6-2, and is derived from the work of Hinings & Greenwood's (1988) and Laughlin (1991). This change track is followed where an organization seeks to cope with external or internally induced environmental 'disturbance' short-term. The organization sees the solution to green disturbances as short-term change within the design archetype, as it is believed to be a problem that will disappear in time. This solution seeks to introduce 'insulation' changes within the design archetype structure and systems. This track suggests that the

interpretative schemes can be de-coupled and re-coupled with different design archetypes without altering the overall internal 'balance' of the organization. Changes in the design archetype, such as the introduction of new forms of environmental accounting, may be implemented and then abandoned as the green disturbance disappears. Figure 6-2 shows the process by which the design archetype oscillates between design archetype 1 and the embryonic archetype 1, but does not affect the overall balance within the organization.

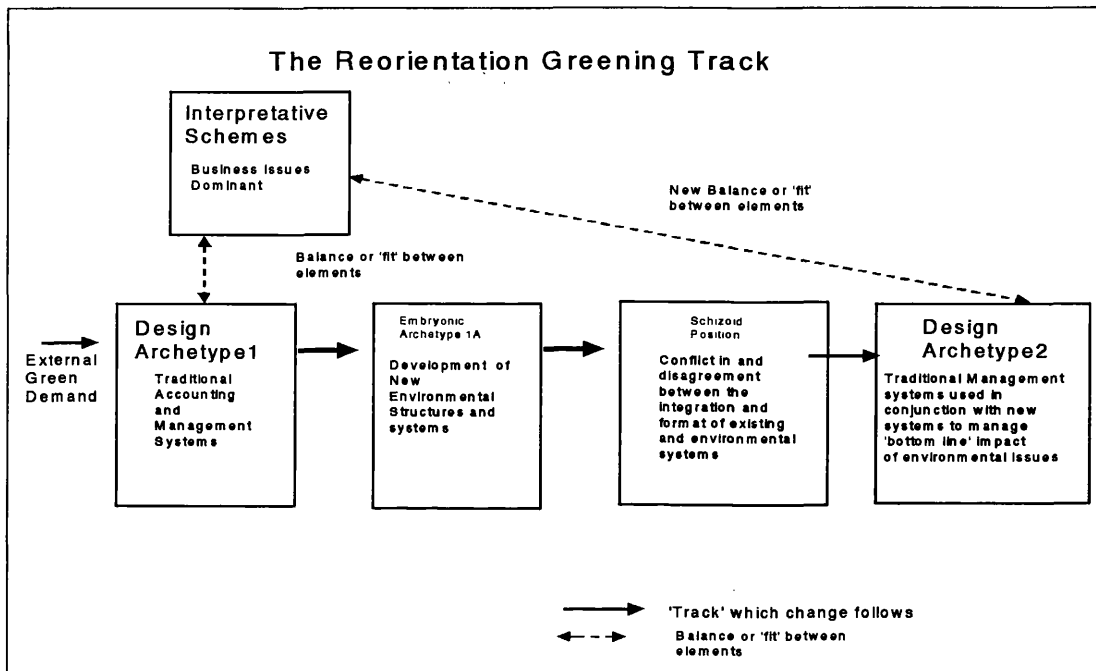
Figure 6-2 The Oscillation Greening Track



The 'reorientation' track, shown in figure 6-3, is followed where the 'disturbance' cannot be managed through oscillating between alternate design archetypes. Reorientation changes must be truly 'embedded' and fused within the systems and structures of the organization. Despite this, internalised change does not affect the interpretative schemes of the organization (Laughlin 1991). From figure 6-3 it can be seen that the track starts with the development of an embryonic archetype 1A, which reflect modest changes from design archetype 1. The 'schizoid' position is a position of incoherence, where there are tensions between two competing design archetypes (see Hinings & Greenwood, 1988) where embryonic archetype 1A strives to concurrently defend and evolve design archetype 1 with the new design archetype 2. This process will result in the creation of the new design archetype 2, perhaps through a quasi-archetype or embryonic archetype 2 as the structures and systems take shape into what will become the final and new design archetype 2. This new design archetype reflects the values of the dominant interpretative schemes.

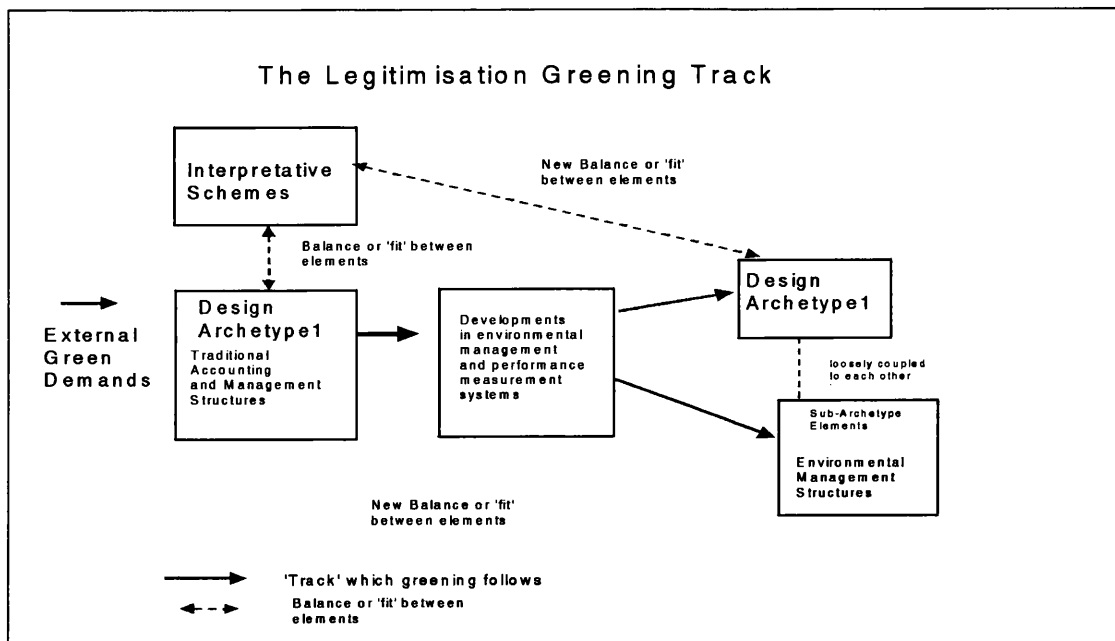
Reorientation suggests that the company adopts new forms of environmental information systems and structures to cope with the disturbance. It could also suggest that existing management accounting systems alter or are challenged by new environmental information. However, as the existing interpretative schemes of the organization do not change, management accounting will still be seen as a powerful force within the firm.

Figure 6-3 The Reorientation Greening Track



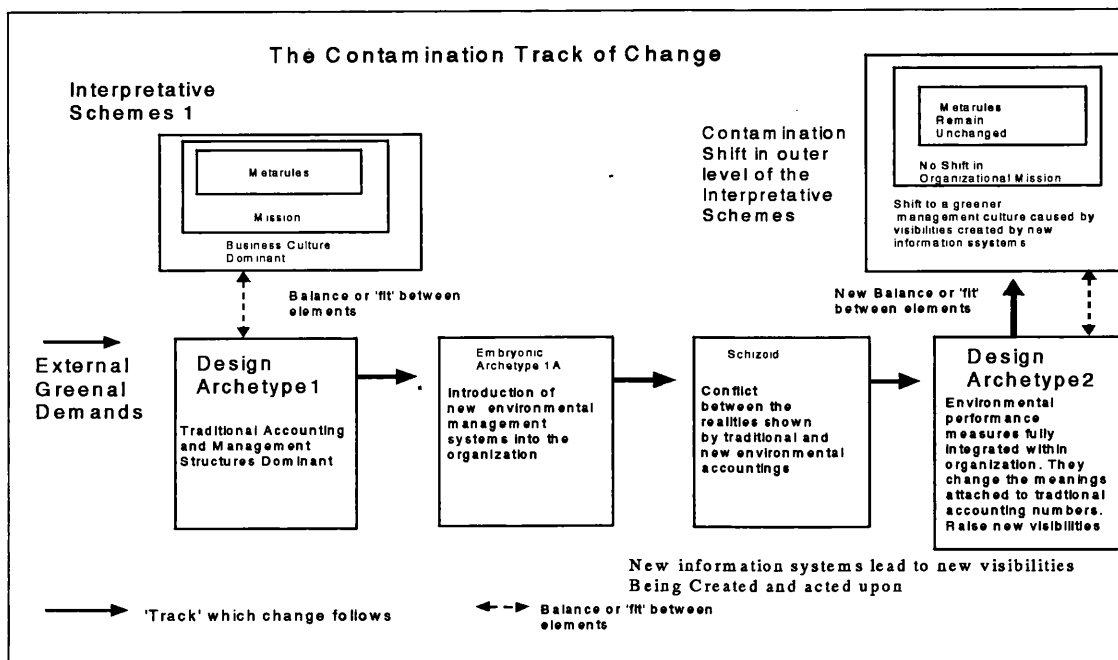
The *legitimisation* track is very similar to the reorientation track, but involves change designed to make the organization appear *legitimate* in its attitude towards the green 'disturbance'. This pathway is based on the institutional theory research of Meyer & Rowan (1978) and Weick (1978) reviewed in chapter 4, and allows for the creation of a sub-archetype that is effectively de-coupled from the main systems and structures of the design archetype. This track is shown in figure 6-4. Here, change follows the embryonic archetype stage, but then reverts to its original design archetype with an additional sub-archetype that is de-coupled from it. This sub-archetype is a method of appearing legitimate to outside parties, but is not used to direct organization action and so does not embody the values and beliefs inherent within the interpretative schemes.

Figure 6-4 The Legitimisation Greening Track



The 'tracks' at intermediate change level are called 'unstable emergent', 'stable emergent', and 'contamination'. This intermediate level of change may be unstable, "schizoid", in nature and following additional 'disturbance' mutate into primary or regress into secondary change. The *Contamination* track in figure 6-5 is where environmental 'disturbance' causes a shift in the technical structures and systems of the organization, and these technical changes reveal new 'visibilities' that create repercussions for the existing interpretative schemes of the organization. Competing interpretative schemes may develop, leading to a small, but significant, shift in the dominant world-view and balance of the organization. Whilst the contamination track does not cause a fundamental shift in the interpretative schemes, it plants seeds for potential future change of that magnitude. Thus, organizational culture changes whilst the metarules and mission remain. For example, a manufacturing organization determines to value the environment *and* their shareholders, continuing to maximise return to the shareholders and produce high quality products for customers.

Figure 6-5 The Contamination Track of Greening Change



The *unstable emergent* track, shown in figure 6-6, leads to a partial shift in the interpretative schemes of the organization. Whilst the mission and metarules of the organization remain intact, environmentally-induced 'disturbance' leads to a questioning of the dominant culture of the organization (e.g. "how we do things") causing a power shift within the organization as the 'dominant' organizational culture is challenged by the development of a new competing culture. This leads to a 'schizoid' position where two cultures compete within the organization. Eventually one of the 'competing' cultures gains power throughout the majority of the organization, and effectively becomes the new 'dominant' culture. However, the old culture remains present within the organization, and can be reverted to if the attitudes change.

Figure 6-6 The Unstable Emergent Greening Track

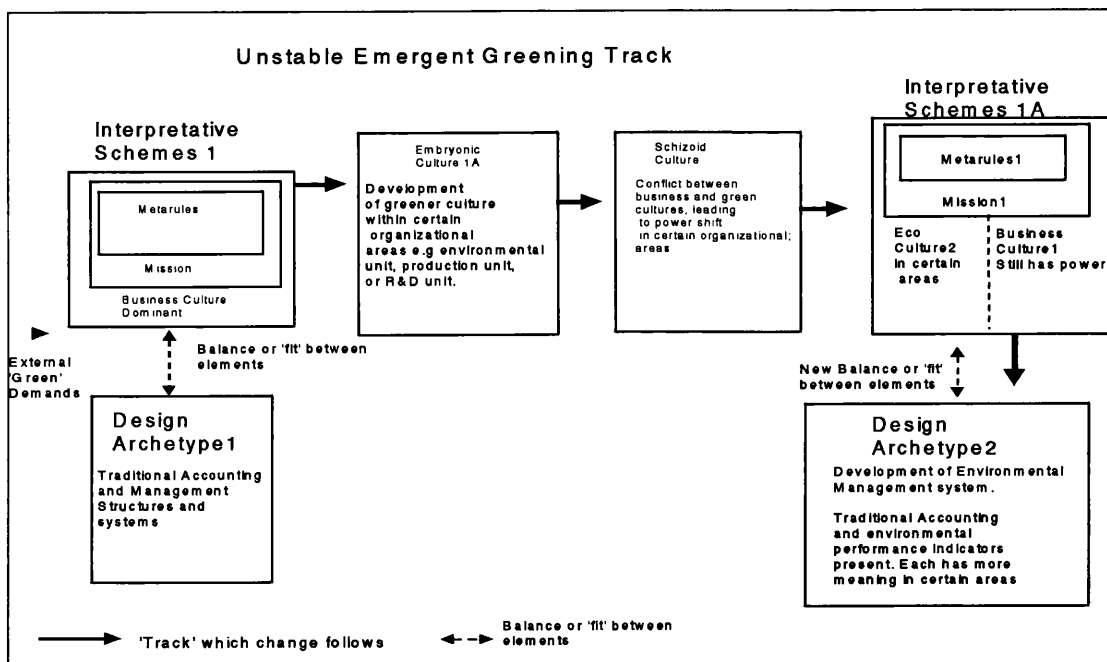
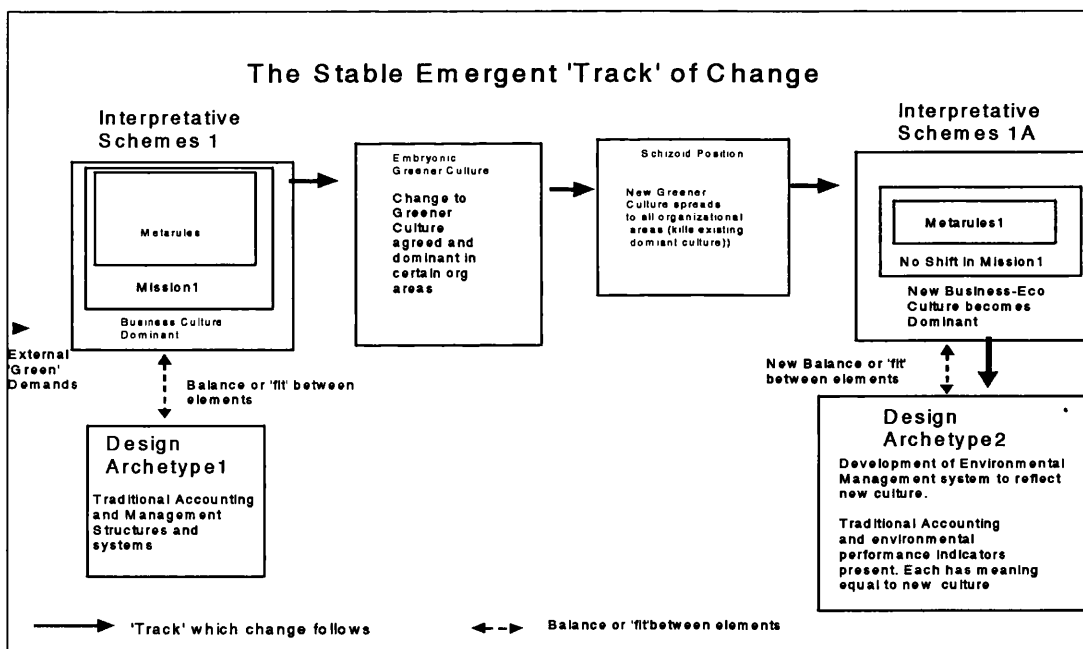


Figure 6-7 The Stable Emergent Greening Track



The *stable emergent* track, shown in figure 6-7, leads to the creation of a new dominant culture throughout the organization, but leaves the organizational metarules and mission intact. In other words, the culture of the organization changes to include some degree of green 'values' or concern in some or all parts of organizational operations.

Figure 6-8 shows the *colonization* track where change in the technical systems of the

design archetype can fundamentally alter all levels of the interpretative schemes. This indicates that new EMS or environmental-related management accounting systems have the potential to create a radical shift in corporate mission towards care for environment. This shift may not be a conscious decision on behalf of organizational participants, but is imposed on them through the new 'visibilities' of corporate operations revealed by the environmental information within the design archetype.

Figure 6-8 The Colonization Change Track

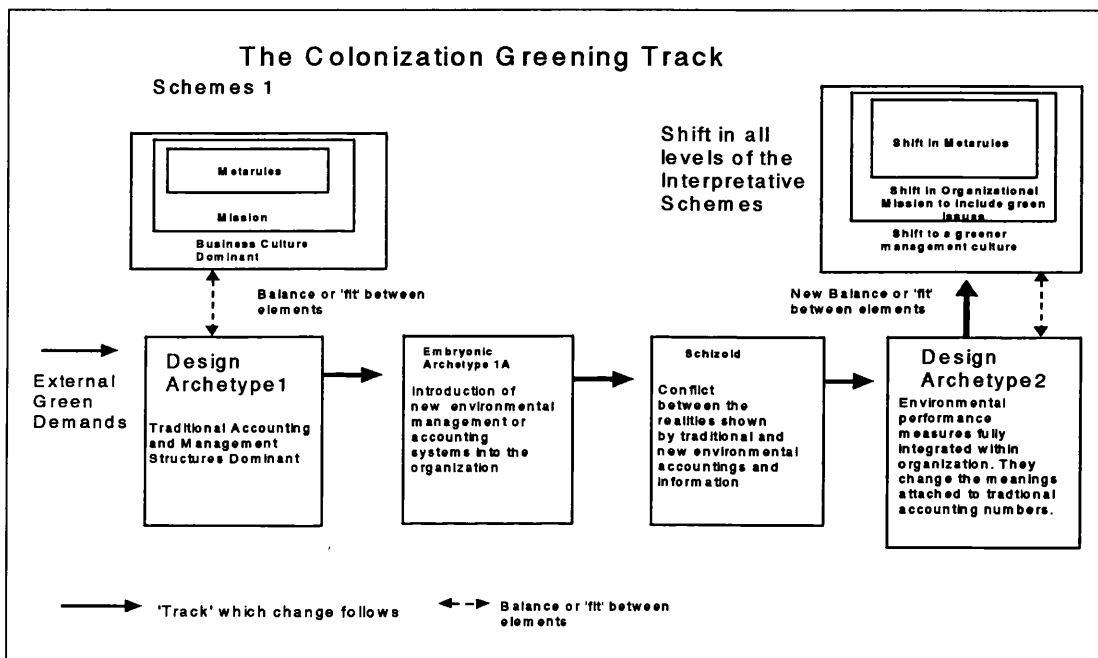
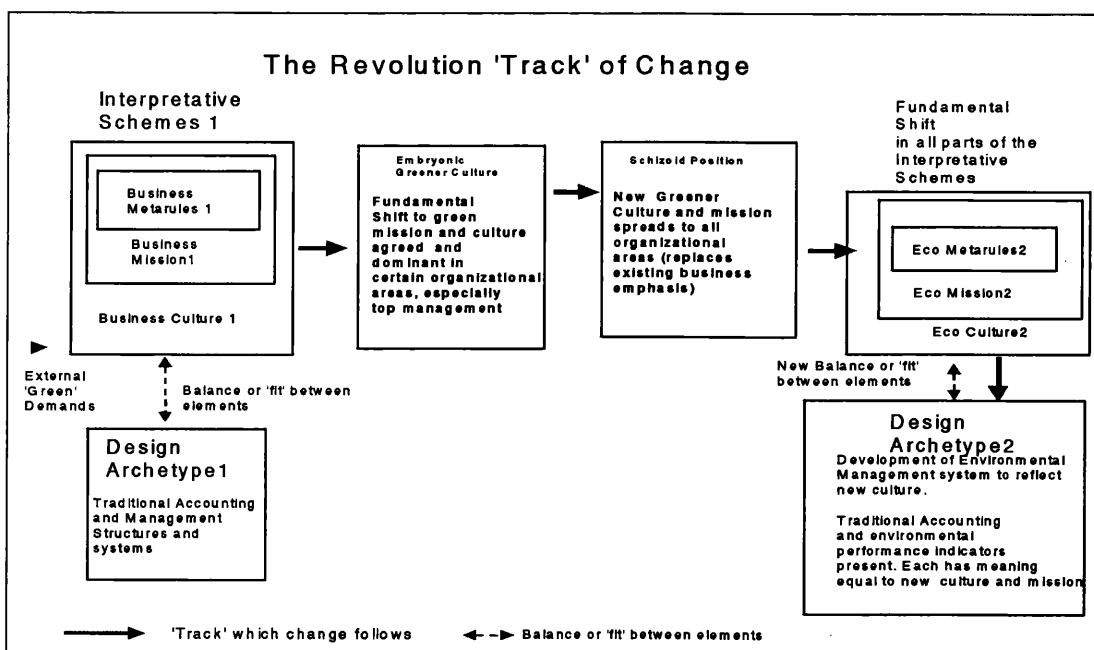


Figure 6-9 The Revolution Track of Greening Change



The *revolution* track, shown in figure 6-9, causes a voluntary fundamental shift in *all aspects* of the interpretative schemes. This primary level change will create a 'truly' green firm with environmentalism as its central mission and goal. To support this new mission, the organization must develop new forms of environmental and accounting information systems within its design archetype. Thus, the revolution track also suggests a fundamental shift in existing management accounting practices, techniques and modes of functioning. This track of change will prove hard to observe in the UK.

In summary, from this discussion of the nine change tracks it is clear that accounting and environmental information system can potentially fulfil a range of different roles in corporate greening. Green disturbances originate from the organizational and social contexts of the firm, and dealing with them may require organizations to invest in new systems of environmental information and accountings. This environmental information, either accounting or non-accounting based, plays an array of roles within greening change. Firstly, it could simply support a new green interpretative scheme. Secondly, environmental information could reveal new 'visibilities' of organizational operations, fostering the creation of competing 'green' values, actions and culture within the firm. Thirdly, environmental information systems are introduced within the design archetype simply to appear legitimate to outside parties. And finally, environmentalism and environmental information generation could be subsumed within existing technical systems and discourses, leading to their 'capture' (see chapter 2; Power, 1994). Within such an imprisonment, environmental problems are tackled using ideas and meanings formed by, and in, established discourse and ways of thinking (such as management accounting).

6.7 Conclusion

This chapter has explored how organizational greening occurs and established the role that management accounting and environmental information systems could play in initiating different 'tracks' of change. The models developed in this chapter suggest a number of uses for environmental information within greening change, and they will be applied to the case studies in chapter 8 to help interpret the findings. The insights from this chapter will first be used in chapter 7 to specifically explore the types of environmental and accounting information that firms use, in a variety of ways, to manage environmental issues.

Chapter 7: Environmental Information Systems and Management Accounting

7.0 Providing Management Information on Environmental ‘Uncertainty’

From previous chapters it is clear that UK manufacturing organizations are responding to a variety of demands for ‘environmentally friendly’ business practice. As a result, organizations now face an additional form of ‘uncertainty’ (Galbraith, 1973) to manage. In order to cope with environmental uncertainty, organizations are urged to generate new forms of internal information for the generation and support of new environmental strategies (see for example, Bennett & James, 1994a, 1994b, 1998a; Azzone & Manzini, 1994; Stone, 1994; Letmathe & Doost, 2000; Burritt & Schaltegger, 2001; Howes, 2002; Burritt, 2004). Such information needs to be adaptable across different organizational operations and functions, but also allow environmental considerations to be integrated or ‘balanced’ with traditional management information in performance evaluation, product design, product costing and investment appraisal decisions (Kaplan & Norton, 1992; Bennett & James, 1998b). This chapter focuses on the generation and use of environmental information in order to establish a potential role for management accounting.

7.1 Providing Environmental Information: Present Role of Managerial Accounting

The extent to which organizational environmental information is currently being, and could possibly be, provided by the management accounting function still remains a relatively undeveloped area for research. Chapter 3 provided definitions of a theoretical range of environment-related management accounting systems believed to provide environmental information for decision making. However, these theoretical models do not appear to be widely used in UK manufacturing organizations.

Empirical evidence (including from this thesis) suggests that non-accountants are the organizational participants with chief responsibility for the operation of environmental management and performance measurement systems. As discussed in chapter 2, there are few empirical studies investigating the interactions between such systems and traditional management accounting systems. Current empirical evidence suggests that management accountants play little or no role within the majority of environmental management developments by organizations (Bebbington *et al*, 1992; Gray *et al*, 1992; Birkin, 1996;

Bennett & James, 1998a; Burritt, 2004). Epstein (1995, p.240) found similar results within 30 US manufacturing corporations:

'I was disappointed to find very little functional co-operation between EH&S [Environmental Health and Safety] and other departments and divisions. In most organizations accounting and finance personnel participate very little in environmentally related decisions'.

As evidence of this, Hill (1995) describes the implementation of Eastern Electricity's BS7750 environmental management system, but makes no mention of any input from the management accounting function. In 1996 the author of this thesis interviewed Hill, Environmental Manager of Eastern Electricity plc, and he reiterated that the corporate environmental management system was largely isolated from the accounting function, although he wished to encourage the accounting function to participate more fully in such initiatives.

Quite clearly, existing empirical studies point to the apparent loose coupling between the management accounting function and environmental management systems. My own discussions with participants in a range of conferences and seminars over ten years confirm that the range of individuals involved in, and responsible for, environmental management issues is dominated by normal line managers, engineers and production staff. For example, Netlon Plc's environmental improvement programmes was initiated and controlled by a senior manager uninvolved with the accounting function of the firm. Vauxhall Motors at Ellesmere Port adopted environmental management structures without the support and assistance from the finance function. These observations match the findings in two of the three main case studies in chapter 8. In the third case, the management accountant was involved in trying to implement an EMS, but that was only because the role appeared to be forced upon him. At best, the present environmental role of management accountants comes from extensions of existing management practice, including traditional cost-reduction programmes that save energy, reduce material usage and reduce environmental compliance costs (see Birkin, 1996; Burritt *et al*, 2001).

This 'negative' empirical evidence is surprising given that the majority of UK and international professional accounting bodies have produced publications considering the role of management accountants in environmental management (see for example Macve & Carey, 1992; The Society of Management Accountants of Canada, 1992; Collison, 1995; CIMA, 1997; Bennett & James, 1998a; Bebbington, Gray, Hibbit & Kirk, 2001; Howes, 2002a; IFAC, 2004). Then

again, the resulting recommendations tend to the general and fail to offer concrete modes of *practice* and *action* regarding the provision of accounting based environmental information. One extremely positive influence comes from the US, where the Institute of Management Accountants (IMA) has taken an active role in the continued development of the US EPA's *Environmental Accounting Project* (see Stone, 1994; EMARIC, 2004). This project has resulted in a number of US corporations implementing an array of environmental cost accounting systems, and the EPA has heavily promoted the 'achievements' from these case studies (for details see Graff *et al*, 1998).

In common with most professional bodies, CIMA has published guidance documents on the role of management accountants in environmental management (see chapters 1 & 3 for details). In addition, the CIMA publications *Management Accounting Research* and *Management Accounting* are increasingly publishing articles concerned with environmental management accounting and environmental measurement within organizations. At best, CIMA, as a professional body, sees a link between good business management and environmental performance, with management accountants still focusing primarily on business efficiency (e.g. via energy accounting – see Wolstenholme, 1982). It is perhaps not surprising that CIMA has been relatively slow to respond to the environmental challenge as it serves to question the rationality of many of the established techniques that management accountants use to measure business efficiency (see Hines, 1994).

From this evidence, management accounting professionals appear cautious in realising any potential they hold for managing environmental uncertainty. This seems strange, since environmental factors can potentially impose large financial and competitive constraints on an organization. As environmental regulation of UK manufacturing organizations increases, then so will the financial burdens and compliance costs of the environment. A focus by accountants on minimising pollution and compliance costs brings greater and greater benefits to the organization (see for example IFAC, 2004). Many techniques currently used by accountants are as applicable for dealing with the environmental dimension of operations (see for example Brooks *et al*, 1993). Furthermore, as discussed in chapter 3, there have been other recent demands to make management accounting more 'strategic, 'market focused' and for it to make greater use of non-financial data (see Bromwich, 1990). So why does management accounting remain inflexible towards the use of external and internal environmental information?

The lack of environmental response has been blamed on management accountants' restricted training in environmental issues and limited orientation for change (Sterling, 1973; Burchell *et al*, 1985; Booth & Cocks, 1990; Lehman, 1988; Gray, 1992). Furthermore, whilst management accounting practice has environmental accounting research to draw upon, the interface between practice and research is frequently distorted. Accounting research rarely becomes practice (Hopwood, 1990), so environmental accounting research which is outside mainstream accounting research is even less likely to do so (Bebbington & Gray, 1992). However, environmental accounting research seeks to produce much more than new techniques to allocate overheads, as it attempts to tackle an important, new and developing issue that is not understood and tackled in practice (*ibid.*). Whilst research into environmental information may fail to change accounting practice, it should aid practitioners by describing the possible options for environmental management information systems and the extent to which the environmental imperatives could be integrated within decision making systems.

7.2 A Need for Environmental Accounting or Just 'Efficient' Accounting?

As discussed in chapter 3, the normative accounting literature is replete with prescriptions of how to reform traditional management into an environment-related of management accounting (Bennett & James, 1994a, 1994b, 1998b; Azzoni & Manzini, 1994; Stone, 1994; McLaughlin & Elwood, 1996; Letmathe & Doost, 2000; Burritt & Schaltegger, 2001; Burritt, 2004). The premise behind these is that existing management accounting systems cannot be used to measure environmental issues:

'Traditional accounting systems tend to hide environmental costs in overhead accounts obscuring the size and sources of such costs'. (McLaughlin & Elwood, 1996, p.13)

Such perceived 'gaps' in management accounting practice are believed to 'hide' the financial benefits of environmental initiatives and thereby hinder their adoption. Many authors have suggested that most environmental costs are currently classified into the category of overhead, and not recovered in a meaningful way. Environmental costs are not measured in separate cost pools and are not made the responsibility of the incurring department, product, service or division. This lack of 'proper' accounting for environmental cost has been claimed as the main reason behind the slow progress of corporate environmental management initiatives. For example, a firm may know that it has an environmental exposure, but without an

understanding of the environmental costs involved it may be difficult to secure commitment for improvements. In order to overcome the alleged deficiencies of existing management accounting, the US EPA (1995a, p.4) suggests the development of a specific environmental cost accounting (ECA) system where:

‘environmental costs - including those that are often hidden in general overhead accounts - are identified and allocated to the material flow or other aspects of a firm’s operations’.

This definition is typical of discussions describing the development of ‘environmental cost accounting’ (EPA, 1995a), ‘full cost accounting’ (Bebbington & Thomson, 1996) and ‘total costs assessment’ (White, 1994) systems to measure the environmental costs of organizational operations. The EPA definition of ECA does not specifically consider issues of sustainability, nor whether such cost data should come from existing management accounting reports or a separate cost measurement system or report. The next section explores the *perceived* need for such environment-related cost systems, and why existing management accounting systems seemingly fail to adequately measure environmental issues.

7.2.1 Present Management Accounting Treatment of Environmental Costs

The cost structures of UK manufacturing organizations include a range of costs that could be defined as ‘environmental’ in nature. These environmental costs originate throughout the organization, and are ‘driven’ by individual decisions as well as the total production level. Environmental cost may be defined as expenditure incurred in meeting the environmental objectives of the firm or more simply as expenditure that varies with the environmental impacts of the firm. Thus, the term environmental cost seems to defy universal definition within the accounting literature (see Ditz *et al*, 1995). A typical example of such definitions comes from Bennett & James (1997, p.44), who define environmental costs as:

1. Costs whose main purpose is ameliorating environmental impacts.
2. Costs on purchasing, processing and disposing of materials, energy and water which are neither incorporated into nor are essential to produce final products or services.
3. Cost associated with actions taken to improve the future environmental performance of business.
4. Costs associated with environmental-related actions taken with the intention of improving future business performance.

Table 7-1 provides a ‘typical’ categorisation of environmental costs by adapting a framework of the US EPA (1995a). Table 7-1 provides five main categories or ‘tiers’ of environmental cost that might be measured and managed within UK manufacturing organizations. Many of these costs should already be measured within existing management accounting techniques,

but if they are, they are normally aggregated as part of overhead or treated as normal operating costs (see chapters 1 & 3). Each of the five tiers of environmental costs will now be defined.

Table 7-1 Tiers & Categories of 'Environmental' Cost

| 'Tiers' & Categories of Environmental Cost (Adapted from EPA, 1995a) | | |
|---|--------------------------------------|--------------------------------------|
| Conventional Costs (Tier 0) | | |
| Capital costs | Materials and energy | Labour |
| Supplies | Utilities and Structures | Salvage values |
| Potentially Hidden Costs (Tier 1) | | |
| Regulatory | Upfront | Voluntary (Beyond Compliance) |
| Notification & Reporting | Site studies and EMS | Implementation of EMS |
| Pollution control | Site preparation | Monitoring/testing & reporting |
| Inspections & Monitoring | Permitting | Planning, Training & Green Audit |
| Modelling & Training | R&D | Qualifying suppliers |
| Remediation | Engineering and procurement | R&D |
| Planning & Record Keeping | Installation | Insurance |
| Waste & emissions management | | Feasibility studies |
| Taxes, Fees & Penalties | Back End | Remediation |
| Manifesting & Labelling | Closure/decommissioning | Recycling |
| Preparedness | Disposal of inventory | Environmental studies |
| Protective Equipment | Post-closure | Community relations |
| Environmental insurance | Site survey | 'Green' projects in society |
| Response to environmental incidents | | Donations to environmental groups |
| Contingent Costs (Tier 2) | | |
| Future compliance costs | Property damage | Natural resource damages |
| Penalties/Fines/Remediation | Personnel injury damage | Legal Expenses |
| Response to future releases | | Economic loss damages |
| Image and Relationship costs (Tier 3) | | |
| Corporate image | Relationship with insurers | Relationship with lenders |
| Relationship with customers | Relationship with professional staff | Relationship with host communities |
| Relationship with investors | Relationship with workers | Relationship with regulators |
| | Relationship with suppliers | |
| Social Costs (Tier 4) | | |
| Impact on human life | Environmental Degradation | Adverse affect on biodiversity |

Conventional costs are the costs of using raw materials, central services, capital goods and supplies, and are usually measured by cost accounting and capital budgeting techniques. These are not considered to be environmental costs. However, the efficient use of all resources and the reduction of waste is also environmentally preferable. These conventional or "direct" costs will already be accounted for by a correctly designed and implemented management accounting system, and do not need specific attention from an environmental cost system. Where this is not the case, an environmental cost system could reveal new information, or at the very least, reveal ways of reducing such costs by using substitute products.

Potentially hidden costs are the costs that conventional management accounting systems typically classify as overhead. In most UK organizations, these environmental costs are not normally identified separately, and their cost causality is effectively 'hidden' during overhead allocation to cost centres and products. These hidden environmental costs are incurred through a number of different discretionary decisions with the firm. *Upfront* costs are incurred prior

to the operation of a process, system, or facility. These can include costs related to siting, design of environmentally preferable products or processes, qualifications of suppliers and evaluation of alternative pollution control equipment. Whether classified as overhead or R&D, these costs can easily be forgotten when managers focus on operating costs of processes, systems, and facilities. *Regulatory* compliance and *voluntary* environmental costs will also be incurred in operating a process, system, or manufacturing facility. Such costs are also normally treated as part of overhead, and as a result, managers may not be aware of their magnitude and importance. *Back-end* environmental costs may not be entered into management accounting systems at all, since they represent future environmental arising from present operations. Examples of *back-end* costs include the future cost of decommissioning a factory that uses hazardous materials and the cost of replacing a storage tank used to hold petroleum or hazardous substances.

Contingent costs are those environmental costs that may or may not be incurred at some point in the future. Examples include the costs of remedying and compensating for future accidental releases of contaminants into the environment and future costs due to unexpected consequences of emissions. Within UK financial accounting, Financial Reporting Standard 12 *Provisions, contingent liabilities and contingent assets* requires that contingent liabilities should normally be disclosed in the notes to the accounts, although a specific provision need not be recognised. Despite this, such contingent costs do not receive specific attention within management accounting systems. However, a number of recent UK environmental regulations adopt a 'polluter pays principle' that place strict liability on operators for the environmental remediation costs of any damage caused by their products or operations (see Short, 2004). This principle is extended further with the EU 'Environmental Liability' Directive issued in 2004 that establishes a framework of strict 'polluter pays' liability for damage to biodiversity, water and land contamination. The UK has three years to transpose this directive, which has the potential to cause a number of future contingent costs to UK manufacturers, into law.

Image and Relationship costs are incurred to effect subjective (though measurable) perceptions of management, customers, employees, communities, and regulators. These costs include the costs of annual environmental reports and community relations activities, costs incurred voluntarily for environmental activities, and costs incurred for pollution prevention and award programs.

Social costs represent the impact of the firm's actions on the environmental quality of society, seeking to place a financial value on any externalities that the firm causes to society. As discussed in chapter 2, these 'social' costs of production have received considerable attention within the environmental economics literature, but are not captured by current management accounting systems that focus on 'private' costs. Despite a small number of mainly North American case studies of social cost accounting in the US, there is little evidence of accountants performing such cost calculations (see EPA, 1996, 1998). For example, in the case of Ontario Hydro in Canada, social cost data was merely collected as part of its license application process to export electrical energy to the United States, but was not used in normal management decision making situations. Until social costs are forced upon the firms by legislation and/or customer demands, management accounting, and even environmental cost accounting, will not consider such costs unless there is a unique context of external pressures and internal catalysts to fuel the development of social cost measurements.

In summary, the discussion above has identified five categories or 'tiers' of environmental cost commonly used in the environment-related accounting literature. However, many of these labelled as 'environmental' costs appear to be costs that should already be minimised as part of efficient cost accounting or management practice (see chapters 1 & 3). The accusation is that conventional managerial accounting systems do not adequately measure or reveal environmental costs, and it requires new systems of environmental-related management accounting to reveal the 'visibility' and importance of such costs in organizational actions:

'The success of environmental accounting does not depend on correctly classifying all the [environmental] costs a firm incurs. Rather, its goal is to ensure that relevant information is made available to those who need or can use it'. (EPA, 1995a, p.12)

Thus, for many authors, a fundamental reason to introduce environmental-related management accounting is to raise awareness of the environmental dimension to business costs (see for example, Bennett & James, 1994a; McLaughlin & Elwood, 1996; Letmathe & Doost, 2000; Burritt *et al*, 2001). Many costs may have an environmental dimension to them, and it is important to promote this within all organizational actions and decision making. In addition to being criticised for its failure to raise the general awareness of environmental costs, conventional management accounting is also subject to a number of further critiques. Firstly, it is criticised for 'lumping' indirect environmental costs with general business overheads

(EPA, 1995a, Burritt, 2004). Secondly, accounting based investment appraisal techniques exclude environmental considerations (Bromwich & Bhimani 1991; Baker, 1996; Smith & Lambell, 1997). Third, management accounting overemphasises the costs of manufacturing (production) rather than the other parts of the value chain that also affect the environment (Porter, 1985; Shank & Govindarajan 1989; Bromwich, 1990). Fourth, accounting performance measures focus on short-term financially orientated measures of business performance and exclude non-financial measures of environmental impacts (see Kaplan & Norton, 1992). Fifth, conventional management accounting does not account for the environmental externalities and social costs, tier 4 in table 7-1 (see Bebbington & Thomson, 1996). Sixth, management accounting systems adversely affect the motivation of organizational participants to manage environmental costs (Wycherley, 1997; Burritt, 2004). Seven, management accounting is driven by financial accounting rules that ignore environmental impacts (Kaplan, 1984; Johnson & Kaplan, 1987).

Many of these criticisms are not new, and do not only inhibit the management of environmental issues. Can conventional management accounting be modified to improve its management of environmental issues with a manufacturing firm? From the literature, the answer is a resounding yes. Suggestions include: modified systems of cost allocation (see Brooks *et al*, 1993); the use of life cycle costing (see Krueze and Newell, 1994; Brady *et al*, 1999; Dunk, 2004); applying total quality management approaches to the environment (Wever & Vorhauer, 1993; Welford, 1993); the use of eco-efficiency budgeting (Burritt & Schaltegger, 2001); and the application of strategic management accounting to green issues (Baker, 1996; Smith & Lambell, 1997). These suggestions represent just a small number of the prescriptions for curing the environmental 'problems' of conventional management accounting.

Additional to green solutions through modifications to existing accounting techniques, the literature is replete with a wide range of alternative environment-related forms of management accounting. Here, management accounting is seen as what it should become (Hopwood, 1987). These systems of GMA, ECOMA and EMA are subject to alternative definitions and prescriptions within the literature but all aim to measure and manage the non-financial environmental impacts and financial environmental costs of the organization (see chapter 3). They are seen as an extension to conventional management accounting, rather than its

replacement. As will be discussed later in this chapter, it seems strange that these prescriptions of environment-related management accounting seem to envisage such systems collecting physical information about environmental impacts. ISO 14001 EMS *already* collect such data, so it raises serious doubts about whether GMA, ECOMA or EMA will function in the manner prescribed in the literature and whether they will be widely used within UK firms.

It is worth reiterating that the research question of this thesis is to identify the current role of management accounting within the overall development of EMS and environmental initiatives within UK firms. The aim is not to provide a prescription of the way that management accounting and accountants *should* play a role in environmental developments. As a result, it is not necessary to provide a detailed critique of each of the potential systems of environment-related management accounting.

7.2.2 Environment-Related Accounting: The Role of Organizational Context

As has been argued throughout this thesis, the role of (and actual need for) new forms of environment-related management accounting, EMS and environmental information *cannot* be prescriptively determined prior to their embedding in the organization in which they will function. Thus, the role of these new systems and existing management accounting within environmentalism will be shaped by organizational life:

‘Rather than being essential to the accounting mission, the roles which accounting serves in organizations are created, shaped and changed by the pressures of organizational life. They are implicated in action, rather than being prior to it’. (Burchell *et al*, 1980, p.19)

In addition, the organizational desire to reform, supplement and extend existing management accounting with environment-related management accounting will be shaped by the same forces. The model of environmental change developed in chapter 6 suggests that management accounting may play a role in the growth of corporate environmentalism. However, this role may not require it to fundamentally change its existing practices and techniques. If environment-related accounting does evolve within the organization, it need not follow that accountants will be the professionals who produce such environmental information, since most of this data will be non-financial and orientated towards measuring specific physical information on the use, flows, and fates of energy, water, and materials (see chapter 3). EMS and compliance monitoring systems collect the majority of this non-financial data, and also reveal environmental cost causality throughout the organization. Environmental managers

undertake the majority of environment-related accounting within the limited evidence of the few UK studies. Having interviewed environmental managers *and* management accountants in same organization, Wycherley (1997, p.182) suggests:

'most organizations adopt an environmental policy and start to implement it with little accounting involvement. Only when some experience with the new direction has been gained do environmental managers become more aware of the potential benefits of inviting accountants to support their efforts'.

Supported by the evidence from the case material in chapter 8, he found evidence that the costs of collecting 'environmental accounting' information were seen to outweigh its value in many organizations. Environmental managers were already aware of where the majority of environmental costs were being incurred, and did not require an accounting system to provide such information. This follows evidence concerning the way that organizational context can prevent the adoption of ABC, as it was seen to merely reinforce what managers already knew about cost causality (see Bhimani & Pigott (1992b). More fundamentally, Wycherley suggests that environmental managers did not want accountants involved in their new area of 'expertise':

'environmental managers will want to retain their influence as the organization's custodian of environmental and ethical policy and will resist accountants' attempts to frame decisions in this area in solely financial terms'. (ibid.)

Thus, the development of environment-related accounting, and the involvement of accountants within environmental management will be shaped by organizational context. However, if demands for environmental accountability grow, and can be discharged by using 'legitimate' forms of internal environmental-related accounting, this creates further potential for accounting involvement in 'greening' derived from the wider social context. Accounting involvement is shaped by both social and organizational context.

By producing internal accounting and non-accounting based environmental information about its environmental impacts, a firm constructs a specific lens of 'reality' through which both it and outsiders (via audit and accreditation of internal systems) can assess environmental performance and accountability (Hines, 1988, 1992). Hence, the types of environmental information influence those viewing through the lens on many different planes. It is not a simple case of accounting for something that was previously 'invisible', but examining how accounting for the environment is, or is not done, within a specific organizational context.

7.3 Types of, and Roles for, Corporate Environmental Information

Within the environmental management and accounting literature the development of specific environmental information and performance measurement systems are seen as a logical and technical extension of 'good management' practice (see Bennett & James 1994a; Burritt *et al*, 2001). Organizations are urged to utilise such systems in order to become seen as socially responsible and to minimise the financial cost of their environmental impacts:

'Environmental performance measurement is fundamental to the successful implementation of environmental policy and strategy. It is only by knowing what causes good or bad performance that management can be effective in making improvements in environmental performance'. (Business in the Environment & KPMG, 1992, p.3)

Similarly, from Bennett & James (1994a, p.4):

'If organizations wish to respond to the [greening] pressures outlined above, they must answer two basic questions:
1. What measures can be used? 2. How can measures be introduced?'

These quotes highlight the method by which environmental information and performance measurement systems are believed to allow a 'managing by the numbers' approach to dealing with environmental issues. Thus, rather than being perceived as an outcome of processes that could make management information what it was not, the provision of environmental information for decision-making is seen as becoming what it should be (Hopwood, 1987). Many authors suggest that the use of environmental performance measurements will rationally increase organisational efficiency:

'In many organizations reducing waste in all its forms provides the greatest potential for environmental improvement. It is also highly likely to result in a reduction in operating costs, all of which go directly to the bottom-line profit and produce extra cash'. (Marsden, 1996, p.42)

In this way, many of these proposed developments in performance measurement are justified or promoted on energy saving and waste reduction grounds, issues that should already be monitored by existing organizational management control systems. Within this functional prescription, EMS and environmental information are implicitly assumed to fulfil an underlying rational purpose regardless of the context in which they operate. Thus, environmental performance measurements allow organizational participants to observe the correct 'answers' to environmental problems without the need to observe the actual context in which such problems arise.

This functional perspective is apparent in the analysis of many empirical studies investigating the role of environmental information within UK firms (see for example Business in the Environment & KPMG, 1992; James, 1994; Azzone & Manzini, 1994, Bennett & James,

1994a, 1998a). Implicit within such studies is the view that the 'successful' implementation of environmental information systems in one organization means that all organizations should adopt identical types of environmental information.

New forms of environmental information and EMS are believed essential for any organization seeking to manage its environmental issues. Such prescriptive views implicitly regard environmental concerns as issues that can be dealt with in a bureaucratic and formalised 'business' manner. Irrespective of whether existing managing information systems (such as accounting) can be used to generate environmental information, organizations are urged to invest in new EMS and information systems. Such a prescriptive view implicitly understates the organizational and social dimensions of management information systems, which are vitally important for understanding how environmental change can arise. Without this theoretical foundation, they are flawed. Environmental information systems must be seen as shaping as well as just simply *enabling* organizational functioning (see Hopwood, 1987) and the *desire* to incorporate environmental measures within the organization may not arise purely within the organizational domain (Burchell *et al*, 1985). For example, published prescriptions of environmental information for decision making, such as the 'Environmental Performance Evaluation Guidelines' of ISO 14031 (BSI, 2000b), may themselves influence the types of information generated within firms.

Table 7-2 uses the framework of James (1994) to provide a categorisation of approaches that are used to generate environmental management information within UK organizations. It shows the range of bodies of knowledge and expertise that are currently used to generate environmental information and performance measures. Such information is predominately non-accounting, and is heavily orientated to ecological or production orientated data.

Table 7-2 Environment-related Performance Measurement within organizations

| Approach | Orientation | Drivers | Measurement Focus | Metrics |
|------------|------------------------|-----------------------------------|---|--|
| Accounting | Reporting | Costs & Accountability | Costs and Liabilities Impacts on Society | Financial Emissions (for reporting) |
| Auditing | Legalistic | Compliance | Management Systems Risks | Emissions/Waste Input Risk |
| Ecological | Scientific | Impacts | Impact Assessment Life Cycle | Impacts Emissions/Waste |
| Economics | Welfare | Externalities | Shadow Pricing | Financial |
| Production | Engineering | Efficiency | Mass Energy Balance | Efficiency & Input Resources |
| Quality | Continuous Improvement | Pollution Prevention Customers | Waste Generation Cost of Quality | Customer satisfaction Emissions & Input Resources |

(Derived from: James, 1994)

Surveys concerning the presence of environmental information and performance measurement systems within UK companies provide empirical evidence for table 7-2 (see James, 1994; Azzone & Manzini, 1994; Business and the Environment and KPMG, 1992; Bennett & James, 1994a, 1998a, 1998b). Performance measurements and environmental information actually generated by UK firms include impact measures, registers of effects, risk measures, measurement of contingent liabilities, physical measures and flows, compliance monitoring, environmental costing, customer views and technological assessments. This is to be expected of firms implementing ISO 14001 or EMAS forms of EMS, which require the company to routinely generate information about corporate environmental aspects, undertake environmental performance evaluations and maintain a register and record of environmental effects (see BSI, 2000b, 2004). This 'routine' environmental information generated by EMS will be discussed further in the section below.

Despite the standardisation effect of EMS standards, published surveys show that there is no common approach towards provision of environmental information. Indeed it is not clear whether such information is even routinely generated within UK firms. More fundamentally, these same surveys show that management accountants *are not* presently involved in the provision of environmental information, and this situation is not expected to change without action by the accounting profession:

'It is unlikely that individual accountants will play a greater role in environment-related performance measurement without continued and enhanced action by accounting bodies. This is necessary in a broad sense to encourage and legitimise their involvement in what can seem an esoteric and peripheral topic, and more specifically to help to raise environmental awareness in the profession'. (Bennett & James, 1998a, p. 123)

Thus, evidence suggests that environmental information is primarily generated by a variety of non-accounting functions and professionals, and is normally non-financial in its orientation.

In addition to highlighting these empirical examples, published surveys typically provide prescriptive suggestions about the types of environmental information and performance indicators that a rational organization needs to generate in order to tackle environmental issues. However, such prescriptions (see for example Business in the Environment and KPMG, 1992) do not adequately consider how the implementation, functioning and integration of these new information systems may differ according to the specific organizational context in which they operate. As highlighted throughout this thesis, the choice and use of environmental

information and performance measurement systems may be influenced by social and organizational contexts. For example, technically similar measurement systems may not be used in the same way in different organizations. Such an appreciation is critical since performance measurement might have little operational use, and yet provide 'legitimacy' for an organization by deterring external enquiry as to the organization's environmental actions (Power, 1994).

7.3.1 The Processing of Environmental Information within Organizations

Management accountants do not appear to be heavily involved in the provision of environmental management information. This raises the research question of how such information is used alongside management accounting information within organizational decision making. The way that environmental information is generated, processed and used within the organization will influence its importance within decision making. Empirical studies of the role of management information systems have shown that information can play multiple roles within an organization (for a review see Dent, 1986), but very few studies have specifically illustrated the role of environmental information within UK organizations (see however, Wycherley, 1997; Bennett & James, 1998a). This section describes the different ways that environmental information may be generated and used by organizational participants to deal with 'green' uncertainty.

Table 7-3 provides a framework of environmental information generation and processing derived from work by Earl & Hopwood (1980). The table illustrates four different types of environmental information processing, and suggests that formal information systems such as EMS and management accounting may be supplemented by other sources of information.

Table 7-3 Processing Environmental Information Within organizations

| (Derived from Earl & Hopwood, 1980) | | |
|-------------------------------------|---|--|
| | ROUTINE | NON-ROUTINE |
| OFFICIAL | ISO 14001 & EMAS Type systems. ISO 9001 Quality Management Systems Waste Management Systems Management Accounting Systems. | 'Round table' discussions. Green Task Forces and Liaison Roles. Environmental Business Units |
| UNOFFICIAL | Local Green Knowledge. Just in case files. | Green Grapevine. What should we do? That looks good. Informal discussions. |

Official, routine environmental information is generated as part of regulatory compliance, but is typically provided by corporate EMS. EMS certified ISO 14001 or EMAS standards are

becoming institutionalised as an essential tool of modern business management:

‘Achieving sound environmental performance requires organizational commitment to a systematic approach and to continual improvement of the environmental management system’. (BSI, 1996b, p.1)

Obtaining EMAS or ISO 14001 accreditation for EMS appears to provide a powerful means of dealing with ‘external’ green demands (see chapters 4 & 5). Both schemes place requirements on an operator of the EMS to produce a range of environmental information. As ISO 14001 is the EMS used by all the companies in the empirical work (Copyco even had its EMS certified to both ISO 14001 *and* EMAS standards), the specific information it generates will be discussed here. An ISO14001 EMS requires the identification and documentation of an organization’s significant environmental aspects (i.e. element of an organization’s activities, products or services than interact with the environment) and impacts (i.e. changes to the environment that result from environmental aspects), that it can control and influence including:

- a) emissions to air
- b) releases to water
- c) releases to land
- d) use of raw materials and natural resources
- e) use of energy
- f) energy emitted, e.g. heat, radiation, vibration
- g) waste and by-products, and
- h) physical attributes e.g. size, shape, colour, appearance

Much of this data should already be collected as part of regulatory compliance, and does not require a detailed life-cycle assessment of costs. A company with or without an ISO 14001 EMS can also choose to implement ISO 14031 ‘*Environmental management – Environmental performance evaluation – Guidelines*’ (see BSI, 2000b) as a means to generate environmental information. ISO 14031 provides a supplemental system of environmental performance evaluation (EPE) that provides two general categories of performance indicators:

- a) environmental performance indicators (EPIs)
- b) environmental condition indicators (ECIs)

There are two types of EPI: management performance indicators (MPIs) that provide information about management efforts to influence the environmental performance of the organization’s operations; and operational performance indicators (OPIs) that provide information about the environmental performance of the organizations operations. In total, EPE provides a tool that can be used to produce an organizationally specific range of detailed environmental performance data.

In addition to data routinely produced by EMS or a system of EPE, further 'environmental' information can be indirectly derived from existing systems of management information and accounting, e.g. energy accounting, combined heat and power (CHP), waste management and ISO 9001 quality management systems. Official systems of management accounting systems can provide environmental information, but, as discussed earlier in this chapter, often render environmental costs and issues 'invisible' to decision makers. In addition, not all UK organizations have a routine and official certified ISO 14001 EMS, choosing to use their own unique system of environmental information provision.

Official, non-routine environmental information emerges from special taskforces with a purposive role in facilitating information processing throughout the organization. This information would be *ad-hoc* and aimed at a specific issue, such as a customer asking for specific evidence on environmental management. In terms of the three case studies in chapter 8, two out of the three companies studied had non-routine environmental systems in place where various functional managers (including accountants) met to discuss urgent environmental issues. As a further example of this, the manager of Eastern Electricity's environmental unit organises regular meetings with line managers to tackle specific green problems. In many instances, corporate environmental management units act as an environmental 'consultant' to functional departments on an 'as needed basis'. These approaches seem to acknowledge that official-routine management information systems, such as EMS, need to be supplemented by information and communication channels that are more timely and issue specific.

Unofficial, routine environmental information is needed to supplement official information systems (such as EMS) in local decision-making. Acting as "just in case" files (Earl & Hopwood 1980, p5), this unofficial information is generated by certain functional managers to aid their understanding of 'green' uncertainties within their area of responsibility or for local managers to achieve broad environmental improvement targets set by top management. It also enables local managers to explain and defend their environmental performance against broad targets set, and may identify areas of the production process that have specific environmental issues. Such unofficial information systems will already exist in certain functional areas, but focused on providing information on non-environmental factors e.g. waste and product

quality. These systems could potentially be incorporated within the official corporate environmental monitoring and information systems, since many newly appointed environmental managers are experienced engineers, production managers or chemists with experience of managing, monitoring and measuring environmental problems within the production process. The case studies in chapter 8 reveal that this new breed of 'environment-production' type managers are surprisingly active, knowledgeable and positive towards environmental impact reduction, and possess their own personal information about environmental impacts.

Unofficial, non-routine information generation and processing occurs during informal conversations between managers:

'To discover what is important, one joins the grape-vine'. (Earl & Hopwood, 1980, p.6)

Earl & Hopwood (1980) envisage the 'grapevine' as representing interactions and information processing between managers within the same organization, but for environmental information generation the boundaries of this 'grape vine' must be extended to include interactions between managers of *different* organizations. The prevalence of conferences focused on environmental issues, GBN and public domain environmental information suggests that an external 'grapevine' is shaping and moulding the environmental management gestalt. This external informational 'grapevine' of conferences and GBN spreads 'industry recipes' (Spender 1993) of environmental management initiatives viewed as essential 'best practice', and explains the widespread adoption of BSI ISO 14001 accredited EMS within the UK (see chapter 4). Empirical evidence for the existence of this 'grapevine' of information comes from the case studies in chapter 8. *All* the companies studied were members of the same GBN, and individual managers freely admitted, and referred to, discussing environmental problems with professionals in other local organizations. Such interactions were held as important to environmental managers as internal conversations with functional managers.

In summary, environmental information problems do not necessarily require environmental information systems; alternative forms of green information processing can and do exist in organizations. As a result, formal EMS and accounting systems are not the only source of environmental information that an organization needs and uses to manage its green issues. Furthermore, the source of this environmental information can influence the organizational

view of what needs to be done with regards to the environment, serving to focus attention towards environmental management as a win-win opportunity (e.g. control waste to save money and the environment) and away from more problematic issues of sustainability.

7.3.2 The Roles of Environmental Information under Conditions of Uncertainty

In addition to establishing the types of environmental information, it is vital to appreciate the *actual* way that organizational participants *use* this information to reduce uncertainty (see Galbraith, 1973). Research on management accounting and information systems has shown that the link between information use and decision making may not always be rational (Galbraith, 1973; Earl & Hopwood, 1980; Hopwood 1987; Hedberg 1981; Starbuck & Hedberg 1977; Lindblom, 1959; Cohen, 1972; Gambling 1979; Mintzberg 1979; Ansari & Euske 1987; Cyert & March, 1992). Information can be used in less rational ways, often being used to justify previous decisions, or used to influence decision making by comprise:

'Information is there to facilitate and ease rather than more actively influence, if indeed not frustrate, the decision making process'. (Earl & Hopwood 1980, p.7)

These ideas raise the concept of environmental information processing having a mixture of both rational and irrational roles, even acting in a 'garbage can' (Cohen *et al*, 1972) or 'semi-confusing' manner (Cyert & March, 1992) in relation to decision making. This has never been explicitly applied to the use of environmental information systems, either alone or alongside management accounting within decision-making. The empirical work in chapter 8 is a first step towards identifying the types of information that *really* secure organizational commitment to environmental issues.

Table 7-4 provides a framework for illustrating the role of environmental information in coping with green uncertainty that is derived from Earl & Hopwood (1980). Under conditions of uncertainty, an information system may not fulfil a technical normative role, and be used to influence decisions in four different, but not mutually exclusive, roles.

Table 7-4 Possible roles of environmental information within an organization

| (derived from Earl & Hopwood, 1980) | | Uncertainty over objectives | |
|---|----------------------|---|---|
| | | Relative Certainty | Relative Uncertainty |
| Uncertainty over the consequences of action | Relative Certainty | Decision by computation 'Answer' Machines | Decisions by Bargaining 'Ammunition' Machines |
| | Relative Uncertainty | Decision by Judgement 'Answer'/'Learning' Machines | Decision by Inspiration 'Rationalisation' Machines |

Where overall green uncertainties are low, environmental information acts as an 'answer machine' that managers follow. However, the uncertainty of cause and effect is frequently high for environmental actions, as environmental impacts are difficult to attribute to individual processes or functional areas of the organization. Given clear objectives but uncertain causation, environmental information provides assistance through the use of what-if models, enquiry facilities and sensitivity analysis, acting as 'learning machines' (see Earl & Hopwood, 1980). 'Learning' systems for tackling environmental issues take time, commitment and resources to develop. As a result, uncertainties about the consequences of action are 'computed' away with the use of technocratic information systems, such as an EMS, acting as 'answer machines'. EMS are designed to reduce environmental uncertainties within the firm, dictating organizational response to all issues, however uncertain the cause and effect.

Where the consequences of organizational action are agreed upon, but the objectives for action remain uncertain, organizational parties seek to influence agendas in their favour, and one method of doing so is by either creating new information flows, or to perpetuate and influence existing information flows within organizations (see Bariff & Galbraith, 1978; Earl & Hopwood, 1980; Dent, 1986):

'By influencing the accepted language of negotiation, such [information] systems can help to shape what is regarded as problematic, what can be deemed to be a creditable solution and, most important of all, the criteria which are used in their selection'. (Earl & Hopwood, 1980, p.10)

Environmental information appears to have potential in acting as 'ammunition' within organizational discussions about the objectives for environmental management programmes within the firm. This new information becomes a powerful tool for groups seeking to alter established power relationships and modes of decision making within organizations. If environmental information can cause a shift in the predominance of the 'visibilities' created by management accounting information, environmental issues may become seen as key strategic issues within decision-making. Alternatively, even after the introduction of environmental information and EMS, the dominant language and discourse may still be financial, with accounting having the most persuasive voice within decision-making and project selection. In this situation, environmental information receives secondary discussion within the organizational decision-making. The predominance of traditional management accounting information within organizational life may be difficult to change (see Earl &

Hopwood, 1980; Hopwood, 1990), unless new environmental regulations acts to change business priorities. Despite this, however, the dominance of financial information in organizational decision making appears to be changing, especially with calls for management accounting to become more strategic, and for it to focus more on non-financial elements of organizational performance within areas such as project appraisal decisions (see chapters 1&3).

Where there is uncertainty about consequences of actions and also the objectives of action decision-making is problematic. This situation commonly occurs during organizational decisions to respond to 'external' greening pressures. Managers must find acceptable solutions, and subsequently justify their decisions to organizational participants. In such decision-making situations, EMS and environmental information would rationally be expected to act as a source of alternative options, providing inspiration for decision-makers. However, in reality, such information may act as a 'rationalisation machine', justifying and legitimising environmental protection actions that have already been decided upon and implemented. This *ex post* 'rationalisation' role of green information appears critical, especially where "leap in the dark" projects or environmental management programmes need rationalisation in order to secure continued funding. For example, EMS and environmental information can rationalise the expenditure on pollution prevention equipment by showing the financial saving it achieved. Environmental information can also be used when projects that are accepted purely on financial capital budgeting criteria need to their 'green' credentials justified, or legitimised, after the decision has been made. Thus environmental information may be used as a justification device, rather than supplying timely green information prior to decision making. Without such information to 'rationalise' environmental expenditure, new initiatives might be difficult to obtain support for. In fact, this role can be a key part of the creative process within organizations, as it serves not only to legitimise what has been done, but also influences what might be done in the future (Earl & Hopwood, 1980). Such ideas require empirical testing, but raise doubts over the normative potential of EMS and environmental information in bringing about the integration of the "green" and business within organizational decision making.

Environmental information systems may play a vital role in justifying internal expenditures on environmental improvement programmes, but can also play a dual role in justifying business action to outside bodies in order to show that actions are consistent with

organizational environmental policies (Howes, 2002b). The mere presence of EMS and environmental information within the firm could act to discharge environmental accountability (see chapter 2) without the need to supply an external account. This 'legitimisation' role of environmental information appears to be important, especially as 'green' improvements can be achieved as a 'by-product' of total quality programmes or energy accounting. This symbolic role could also function internally and help to mediate between different organizational factions, and to justify environmental expenditures to all parties.

The organizational roles that environmental information performs ultimately depends on the type of organization being considered. The specific organizational characteristics that determine the roles of environmental information are difficult to identify, but such roles will arise within the complex web of relations that constitute organization context (see chapter 5). For example, at the factory floor level of the organization, where increased levels of performance are required, such information is used as an 'answer machine' to forecast how operational changes may reduce environmental impacts. Alternatively, at top management level, such information is used to justify and rationalise prior capital expenditures on new machinery, and to show how performance has matched organizational environmental goals.

Environmental information systems help to shape conceptions of organization reality and action, and, in turn, also reflect such organizational pressures for action. Normative prescriptions of 'the best' environmental information systems for decision-making are doomed to failure; information systems operate in a domain of complex political interactions. The ultimate role of environmental information alongside traditional management accounting information will be dependent on the organizational pressures and context within each organization.

7.3.3 Relationship Between Environmental Information & Environmental Change

Rather than simply identifying the diverse array of technical and computational practices that provide environmental information, empirical research into corporate greening needs to explore how such information is actually used, and the type of roles it plays. Changes in the provision and use of environmental information within decision-making reveal the *true* level of change and green commitment within the organization. For example, the level of coupling between environmental information, management accounting and organizational action will

indicate whether green information is *really used* and valued in decision making or simply serves to 'legitimise' and rationalise decisions ex post. Exploring the introduction of EMS or environmental information systems (or their absence), their level of "fit" within the organization, and their interactions with financial and other systems appear the only way to obtain insights into the process of environmental change within organizations.

The models developed in chapters 4, 5 and 6 predict that corporate environmental attitude emerges from interactions within organizational and social contexts. As a result, organizations require different types of environmental information and use it to fulfil different purposes with the firm. This environmental information can merely reflect existing attitudes in the organizational context, but could also influence the type of green attitude that develops within the firm. The provision of certain types of environmental information does not have to lead to certain levels of environmental behaviour change. Rather, the roles, types, function and use of such information is indicative of the organizational view towards environmental issues.

Chapter 6 explored the roles that environmental information systems play in each level of greening change. This linkage between change and information system use remains skeletal and requires rigorous empirical testing, but suggests multiple roles for environmental information systems. An important point is that the thesis *does not* assume that *existing* management accounting systems have to *fundamentally change* prior to or after environmental change begins within the organization. Empirical research has found that management information systems have to change in order to facilitate fundamental shifts in organizational strategies (see Simons, 1987, 1994). However, in a greening context, it could be that it is the use of existing management accounting information systems that change, not the systems themselves. Environmental information may be used to supplement the 'green' deficiencies of management accounting, rather than replace it within all types of decision making. Thus, there may be no need for specific environment-related accounting systems.

Changes in the provision of environmental information and EMS do appear needed to promote green change, not only to help decision making in a rational sense, but more fundamentally to encourage and force the 'environmental' to be used and considered in organization discourse and cognition. Furthermore, as discussed earlier, the systems that are of use are not just the official, routine systems, but also unofficial types of information processing that are an

important supplement for organization actions and cognition.

Secondary change could result in existing management and accounting systems being used to provide environmental information, allowing such systems to 'capture' green issues and remain dominant within organizational understanding and decision-making. Here accounting information practice becomes, and influences, the whole theory of environmental responses towards the environment - what can and cannot be done. It can also shut down outside understanding of such issues, fulfilling a vital role for the organization, and its survival (Power 1994). Alternatively, new systems of environmental information may emerge that are used without commitment and linkage to action, acting solely as a way of rationalising the greenness of existing corporate decisions.

At the intermediate change level, it is expected that the new environmental information systems play a much more constitutive role within the organization, seeking to establish the environmental message throughout certain areas of the organization. Here accounting and other information plays a number of roles including supporting green decisions, providing 'ammunition' for environmental supporters within the organizations, and even acting to introduce environmental management into day-to-day decisions. The 'ammunition' such information creates may be critical for creating competing views of green issues, especially when there is uncertainty over organizational objectives.

The incorporation of environmental information within the design archetype also creates new 'visibilities', and constitutes new organizational understandings. Such visibilities may strike at the core of the underlying organizational interpretative schemes, laying the pathway for the organization to follow a primary change track. Alternatively, the environmental information systems function in a more negative way, limiting the debate and environmental visibility of organizational operations, and reducing change possibilities back towards a secondary change, where business issues dominates. This would tend to happen in situations where environmental issues are tackled in a computational manner, and decisions are programmed, reducing uncertainty in an unrealistic manner. In such cases, accounting and environmental information functions as an 'answer machine', reducing environment management to a set of procedures and practices.

At the level of primary change, environmental information systems constitute or reflect the organizational view that environmental issues are vital. Here the culture of the firm is being changed in a fundamental way, whether this is caused by initial changes in the design archetype, or backed up by changes in the design archetype. Accounting and other environmental information systems play a vital co-ordinating role in revealing and presenting an ecocentric organizational culture.

7.4 Corporate Requirements for Environmental Information

From the analysis in this chapter the generation and use of environmental information appears to differ between companies. The theoretical model of organizational response to green issues (see Figure 5-2) predicts that environmental information is generated to fulfil a number of functions including: compliance with regulatory requirement, the operation of EMS, identifying competitive advantage, cost control, and to provide 'legitimacy'.

The environmental information (and accounting) measures used by each company are influenced by, and influence, the organizational and social contexts in which they operate. For example, UK environmental legislation appears to influence the professional bodies of knowledge used to control environmental management and information within the firm. Compliance with IPPC regulations requires companies to adopt the best available techniques (BAT) for controlling environment impacts (see chapter 4). The very implementation of the BAT concept increases the power of scientific expertise within the firm, expertise traditionally seen as subordinate to accounting knowledge and discourse within business decisions. Thus, environmental monitoring information, information and performance measurement may be controlled by, or influenced by, an 'environmental management unit' that includes both the scientific expertise function and health & safety functions of the organization. This process helps to explain both the role of 'expertise' in environmental management and why management accountants and accounting are relatively uninvolved with the provision of environmental information.

The remaining part of this chapter predicts the stages of environmental information provision within UK manufacturing firms. These requirements are split into three stages of information provision, and assume an increasing level of sophistication and coverage of environmental issues and environmental cost. A problem in devising these stages of environmental

information is that an organization may generate environmental information that is *not subsequently* used in business decision-making. This is something that can only be discovered in empirical investigation, but must be recognised here. The stages are exploratory in nature, and are offered as a mode of illustrating the level of information that each type of firm may provide. Table 7-5 applies these stages of environmental information provision to the typology of firms developed in table 5-3, and illustrates how environmental information and EMS are generated within each type of dominant attitude. The majority of environmental information will not currently be collected or directly used by the management accounting function, even though it could be captured by established accounting techniques and help control environmental costs. The three stages of environmental information provision will now be briefly discussed.

Table 7-5 Predicting The Environmental information utilised by Organizations

| | Inertia | Reactor | Defender | Experimenter | Mediator | Reparator |
|--|---|---|---|---|--|---|
| Dominant Environmental Attitude | Normal Business Attitude Comply with law if cost effective to do so. | Comply with law | Comply with law, but with additional 'green veneer' | Beyond Compliance where Win/Win applies | Green issues routinely discussed within all decisions and operations. Beyond win/win environmental management. | The truly 'sustainable' organization Green issues given priority over conventional business imperatives. |
| Form and operation of environmental management system | No EMS Management accounting information is the primary influence on decision-makers | No EMS, unless to supply legitimacy. Compliance monitoring system, remaining divorced from normal performance systems Management accounting information is the primary influence on decision-makers | ISO14001 or EMAS form of EMS system, but remaining largely divorced from most decision-making situations. Management accounting information is the primary influence on decision-makers. | ISO14001 or EMAS form of EMS. Used to identify win/win opportunities and other eco-efficient ways of doing business. Management accounting information is still the primary influence on decision-makers, but supplemented by EMS data in certain situations. | ISO14001 or EMAS form of EMS Used extensively within all financial and operational systems and decision-making. Green issues and information on a par with business issues and accounting information. | Totally 'green' management system that serves to put the environment before business issues. Covers all 'green' issues and areas, including the sustainability and the social costs of operations. Existing Management Accounting subservient to green management system |
| Stages of Environmental Information Required | Stage 1? | Stage 1 only | Stages 1-2 | Stages 1-2 | Stages 1-2 Stage 3 may be consulted | Stages 1-3 |
| Examples of type of information used. | Compliance monitoring if cost effective to do so | Compliance monitoring information. | Compliance information + ad hoc info to tackle "green" problem areas | Compliance + systems to identify the causes of environmental impacts which have financial costs | Information beyond win/win, environmental information measures reported and measured formally across the whole organization | Full life cycle analysis of all products, coupled with measures of sustainability of all operations |

Table 7-5 Predicting the Environmental Information Requirements of firms

7.4.1 Stage 1: Minimum environmental information and performance measures

The most basic corporate requirement for environmental information is to achieve compliance with environmental legislation. However, this assumes that all organizations will *actively* seek to achieve compliance with environmental legislation, an assumption challenged by the lack of regulatory enforcement of SMEs (see chapter 5). The decision to prosecute non-compliance is not clear cut, as the Environment Agency takes into account the corporations attitude and record on the environment (see Environment Agency, 2004). If the company is deemed to comply with the 'spirit' of the legislation it may escape prosecution. Institutional theory would suggest that one method of seeming to comply with the 'spirit' of the law is obtained by the firm producing 'legitimate' environmental performance measurements, even though such measures may not be used in decision-making. Thus there is a potential to see an organization as acting like an 'amoral calculator' (Kagan & Scholz, 1984), assessing and comparing the possible economic costs and savings from not ensuring legal compliance. Cross & Stapleton even suggest firms (1994) have a 'regulatory budget' implicitly devoted to compliance, rather than performing a cost-benefit analysis of compliance with each individual regulation. Whilst this "amoral" calculator trade off process may take place in certain types of organization because of the lack of regulatory enforcement, such actions may not be available to organizations with high 'environmental visibility' (see chapter 5).

Despite these concerns, it seems reasonable to assume that the majority of United Kingdom organizations will, at a minimum, compile environmental information concerned with their legislation compliance performance even if its only purpose is to ensure that the minimum legal standards are being met (see chapter 4). Compliance with UK environmental protection statutes increasingly requires UK manufacturing organizations to provide environmental information and monitoring data on many activities. Whilst the form of this 'compliance reporting' varies and is unpublished, it provides a key source of environmental information within every firm. Measurements obtained as part of the compliance process will obviously be non-financial and highly scientific in nature, specifically tailored towards identifying and measuring the quantity and chemical content of all emissions and discharges in order to provide an audit trail for the Environment Agency (see Mistry & Dowling, 2002). Thus, under current UK legislation the bulk of the environmental information that the firm is required to maintain can be characterised as regular monitoring of emissions across all types of

environmental media. Such self-monitoring is imposed by the Environment Agency on certain authorisations and licences to operate, and automatic monitoring systems are increasingly used to reduce the total costs of data collection (Feates & Barratt, 1995).

The findings from the case material suggest that management accounting plays no role in the actual measurement of compliance with legislation targets, as all of the information is non-financial, highly scientific and is collected electronically as part of EMS. Whilst there was a recognition that monitoring information *could* be adapted into an accounting system that traces emissions and compliance costs throughout the plant in order to identify problem areas and charge overhead to those cost centres or products causing them, it was believed unnecessary. The cost involved in setting up such an accounting system was perceived to be prohibitive, but there was also doubt that the information obtained would actually aid management. The potential of accounting to be involved in environmental information was much greater during the appraisal of certain capital investment opportunities, as the environmental benefits were used to help justify the decision to invest. However, when new technologies were needed for legal compliance, the role of the accounting function was limited to simply budgeting for the capital expenditure.

Stage 1 level environmental information should be generated by all the companies in table 7-5. However, the 'inertia' firm may decide that non-compliance is the most cost effective option until regulatory penalties become too high.

7.4.2 Stage 2: Beyond Compliance: Win/Win and Defensive Objectives

Apart from the inertia attitude firm, all the firms in table 7-5 will actively manage their environmental impacts, and require the generation of environmental information that goes beyond the simple compliance data of stage 1. At this stage companies will require environmental information that identifies problematic aspects of operations and areas where economic cost saving and environmental improvements can be jointly obtained in win-win projects. Thus, information provision at stage 2 is orientated towards revealing linkages between environmental and economic efficiency. Such information is normally obtained by supplementing existing quality management systems with new EMS, to systematically monitor and manage environmental impacts. Stage 1 information can be used as the basis for the information collected by EMS, but provides largely non-financial environmental information

on all operational impacts, performance against environmental targets, procedural information on handling environmental waste etc.

As was discussed earlier in this chapter, the management accounting literature is replete with calls for using established and 'environmental-modified' management accounting techniques to provide environmental management information on costs and impacts. The potential for such techniques to supply stage 2 environmental information appears much greater. Organizations may already be producing 'environment-related' information and reducing their environmental impacts as an indirect result of actions taken to measure and manage waste, energy, and product quality in manufacturing processes. Thus environmental improvement can be an 'invisible' by-product of existing systems that reduce costs and increase product quality. Whilst these information and management systems, such as accounting and total quality systems, are not called 'environmental', their information can be used to manage environmental issues as part of normal business efficiency. Similarly, environmental management information is needed that reveals the joint, but largely 'invisible', environmental improvements and problems that accrue from investments in AMT (see Bromwich & Bhimani, 1991). For example, although waste products from AMT production could be lower in total volume, they could be more harmful towards the environment (see Baker, 1996).

At stage 2 firms may also require information about environmental demands by its customers, the environmental impacts of its suppliers and the environmental costs of its competitors in order to defend and exploit its competitive position in the market (see chapter 4). In summary, at stage 2 the requirement is for environmental information that promotes eco-efficiency within business operations, in order to construct a 'truly' 'balanced scorecard' of performance measurement for decision-makers (see Kaplan & Norton, 1992).

7.4.3 Stage 3: Beyond Win/Win: Towards Sustainability

At stage 3, the company seeks to generate comprehensive environmental information regarding their impact on the natural environment. Utilising this stage of information provision would be the 'Mediator' and 'Reparator' types of organization seeking to reduce the total level of environmental impacts. However, the Reparator would give priority to such information on sustainability and social costs in its decision making. Despite the presence of 'external' greening pressures, the majority of UK manufacturing organizations have not adopted

‘Mediator’ or ‘Reparator’ types of dominant attitude towards the environment. However, this does not mean that UK organizations will not generate stage 3 environmental information within the firm, just that it will not be used in most business decisions.

At stage 3, information will be generated that monitors corporate impact on the sustainability of natural environmental resources. Such information goes far beyond the confines of organizational impact on the environment, concerning itself with information regarding the whole life cycle of the product or service that the organization supplies. This could involve the use of life cycle costing and information on the full environmental cost of the product in terms of replacing the natural resources used and the impact of their original collection on future generations and the biosphere in general (Pearce, 1993a). It is beyond the scope of this present chapter to review the methodologies that could be used to provide stage 3 information, but as was highlighted in chapter 2, there is considerable disagreement concerning how the sustainability of business operations can be measured (see Bebbington, 2001).

7.5 Conclusions for Research into Environmental Information & Accounting

This chapter has highlighted that environmental information is being generated, processed and used in a variety of ways depending on upon the specific organizational and social contexts of the firm. However, the extent of this within UK firms, and how it is influenced by the attitude of the firm is inadequately understood.

Despite the alleged failures of traditional management accounting to provide relevant information on environmental issues, evidence suggests that the ‘new’ environmental information generated by UK firms is largely non-accounting and non-financial in emphasis. Accountants seem to be uninvolved in the management of environmental issues, unless these issues can also be defined as part of normal business efficiency e.g. energy management. However, even in these situations, managing accounting does not seem to be reaching its full potential, leaving the management of such issues to environmental or production functions within the firm.

The next chapter uses the range of theoretical models devised in this thesis to interpret case study empirical research into the role of management accounting within the development of environmental management initiatives.

Chapter 8: Empirical Case Studies and Findings

8.0 Introduction

This chapter provides the results of three main case studies and a further preliminary case study of empirical research investigating the role of management accountants in the general development of environmental management initiatives within UK manufacturing organisations. The array of ‘skeletal’ theoretical models developed in chapters 4-7 are applied to, given meaning and ‘fleshed out’ by this empirical evidence. Furthermore, the case study evidence will be used to accept or reject the six general hypotheses developed in chapter 5. The analysis commences by reviewing the findings from a preliminary case study undertaken by the author.

8.1 Preliminary Case Study: Cobe Laboratories Ltd

This preliminary case study was set up to highlight the potential role of the management accounting function in the development of a corporate environmental information system. In contrast to many of the interviews used within the three main case studies, the Cobe Laboratories interviews were only documented using notes and not recorded on tape. As the case shows, the organization’s management accountant had no input into the initial design of the EMS, and neither did he supply any managerial expertise during its implementation. This contradicts the argument within the professional literature that management accountants have a knowledge base and expertise that can be used to manage any business related issue or crisis, and that accounting should evolve into an environment-related form of management accounting (see chapters 1, 3 & 7). In fact, environmental information from Cobe’s EMS has revealed new ‘visibilities’ on how to control costs and increase efficiency, insights that were largely ‘invisible’ within conventional management accounting information systems.

Cobe Laboratories Ltd is a medium-sized specialist UK manufacturer and supplier of medical equipment. Based in Gloucestershire, it supplies equipment to all parts of Europe, its largest market being Germany. As a direct result of the ease with which it implemented its ISO 9001 certified quality management system, the company used ISO 14001 as the basis for its EMS. The organizational manager chosen to design, implement and develop the EMS was the quality manager, Peter Trottman, as he was “the most

logical choice, due to the link between quality and green issues". The company did not possess substantial resources to devote to the EMS project, so Trottnan initially worked on it alone, with some assistance from the health and safety officer. Trottnan possessed a chemical engineering background and expertise, but no specialised accounting knowledge. Although personally ambivalent to environmental issues, Trottnan believed that the management process should aim to integrate environmental and quality issues into every organizational action that the firm took.

Using the firm's existing ISO 9001 quality management system as its basis, the ISO 14001 EMS aimed to raise the 'awareness', and to stress the importance, of environmental issues and cost in the minds of participants throughout the organization. The primary impetus behind the development of the EMS was the introduction of The Producer Responsibility Obligations (Packaging Waste) Regulations (see chapter 4). These regulations place 'polluter pays' obligations on businesses in the packaging chain to achieve target levels of recycling and recovery. Under these regulations, the disposal and recycling of packing waste became the legal responsibility of the supplier of the finished goods, not the consumer. Cobe manufactures a range of cardiovascular and blood cleaning treatment medical equipment. Such equipment has traditionally required large amounts of packing in order to guarantee that it is both ready for immediate use and that it is also sterile when it reaches the customer. Because of the high levels of packaging within its products, Cobe regarded the new packing regulations as generating substantial compliance costs, and wanted to introduce immediate changes to its manufacturing and distribution processes in order to minimise them. Whilst the regulatory changes provided sufficient incentive for Cobe to develop some form of EMS, it did not, in itself, justify the extra cost of developing an EMS certified as complying with ISO 14001.

A vital 'external' pressure for the development of an *certified* ISO 14001 EMS at Cobe was that an increasing number of customers wanted evidence of supplier commitment to environmental management. Cobe sold most of their products to medical companies, various hospital trusts and health services across Europe. Customers based in Germany were increasingly asking Cobe about the environmental quality of their products. In addition, Cobe was also facing environmental questioning by public institutions that were part of the UK National Health Service. Cobe saw that the development of certified EMS

could see the company retaining existing customers and also having the opportunity to attract additional customers. ISO 14001 certification of the EMS would provide evidence of Cobe's environmental 'legitimacy' to customers and other outside interest groups. Ultimately, the use of ISO 14001 EMS during manufacturing operations provides customers with an extra and desired product characteristic at no extra cost, as Cobe products could be viewed and marketed as 'environmentally friendly'. For the company itself, early leadership in the development of an EMS would give it a vital short-term "competitive edge" over its main European competitors.

Certification of Cobe's ISO 14001 EMS took approximately nine months to complete. However, during the development and implementation of Cobe's ISO 14001 EMS, the management accounting function played no role, other than to provide access to financing for the project. However, more recently, the head of management accounting has taken a small, but active role within environmental management by leading one of the 'environmental teams' that meet to discuss environmental issues and problems. There are three of these teams, which are cross-functional in their membership, involving production, sales, product design and general staff and management. Each team consists of three members, and is responsible for managing a certain part of the environmental dimension of the organization's operations. Areas of concern are divided into certain categories, which include: energy use; packaging directive; waste disposal; buildings; legal compliance; supplier development; water use; and employee awareness. Each team meets monthly, and Peter Trottman acts as overall co-ordinator for their actions.

The environmental teams at Cobe have recommended a number of operational changes to reduce environmental impacts and aspects. These often require substantial 'up-front' costs and investment, but the management accounting function had not yet vetoed any of them on grounds of cost. For example, the firm has spent considerable time and resources seeking to develop ways to reduce the amount of packaging that is dispatched with its finished goods. Management and the accountants have recognised that "meeting the environmental regulation head-on" can generate cost savings and supply greater levels of value added for customers. However, such cost saving opportunities were previously rendered 'invisible' under the information provided by the conventional management accounting systems. Thus, the Cobe management accounting systems did not cover all

aspects of the firm's cost structure. It has taken a regulatory response to actually force the firm to consider the full array of its cost drivers and costs. A management system introduced to solely manage the environmental dimension of the firms operations is now seen as a fundamental part of the firm's management information systems. Furthermore, the cost savings and process improvements are not a "one-off" improvement, but are part of an ongoing and incremental process of adjustment. One distinctive characteristic is that the EMS at Cobe are seen as part of "efficient management", rather than a genuinely "green" system of management. This suggests that aspects of environmental management should already be within the remit of management accountants as part of their alleged ability to measure and manage efficiency with the firm. It also suggests that EMS are not being designed to focus on the management of 'truly green' issues, such as the sustainability use of natural resources and the measurement of social cost externalities.

Evidence at Cobe Laboratories suggests that environmental management is being turned and tuned into a simple quest for greater levels of business efficiency and competitive advantage. At Cobe, the organization was not promoting the EMS as a system designed to help the environment, as Peter Trotman explained during a Gloucestershire Green Business Club presentation that was taped:

'We do not sell the concept as an environmental one, but as a total business initiative which is focused clearly on serving the customer. It has nothing to do with environmental management. It is just sound business sense'.

The EMS project has resulted in greater levels of cost control, and reduced the use of materials and energy. Within Cobe's market, the customers, normally hospitals, are extremely price sensitive. As a result, it is vitally important for Cobe's tender documentation to be competitive. Normally, the management accounting function should be able to fulfil this need by supplying accurate cost data. However, it seems that because of the special nature of Cobe's products, coupled with the newly introduced packaging regulations, the management accounting function did not supply an 'appropriate' level of cost and non-financial information data for managerial decision-making and cost reduction purposes. It took the development of an entirely new EMS in order to supplement the deficiencies apparent in conventional management accounting information. Once these deficiencies were discovered, conventional management accounting information did not have to change. Instead, corporate management, including

the management accountant, could use their 'awareness' of environmental issues and the environmental information generated by EMS to improve decision-making.

8.1.1 Applying the Skeletal Theoretical Models At Cobe

'Corporate greening' at Cobe can be explained by a number of the theories contained within the 'envelope of greening' from chapter 4. The adoption of 'green' EMS allowed the company to achieve external legitimacy, increase both its 'green' and 'non-green' effectiveness and retain access to its customers.

Cobe was a 'small' business that produced products with relatively few environmental impacts. In addition, it has not been prosecuted for its environmental performance or received media attention for its adverse environmental actions. As a result of these factors, Cobe exhibited a relatively low 'environmental visibility', and did not face 'external' pressure for greening except from regulatory pressure and certain customers.

The primary 'external' pressure for greening surrounded managerial 'worrying' about the introduction of new environmental regulation that posed a number of operational issues for a packaging intensive manufacturer like Cobe. However, this 'green' legislative pressure on the firm was increased by 'environmental questioning' from customers. As a result of these pressures, Cobe required additional information on its environmental aspects and impacts, and needed a way to demonstrate its environmental credentials to customers. The solution to these pressures was to adopt an institutionally accepted form of management system, ISO 14001, which was already widely used in UK industry. An incentive for this solution was the way that it offered the firm the ability to enact its 'environmental visibility', retaining customers and reducing the possibility for future 'external' pressure for greening.

In terms of the internal catalysts and filters for greening, the small size of the organization acted as a 'filter' for greening, since it restricted the initial amount of financial and management resources that could be devoted towards environmental management. However, once the EMS and the environmental manager had helped to reveal cost savings, the company accountants were willing to commit further resources to environmental management projects.

Another internal characteristic that influenced ‘greening’ was that Cobe’s environmental management structure built on its existing ISO 9001 quality management systems, and involved its quality manager. The managerial experience gained from implementing this prior ISO 9001 management system gave Trotman something to “work with” during his implementation of EMS, and provided an existing structure of systems and procedures that could be adapted from quality to environment management. This commonality is something that ISO and BSI intended during the design of the ISO14001 standard for EMS:

‘This international standard shares common management system principles with the ISO 9000 series of quality system Standards. Organizations may elect to use an existing management system consistent with the ISO 9000 series as a basis for its EMS’ ... While quality management systems deal with customer needs, environmental management systems address the needs of a broad range of interested parties and the evolving needs of society for environmental protection’. (BSI, 1996a, p. 4)

However, aside from their specific focuses, a fundamental difference between the systems is ISO 14001’s requirement for setting targets, objectives and continuous improvement. Whilst ISO 14001 “does not establish absolute requirements for environmental performance beyond commitment to compliance with applicable legislation and regulations” (BSI, 1996a, p.3), such EMS should provide a:

‘structured process for the achievement of continual [environmental] improvement, the rate and extent of which will be determined by the organization in the light of economic and other circumstances’. (ibid, p.9)

In interviews, Trotman did not provide specific details of the objectives and targets of the EMS, but he did say that the priority was reducing the packaging included in products. This organizational commitment to environmental targets and improvement has the potential to influence organizational actions throughout the firm, but could not be explored in this case due to the restricted level of organizational access. It is an issue that will be explored more fully in the other case studies.

Another prominent internal ‘filter’ for influencing the approach to EMS was the limited availability of corporate resources. However, once the ‘value’ of environmental management had been proved, it was given extra resources and became a vital ‘support’ system of managerial information within decision making. Although its scope did not cover issues of sustainability and environmental externalities, awareness of ‘efficient’ environmental management permeated across functions, and promoted dialogue between

disciplines at monthly meetings. The management accounting function was not involved in the EMS, and its existing information was found deficient for decision-making. Evidence was not available about how the management accounting function perceived its role in environmental management, but it was clear that the accounting function had *not* started to produce an environment-related form of management accounting information. According to Peter Trotman, the head management accountant was now much more aware of how environmental and quality issues impacted on costs and competitiveness, but it was the EMS that generated the environmental information necessary to supplement deficiencies in the company's cost accounting data. The actual environmental information generated appeared to be non-accounting stage 2 information (see chapter 7), and allowed the company to identify win/win opportunities. Due to limited access, it was not possible to identify the range of roles this information was used in decision making

The level of organizational 'greening' at Cobe does not appear to have changed the interpretative schemes of the company, so appears to be 'secondary in level. 'Greening' change was primarily motivated by a need to 'serve the customer' rather than to protect the 'environment', and was originally seen as an extension of quality management at the firm. The dominant environmental attitude at Cobe appears to match the 'experimenter' type of firm (see chapter 5), as the firm is actively seeking opportunities to identify win/win improvements that reduce environmental impacts and costs, rather than merely adopting a 'defender' type attitude towards environmental pressures.

'Greening' change at Cobe appears to have followed the secondary 'reorientation' track of change. The design archetype of the firm has altered to include the EMS, and this new environmental information has created new 'visibilities' about business efficiency and the control of cost. Whether this 'green' information has the potential to cause 'intermediate' level greening, and create a fundamental commitment to a 'greener' corporate culture is not possible to identify due to the restricted access to organizational participants. However, if the attitude of the environmental manager was an indication, management of 'green' issues appears to be seen as a way of securing competitive advantage through the systematic elimination of unnecessary operational costs.

8.2 The Case of Iceco

The first of the main case studies was the Iceco ice cream manufacturing factory in the West of England. The Iceco site used to be part of an independent UK company, but in 1981 merged with Unifood, a large multinational European food group that is listed on the London Stock Exchange. Unifood has operations throughout Europe and the rest of the world, and manufactures a wide range of different food products. Unifood has a group-wide policy on environmental management, which is as follows:

Environmental management at Unifood

All Unifood companies must comply with local laws and adopt the same standards for occupational health and safety, consumer safety and environmental care.

Our environmental management systems are designed to achieve continuous improvement and are based on, and compatible with, ISO 14001.

We are committed to eco-efficiency – improving the environmental efficiency of our supply-chain operations, and to eco-innovation – incorporating environmental factors into the design and re-design of our products.

We base our approach on environmental science and use techniques such as the life-cycle assessment of our products to gain understanding of where our main environmental impacts lie.

We interact with an extensive group of people outside our organisation and aim to work in partnership with our key stakeholders.

The UK site was run by a general manager, and was divided into the factory itself, and three departments directly controlled by the Unifood's head office. These are the product development department, the accounting department and a selling department. The factory was split into the following departments: manufacturing improvement, manufacturing quality, personnel, technical, commercial and a logistics group. Within this organizational structure, there was no specific 'environmental' function, since responsibility for environmental management was given to an environmental steering group comprised of managers from the technical and quality departments of the factory (see below for further details of this group).

One of the critical influences behind the introduction of Iceco's EMS was its Unifood parent, which perceived a need to demonstrate the environmental responsibility of the company through its 'world class' management systems. It was believed that an externally audited and certified EMS system was the appropriate way to demonstrate environmental management to society:

'I would think, at board level, the introduction of ISO14001 was considered because Unifood does take, I think, a very responsible view towards the environment. And there is, as it were, a debate that says: should you have an externally audited system as opposed to an internal one; and is there a difference in credibility. This site three years ago, had a site general manager who really had the view that the site was to be world-class - and world-class meant world-class in everything - and was prepared to take on the 14001 challenge as a lead site for Unifood'. (EM1)

Thus, the Iceco site general manager's belief in making all aspects of management 'world-class' acted as a major impetus behind the original development of the ISO 14001 EMS at the factory. The company and its European parent were acting as environmental leaders in the development of corporate environmental management initiatives within the UK. One way to demonstrate this 'green' attitude at the site was to harness the powerful influence of the media:

'Safety, health and environment can almost be seen to be assumed start points that we've got those things right. We can't risk them, what was the nature of the press. (EM1)

'I was talking to somebody in the press last week, and he wrote a very encouraging piece about our EMS achievements here at the factory'. (EM1)

'Sadly, the world only listens to over the top statements [from environmental pressure groups]. Then hopefully, people are educated and responsible enough to interpret what they hear'. (EM1)

'As you know, we have hosted two open evenings here at the plant for members of the Gloucestershire Green Business Club. In fact, Unifood actively encourages the factory to promote its environmental management programme and achievements to the local community. It helps to show that we, as a company, are more than just talk and 'hot air'. (EM1)

The costs of implementing environmental management were seen as minuscule next to the positive public relations benefits of possessing an EMS. Iceco was one of the first UK food factories to implement an EMS, and used its existing ISO 9001 quality management system as the basis for introducing an ISO 14001 certified EMS:

'Very few food companies have taken it [an ISO14001 EMS system] up. And, we had already got ISO 9001 [quality management system] with the Lloyd's Register and we elected to go to Lloyd's again to meet 14001; I think they were also very interested to be involved with a food company so we worked very co-operatively to establish the system'. (EM1)

According to the environmental manager, the development of the ISO 14001 EMS took "about a year", with the site chief engineer given responsibility for "driving it on site" with "no involvement from site accountants". The environmental 'steering group' now has responsibility for the EMS, and the following membership:

'The number of people on it now are four; there's the environmental manager (that's myself). There's the environmental co-ordinator, who is also our site safety co-ordinator. We have a site services technician who looks after particular auditing and waste management; and we also have on the Steering Group the site quality manager because he's the one manager in that group who is on the site operations team, and he also looks after 9001'. (EM1)

The membership of the EMS Steering Group is indicative of the strong link between the management of quality issues and environmental issues at Iceco; for example the site quality manager, responsible for the ISO 9001 quality system, is a member. The present environmental manager at the site was chosen because his professional expertise matched the main environmental impacts at the site. He is a professional engineer, and most environmental impacts at the factory come from energy usage or emissions, and fall neatly into the role already performed by him as the site services engineer:

‘We did look at the impacts they’re mostly in forms of energy usage or emissions and therefore they fall quite nicely into the role of the site services engineer; they also call me the senior services engineer. I may be called the site environmental manager, but I am here, first and foremost as the site service engineer’. (EM1)

Irrespective of his engineer expertise, the environmental manager possessed a strong personal belief in the need to protect the environment:

‘You’re speaking to somebody who has a real commitment to environmental issues. If you were born before the war, brown paper were the only thing you got things in and you kept all the brown paper bags, and survival in those days actually made you quite environmentally aware. We knew what smogs were like and we got coughs and that’s daft. So, you can see that a good environment makes good sense’. (EM1)

He believes in the value of his organizational role, and acts as a powerful ‘environmental champion’ for the use of EMS at the site. He even had his own “pet project”:

‘I’m particularly keen on one tackling one issue at the moment. It is my sort of pet project. We are looking to reduce the amount of effluent that we put out, significantly. So we are pushing along a new approach to managing trade effluent which will help to measure trends. But we have only just literally, put that out’. (EM1)

The activities of the site-specific environmental steering group were supplemented, once a quarter, by a meeting of the safety, health and environment group (SHE) which highlighted SHE issues originating from head office at Unifood. At this point it is important to mention that no member of either the SHE group or the environmental steering group were site management accountants.

Although the Iceco factory implemented its own site-specific ISO 14001 EMS and set its own environmental targets and objectives, it required, and still requires, specific assistance from its Unifood parent in order to assess the total environmental impact of factory operations. For example, packaging had to be purchased from group-owned suppliers:

‘Packaging was a difficult one when we set out to do 14001 because it’s not really a site-based start point. We use the packaging materials that Unifood directs us to use, rather than that which we buy for ourselves. So, when we worked up our management system, we had to involve the packaging group at

head office, because we always wanted to be satisfied that this was a properly-backed management system all the way through. What we now do, is we involve the packaging group on the quarterly meeting as part of our management system to keep us aware of what is happening in environmental terms'. (EM1)

During the implementation of the EMS, sixty-six significant environmental aspects were identified at the site. For example, surface water was especially problematic:

'Surface water used to be quite difficult but we've done two things. One, is we paid a penalty and discharged it through trade effluent; but the second thing we're doing is going to re-use the water, so we won't incur the cost to effluent and we'll save on more water'. (EM1)

This problem was tackled in a typical manner, with the environmental manager putting a specific project appraisal solution to the site accountants:

'We did a cost/benefit capital proposal. The project proposal asks how much would the solution going to cost, and what are the attendant running costs, and then what are the savings. Then the accountants did a DCF and see what its return will be'. (EM1)

This project, like any other at the site, had to "stand financially, unless there was a specific piece of legislation demanding it" (EM1). Non-financial environmental, safety and strategic benefits could be used as a "strategic summary" to support such projects, but the environmental manager thought that the site accountants were now "jaundiced about such claims" and were generally discounting them unless the project was close to meeting its hurdle rate:

'I would honestly say that the accountant would first of all be quite hard-headed and look at on its cost/basis, but there are some things you can frighten people into doing. So, it isn't always just totally a cost case. I mean, if I'm going to say: you've got to replace something and the risk is that if you don't, you won't be able to produce for a whole month, then you frighten them'. (EM1).

A month before the case study commenced, Iceco had an external audit by Lloyds of its ISO 14001 EMS, and the auditor identified that Iceco was not fulfilling the pledge in its EMS to identify the root cause of every environmental incident at the site. The environmental manager explained why this was happening: ✕

'My own view is that folk who are associated with an incident that might be, for example, a spillage, aren't actually reporting it fast enough for us to manage it. And that really is a management weakness'. (EM1)

'It's not catastrophic. However, we have a management system that says we shall investigate issues - and we didn't demonstrate in their [the auditors] view, sufficiently well that we had. We've now taken steps to improve that'. (EM1)

To the environmental manager an external audit of an EMS was necessary to provide external 'legitimacy' of the system:

'If we audited the system internally, a member of the public could claim - cover up'. (EM1)

The environmental manager saw his primary role as educating organizational participants into developing an awareness of believing that better environmental management would 'pay its way' financially:

'I'm quite happy to feel that I can go and ask my colleagues to be a bit more diligent. It really is a case of saying: better management would pay its way'. (EM1)

'We try and make it as much routine to the manufacturing teams as it is just second nature'. (EM1)

However, the environmental manager regarded the current accounting system a direct hindrance to environmental management as it penalised departments for voluntarily reporting environmental problems to his management function:

'From a financial point of view, for example, the development department had been responsible for quite a considerable loss of chocolate. Because they have a different budget, the factory was able to go to them and say you were responsible for losing us £x-hundreds worth of chocolate, will you please reimburse us. Which they did. I would have said otherwise; the fact that they probably did not declare it because they didn't want to be told off for it'. (EM1)

Instead of financially penalising departments for reporting environmental issues, the environmental manager wanted the site's EMS to foster a 'no blame' culture that encouraged departments to report specific environmental problems and impacts.

'We would like to feel that we have a no blame culture that we are trying to have on site, because no blame cultures help you to identify where problems are and then you can create some improvement but that is still very much a developing culture change. That isn't done overnight'. (EM1)

To Iceco, implementing an ISO 14001 EMS seemed like a logical extension of their existing ISO 9001 certified quality management system. Furthermore, the environmental manager had not had a chance to even consider the alternative EMAS standard on EMS:

'We had ISO 9001 some years before, and it struck us, I think, that it [an ISO 14001 EMS] was a logical development on that. And, well, let's put it this way, I haven't really had to stop and consider EMAS'. (EM1)

However, the environmental manager saw that a fundamental difference between EMS and ISO 9001 quality management systems was the requirement for EMS to include targets for continuous improvement. Iceco's EMS incorporated the concept of continuous improvement, setting objectives and targets for environmental management at the site:

'We are required to have objectives every year within our management system, and these will set targets generally seeking reductions or changes'. (EM1)

At Iceco, site management appreciated the costs of failing to comply with environmental legislation, even without a dedicated EMS:

'We already recognised that there was a cost of not complying and so we had systems in hand that said. ISO 14001 didn't move us terribly far from where we were, except to document things better'.

However, Iceco do not formally measure the compliance costs associated with meeting environmental regulation, leaving them as part of site general overhead. Although Iceco had introduced an activity-based costing (ABC) system five years previously, this was not used to trace environmental regulatory compliance cost or the running costs of the environmental steering group to products and cost centres:

‘We don’t really do this. We do not uniquely use ABC in environmental terms, but we do for utilities and the energy users’. (EM1)

The environmental manager believed environmental regulatory compliance costs and other types of environmental costs could be traced by the ABC system, “but it’s not normally worth it for such a small amount of cost” (EM1). However, the cost of disposing of trade effluent was merely treated as a general overhead, and was not included in the budgeting system at Iceco. This was seen as a specific problem by the environmental manager, since it did not encourage site operators to ‘take care’ of the effluent problem:

‘I would like it to because the best way of getting an operator to take care is to show him what it costs and hold him to it. So, we are trying in the common areas to get metering of quantities into local budgets. I think that will come but it isn’t with us yet’. (EM1)

Although this issue is something that the environmental manager had not specifically raised in discussions with the management accounting function, he was worried that the cost of the monitoring equipment would prevent the idea of including effluent disposal costs in specific operational budgets:

‘We haven’t had a formal meeting [with the accountants] as such. One of the problems would be, I think, the cost of the additional metering and the maintenance of that metering equipment’. (EM1).

Effectively, the accounting function were happy to leave the monitoring and measurement of effluent to the environmental unit:

‘They’re reasonably happy that somebody like me is monitoring it because I use monitoring and targeting, and keep my finger on the pulse’. (EM1)

‘However, It’s difficult to pinpoint it to say a team within a group. I mean, we might be able to say that the factory is split up into two areas. Within those two areas there may be eight teams, running round the clock so that could mean between 35 and 40 groups of people. I cannot easily attribute all the consumptions or sources of waste to all those groups.’ (EM1)

‘We do know, in waste terms, because we do have a monitoring system on waste, where distinct teams associated with a manufacturing line will measure their waste, and they are responsible for that. I’m not really responsible, as the Environmental Manager, for the waste’. (EM1)

The Site Services Technician (referred to as SST1) suggests that accountants are very interested in the control and management of manufacturing waste, but “are not a bit

interested in the environment, just the cost of the waste and its disposal cost to landfill” (SST1). In fact, the EMS information on waste and energy consumption has helped to improve the ABC system, and allowed benchmarking of the cost of electricity used to make a litre of ice cream:

‘They [the accountants] will compare, for example, the electricity for every litre of ice-cream we make with our sister companies on the continent. There's lots of internal benchmarking taking place in that type of area’. (EM1)

Site accountants would equally welcome the ability to accurately know where the trade effluent was being generated in the factory:

‘It would be useful to the accountants. We have to make a guess as to where the effluent is being generated. They have a reasonable handle on the waste that is weighable, measurable and local. But trade effluent waste goes down a pipe and then it meets up with lots of other wastes, so it's only at the very end that you get your broth and can measure that’. (EM1)

This knowledge of cost causality would give the accountants the ability to allocate and apportion the environmental cost of effluent into operational budgets, something that even the environmental steering group only had partial knowledge of due to the way that effluent was caused in the factory. The site services technician stated that projecting waste in each functional area was problematic:

‘with the help of Unifood we now have a better understanding of the processes that create the most effluent, but considerably more work is needed before we can make projections of effluent created per ice cream product produced.’ (SST1)

In order to improve waste management, the site services technician thought that Iceco needed to invest in extra monitoring equipment. At the site, waste as a percentage of product inputs was a considerable cost to Iceco:

‘One per cent of waste is worth about a £1M, and we'd like to stay less than 3% - that's a lot of money. And we have been in the past rather higher than that, so we are really working hard at that.’ (SST1)

The operations of the EMS and the steering group were helping to manage and reveal critical information and ‘visibilities’ about this vital part of the cost structure at the factory, something that conventional management accounting seemed to inadequately manage. However, even the EMS was failing to adequately assign the cause of trade effluent waste due to the lack of monitoring equipment and the way that waste streams were created in the factory.

While the cost control of certain types of waste was a specific problem at the site, energy management seemed to be under control. The ABC system made it possible to ascertain which lines used most electricity and had the greatest “environmental impact in terms of

energy” (EM1). Even before the present ABC system was introduced, the control of energy costs was highlighted in the budgets as a separate cost:

‘We had been pretty conscious in energy usage because we've always shown it as a separate budgeted cost. To my knowledge - certainly since the mid-70s, and probably before - certainly in 1990 the view of our Technical and Site Director was energy is almost certainly going to cost more rather than less with time. Therefore, it must be our policy to use less of it’. (EM1)

However, energy costs at the site were a small fraction of total costs:

‘It is actually a very small [percentage of total cost]- I mean if we were glass or steel manufacturers, energy would be seen to be a very high cost but on £260M-odd sales, our electricity is £1.7M and our gas is about £¼M - that's very small’. (EM1)

Whilst the energy costs of each cost centre were included in the local budgetary system, these costs were effectively managed and monitored by the environmental manager, not the accounting function. However, the future of energy management at the site was unclear, as the current environmental manager was about to retire. In the opinion of the environmental manager, the relatively small magnitude of energy costs made it ridiculous to have both environmental management and the accounting function involved in energy management. However, he was unsure what would happen upon his retirement:

‘I'm not sure - it depends on, for example, when I retire (which will be next year) how will they [the accounting department] deal with things- will they just take it all into the accountancy function anyway? I mean, 'cos I negotiate [the energy bills with suppliers], I pay the bills; they don't worry about those things; do they really need to have somebody on my salary doing those sort of things? Up to now, I think they see it as being an advantage but I think a lot will depend on when I go how they want to replace what I do - I don't know’. (EM1)

Thus, the accounting function appeared to see the delegation of energy management to the environmental manager as a way to enhance the control of such costs. The management accountants might ‘bolt’ this activity on to their existing duties, but only after the environmental manager showed them the utility and cost savings that could be obtained through better management of energy costs. This appears to be a good example of the environmental manager, along with the EMS, revealing ‘visibilities’ about the efficient management of energy costs that management accounting could not hope to achieve alone. As the environmental manager at Iceco acknowledges, many of the roles of environmental management at the site could be slowly subsumed into the management accounting function as they become more routine and certain. As environmental uncertainty is reduced, the value of environmental information is revealed. Whilst there is a definite potential for management accounting to takeover environmental management, it was assumed that the two functions would coexist alongside each other:

'They could do. I mean we, as engineers we thought that we displace the accountant completely because they are a waste of time in that, in theory, you ought to be able to put up your case and if the sums came out right, you get on with it. But that doesn't work out either. I believe it would be more likely in our organisation that folk will accept environment as they do safety as they do quality, and it just becomes a part of life'. (EM1)

'And, you don't necessarily have an ABC focus on things. And it's a food company, you can't afford not to have quality. It's an overhead that's got to be there; health - you can't poison people; you can't afford not to have it. Environment, with things like GM foods, BSE, big public concern. I think the company will still evolve on the environment and make it routine'. (EM1)

To the environmental manager, many of the site improvements made through implementation and operation of EMS were simply part of general management, rather than 'real' management of the natural environment.

'I put it down to general management. We wanted to do it anyway. It wasn't really environment. The fact that we attached it on to environment means that it is something that is controlled by a management system, that's all'. (EM1)

Despite this, the EMS encouraged awareness of environmental issues into many different kinds of decisions that would previously have ignored them at both group and site levels:

'I think we have certainly sown seeds of concern for new products because of environmental issues and Unifood's own life cycle costing. If you are going to use chocolate, you ought to consider where you source it from because if it's from West Africa, that's indigenous; if it's from the Caribbean, it's not. And the environmental impact between the two can be quite significant'. (EM1)

'In terms of on-site, folk are required to fill in an environmental statement about any intention to spend money on capital, and that's therefore meant to be an opportunity to say, well look, you have to stop and think about it. You can see that rubbing off, people say 'we are going to try and avoid a clean - it saves the water'; 'we are not going to use chemicals'. They are beginning to use environmentally attuned practices. It does rub off yes. That's drip feed.' (EM1)

At Iceco, "environmental awareness is very important" and is now "part and parcel of efficient management" at the site (EM1). This awareness of environmental issues was apparent in all the conversations and interviews that the researcher had with various members of the production teams at the factory (each distinct member is referred to as PTM and a number). However, control of certain 'environmental impacts', such as waste ingredients and energy usage, were heavily controlled and measured long before the introduction of EMS at the site:

'As part of our cost sheets [for a shift] we are given an allowance for wasted ingredients. We have always been told this'. (PTM1)

'We have an idea of the standard yield from each of our ingredients, but waste products can be generated by operating error, machine breakdowns and defective ingredients'. (PTM2)

'We have a procedure where one of us turns off all the machinery at the end of the shift. This saves money for the firm. It is something I have got used to doing, and even do it to my lights at home. (PTM3)

Despite these existing controls over environment-related issues, the influence of the EMS and the environmental steering group was readily apparent in the environmental awareness of the production staff, and was used to motivate them:

‘At a meeting he [the environmental manager] told us that for every pint of beer that we buy the brewery uses eight pints of water, or if they are good, five. He asked us what we can do for ice cream. If we save money on water by using the hose less, some of it is donated to a charity. It is now a challenge between teams’. (PTM1)

‘We got training about environmental procedures in the factory and what we can and cannot shove down the drain’. (PTM4)

For one of the production managers at the site (referred to as PM1), environmental management was not seen as anything new:

‘Environmental management is simply quality management by a different name. Our staff are trained to reduce waste and energy as a matter of course, and if you wish to call that environmental management so be it’. (PM1)

The Quality manager at the site (referred to as QM1), who was both a member of the environmental steering group and the manager responsible for the ISO 9001 quality management system, also saw the importance of environmental management at the site:

‘Environmental management is simply an extension of what we were already doing with our ISO 9001 quality system. We must produce a world-class product, that excels in quality but doesn’t harm the environment’. (QM1)

Whilst he saw quality and environmental management activities as being mutually supportive in most circumstances, there were potential tradeoffs between the issues:

‘We have found that improvements in production quality help the environment, by reducing waste. However, there can be trade-offs, say, by improving the packaging of the product to reduce transit damage. This improvement may require thicker cardboard which requires more fibre. We are still learning, but the link between environment and quality is there, and will only develop over time’. (QM1)

‘Food quality and hygiene is critical. Environmental issues can be of secondary importance. For example, if ingredients or finished product are spilt on the floor it is taboo to use them. They must be dumped on health grounds, even if it causes waste to the environment’. (QM1)

For the quality manager, the information from the EMS could even provide new ‘visibility’ on long-standing product quality issues at the factory:

‘It was only through the implementation of the EMS that we discovered one of the water pipes into the plant was being slightly contaminated by surface water. This was causing a slight aftertaste in some of the ice cream, and, no matter how we tried, we couldn’t identify it before the environmental aspect study happened’. (QM1)

In terms of the accounting view of environmental issues at the site, the head management accountant at Iceco was fully aware of the importance of environmental management at the site, and believed that he had a role to play in such initiatives:

'Unifood has a policy on trying to tackle these environmental issues and actively promotes its managers to consider these issues, but I think in practice what we've done here over the last few years, is we've had a number of managers with particular responsibilities to try and improve our environmental standpoint - and we promoted that --- locally'. (MA1)

The head accountant, who was CIMA qualified, was called the "commercial manager" for the site, which was corporate-speak for "managing all things accountable":

I'm responsible for the site's logistics, so all material movements, materials warehousing, labour planning, production planning especially, that's all of part of my parish. But, which is the thrust of making ice cream, in a sense. My department also looks after weekly performance reviews by production line of how well we're doing. The department also does capital monitoring and capital investment appraisal'. (MA1)

To the accountant, an important drive for environmental improvements came from the on-site managers agreeing to certain objectives:

'We have had personal agreement from the teams [that] we actively wanted to improve, for example, our water usage. We've said that we think we're a big water user at this site and we should reduce the amount of water we're using, and we'll make that public by linking ourselves up to Water Aid and making charitable donations, so that makes that one a bit public and gives us some targets to aim at'. (MA1)

In agreement with the environmental manager, the management accountant saw no need to compile a total environmental regulatory compliance cost for the site:

'We do not aggregate the total cost of meeting environmental regulations, and we wouldn't know how much it cost us to meet individual requirements, such as Severn Trent's'. (MA1)

'I'd rather trace them back to the drivers of the costs, but driving them back to legislation doesn't help you. It is only useful if you drive it back to an activity that you can influence. Because then, you can employ some management of that activity'. (MA1)

Instead, the management accountant wanted to examine the portion of 'environmental cost' related to utilities, and find a benchmark against which to make improvements in usage:

'I'd rather take utilities and say what are the activities in utilities which drive the cost. How we do compare against others in those activities. That gives us a benchmark to try and improve.' (MA1)

'You might be trying to meet environmental guidelines, but the way to manage through is to compare against others or compare against an industry norm and say, where should our level of activity be? (MA1)

Through the activities of the environmental steering group, the management accountant thought that benchmarking on utility usage was already happening at the site:

'I think we're doing it to an extent already. It's patchy because we are talking very generally, but in some areas we're definitely doing it. In other areas we probably haven't thought about it yet'. (MA1)

To the accountant, the motivation for doing this environmental benchmarking came from the initiative of specific managers at the site, rather than from Unifood.

I think in practice what we've done here over the last few years, is we've had a number of managers with particular responsibilities to try and improve our environmental standpoint. (MA1)

Although he did not know if such environmental management generated extra sales of ice cream, he valued the importance of its public relations role.

'I don't know if people eat more ice cream as a consequence. But I think its useful publicity, and it motivates internally. (MA1)

The Iceco management accountant saw that that the EMS 'picked' at the same drivers of cost as the ABC system that was used at the site:

'The two programmes [ABC and EMS] are focused on the same drivers of cost. I don't think one relies on the other. But I think they both are picking at drivers of cost, which is the important point. The issue of why do people undertake that activity? What drives it? ABC challenges it, so does environment management, on water, particularly'. (MA1)

Thus, for the accountant, the ABC system and EMS were to some degree mutually reinforcing in helping to reveal cost causality within the site. In addition, he saw that much of the information obtained by the EMS was operating data useful to any business:

'You don't really have to call it [the data from EMS] environment information, it could quite easily be collected by some other type of management information system'. (MA1)

Obtaining benchmark comparisons of cost was seen as a critical issue to the head management accountant:

'The factory is in two markets; if you like, it's in two positions. It's trying to sell ice Cream in the UK, battling against our external competitors. But it's also in the business of trying to sell Unifood ice cream across Europe. If we don't make it, one of the other Unifood factories will'. (MA1)

'So, I undertake some analysis to compare our costs with our competitors. We also undertake cost comparisons across ABC categories with other Unifood factories'. (MA1)

'You can get good benchmarks of other businesses in the world - so I can quite happily benchmark Unifood businesses on other sides of the world and it's professionally more useful to me because we're making the same products'. (MA1)

The majority of the benchmark cost data came from Unifood sites, and was invaluable since it allowed the accountant to visit factories to see how Iceco could improve its operations:

'I can get right into the detail. I can really understand it and if I want to, I can go and see it'. (MA1)

This cost benchmarking already included normal aspects of 'environmental' cost, such as utilities:

'If I take energy and utilities to pick on a good one, then we're better than everybody'. (MA1)

'Effluent treatment is split out [by line]. Effluent treatment in the mix department is split out and waste on some of the lines is split out. But below that would take a lot of further work'. (MA1)

Iceco had even undertaken some collaborative benchmarking with other manufacturers about the cost of waste management:

'We did some work with Britvic and Guinness at one point; and were looking at inefficiencies in waste'. (MA1)

The management accountant believed that it was possible to extend the benchmarking to cover other 'environmental' costs, but was not sure how one could actually define an 'environmental cost':

'We could provide categories for other environmental costs, but it depends on what you define as environmental cost. It would be very difficult to do, and would have to be done in the same manner by the other Unifood sites'. (MA1)

In addition to the formal, routine benchmarking conducted at Iceco, the management accountant also attempted his own cost assessment of the product characteristics within certain products produced at the site. He used a technique called design for manufacture (DFM) to create his own cost assessment of the product characteristics desired by the consumer:

'I've done my own design for manufacture assessment on a couple of products where we've run. The first element of it is quality function deployment (QFD) which is where you set out the objectives that the consumer is looking for from your product and the qualities within it. You put alongside that what attributes and what drivers you have in place. You then examine the product to see where you get hits and where you get misses. QFD does that, and then if you then take that into design to cost, you can then say 'are we spending our money in the right places?'. (MA1)

This DFM technique was a form of strategic management accounting, and the use of this 'strategic' cost information was something that Unifood was trying to encourage in an effort to manage change:

'Unifood's embraced it by trying to take on the philosophy into its ice cream businesses because we have a lot of change. That's [DFM] all about managing change, and strategic change and product change'. (MA1).

The management accountant had not extended his DFM analysis to encompass the environmental characteristics of ice cream products. Although he thought it was possible to do so, it was believed that customers wanted 'fashionable' ice cream, rather than an 'environmentally friendly' product:

'It's [ice cream manufacture] primarily a fashion business, so we'll struggle to justify spending more on the environmental qualities of the product. If we were producing fish based product, maybe.

Iceco regularly reviewed customer complaints about its products, and the management accountant was actively involved in finding solutions to factory-related issues:

'Part of our regular review is customer complaints. We separate out those things which are masking issues and those things which are factory issues. Within the factory issues we split out what is it by

'brand that customers don't like about the product, and that gives us another route to look for improvements'. (MA1)

However, the management accountant did not believe that any customer complaint had directly related to the environmental characteristics of the product or the factory operations themselves.

In terms of capital budgeting, the environmental manager was free to propose capital projects to the accounting function, but acceptance would be influenced on cost grounds:

'He'd make a proposal to make an improvement and if his boss agreed it then it would come to me and the factory manager as to whether it was the right thing to do or not. Double the costs, no, forget it, but 'I need to spend a bit of money buying a bit of kit or modifying a bit of kit', well yes'. (MA1)

For projects over a certain amount, prior approval had to be sought from Unifood.

'We put forward a suggestion of the projects which need to be undertaken at this site and they might then say we haven't got enough money to do all of those things'. (MA1)

During interviews with the accountant, the researcher was shown details of a number of the capital projects at the site, and all included details of the environmental impact of the project. The largest was the installation of a new production line, and the proposal sent to Unifood included details of:

'It says: this is what we want to do technically. This is the logistics. This is the environmental impact. This is what we are going to spend the money on. These are the savings from spending the money. Project timetable. Why we are going to sell the product. DCF analysis'. (MA1)

Capital proposals were written by the site management accountant, but required input from other functional managers, including the environmental manager:

'I got the Engineering Manager to write that thing. I got the Environmental Manager to write that bit, but I pulled it together and we have the same format pretty much for all investment decisions. Marketing appendix, technical appendix, timescale, logistics, environmental, and commercial. Those things are nearly always there. And this one - there's not a great deal of analysis but it does — it just talks about rationalising resource, economies of scale and utility loads'.

In one of the proposal documents shown to the researcher, the proposed production line utilised liquid nitrogen. As a result, the capital proposal included a statement from the environmental manager on the environmental benefits of the project:

'Environmental benefits achieved were greater efficiencies in nitrogen rather than the previous process. Building on work in Heppenheim [a Unifood factory in Germany] from benchmarking activity, we learnt that they are using less nitrogen than we were and we changed that process. Shrink wrapping rather than using outer cases reduces packaging material usage. Further, the resultant transport costs savings for more efficient palletisation gives clear environmental benefits'. (MA1)

'[EM1 the environmental manager] would have had an input into the nitrogen bit of it. (MA1)

The management accountant would normally hold a meeting of functional managers in order for him to “pull together” the various financial and non-financial issues of a capital proposal. However, there was no need in the particular case shown to the researcher:

‘There would be [a meeting about the proposal], but, on this particular one, there's no need to be because various parties know their part of it. There's nothing to be decided. It's just, pull it together’. (MA1)

In terms of the benefits of a project that could not be reliably estimated in financial terms, such as flexibility in the production line, these would be included within a “strategic summary” that was placed at the front of each proposal document:

‘If it's a benefit that can't be costed, then it's one of a few things. It might be a strategic benefit, i.e. that it gives an advantage in the market place in some way. In which case we would normally include a strategic summary that would include things like flexibility’. (MA1)

‘It's just a strategic advantage to have a flexible line in an ice cream season. So, that sort of thing would go in’. (MA1)

Non-financial environmental benefits identified by the environmental manager would also be routinely included within the “strategic summary”. However, in the proposal shown to the researcher, the management accountant believed that the environmental benefits could be quantified as part of the normal ‘commercial’ case for the project:

‘On this case, actually, the environmental benefits are built in to the commercial case. Because savings improve nitrogen utilisation, reduce materials waste through more modern technology, £80,000 a year built into the case. And, there should be some packaging savings as well ...£200,000 a year. Then the transport savings. So environmental savings are actually built in to the investment appraisal’. (MA1)

The management accountant saw no specific accounting need to classify such savings ‘environmental savings’:

‘You could simply call them, just say they're product costs and it's an improvement in product costs’. (MA1)

However, he saw that separately identifying the environmental benefits of a project helped to reinforce the Iceco philosophy of making organizational participants aware of the need for environmental management at the site:

‘It fits in with the philosophy, and if we didn't, as a matter of course, view for a particular investment decision what's the environmental impact, then you might be in danger of missing it sometimes because you might be focused on product costs’.

The management accountant believed that before the EMS was introduced, he and other managers were often “unaware” of environmental issues, and “maybe” excluded them and their associated costs within decision-making (MA1). However, since the implementation of the EMS, environmental issues have been actively considered in cost control and investment appraisal at the site:

'Our approach today is to always consider that [environmental] impact. Sometimes that follows the route into savings which are in the product costs, sometimes it doesn't. So changes in packaging and plant utilisation will nearly always end up in the commercial analysis as a product cost or the transport cost has changed. Savings in the amount of utilities used might be, might not be, a product cost. It might be too difficult to assess'. (MA1)

Whilst he often found it difficult to quantify the benefits of increased flexibility and reduced environmental impacts, he thought that it was possible, especially for the cost benefits of flexibility:

'I have in proposals costed flexibility. I've costed the benefit by saying I'll be able to run shorter runs, have a lower stockholding, and I've made some assumptions, and then said, okay, in that scenario in the old production line against the new production line, how many production runs would I have? What lead time on stock would there be, what's the difference in pallet weeks stored? And, then, you get an estimate of the storage costs that you're saving through additional flexibility. So, you can do it, you can nearly always cost it. You have to make some assumptions but you can do it'.

Internal rate of return and payback were used to assess capital projects at Iceco. Normal payback was two to three years, since Iceco had lots of alternative opportunities within this time span. For each project, the site accountant had to balance the relative importance attached to each method along with how it alters the company's overall yield:

'If you're investing a sum of money in the first task it is DCF. If you're investing a small amount of money, then payback. If you are going to invest £50,000 to make an improvement, then are we going to get our money back within a year? That's probably pretty much how we make the decision. If we are going to invest £200,000, then is it going to improve the company's yield? That would probably be first. And there's a lot of capital spend you have to undertake to just replace and to maintain. So projects such as this [the one shown to the researcher], where you are investing for the future, have to have a relatively high return to pay for all the others'. The hurdle rate will depend on the project, but always using as a benchmark: what's the company's yield?

However, projects decisions were not made on financial grounds alone, as these figures had to be jointly assessed with the non-financial strategic and environmental benefits, with the final decision determined by the accountant:

'Have to be sense of judgement, there's no other way of doing it. You try and cost in all of the costs or benefits, whether it's a hard thing or a soft thing, try and cost it. If there are still some things, like, the advantages of having a second production facility in Europe. Very difficult to cost how useful that is. But, strategically, that might be what you're actually doing. I don't think you can build that into the DCF but what you can do is say, well, this is the DCF: does the project stand and fall on its own merits, and strategically, this is why we should do it. You decide'. (MA1)

'I think you have to play both arguments. You have to play the project argument, of does the project stand up [financially]. Because if the project doesn't stand up then forget it, there's no point going forward. If you've got a project that stands up, you can then go and say are there strategic benefits that you can identify. If you can identify them you can have a crack at costing them'. (MA1)

At Iceco, the specific interactions between the environmental steering group and the management accounting function depended on the activities concerned:

'It depends what it's about. On investment appraisal I might speak to him [the environmental manager], one of my guys in my department who looks after some of his capital work would probably speak to him. On budgeting, certainly. The budget accountant would speak to him and say what is going to cost

us for water spillage, gas for nitrogen, effluent, what are the targets for next year, what are the activities, how much kilowatt hours, all that sort of stuff'. (MA1)

The environmental manager seemed to provide a critical source of supplemental management information for the management accounting function:

'Even the cost accountant might talk to [EM1, the environmental manager] about particular product issues. So, there's a number of interfaces depending on the issue'. (MA1)

Whilst there did not seem to be a constant 'routine' link between the environmental steering group and the accounting function within day-to-day actions in each functional area, the management accountant function certainly appeared to value the environmental information generated by the EMS and the environmental manager. The researcher was only able to conduct a series of interviews with Iceco's head accountant, and was not allowed to interview the cost accountant or the budgeted accountant due to them being "knee-deep in work". However, the head accountant was the manager who ran the accounting function, and was the one who was responsible for establishing the links between accounting and the environmental steering group at Iceco. For example, the head accountant even saw the need to utilise the environmental manager's expertise into efforts to improve his benchmarking of cost with other Unifood factories:

'I roped him [the environmental manager] into my benchmarking work. He did some work with Heppenheim [the German Unifood factory] and looked at the activities, the usage of electricity, of water, effluent, and compared it to theirs, and then I talked to [him] about it'. (MA1)

'There's lots of internal benchmarking taking place, and I was recently asked by [MA1, the head accountant] to visit our German factory and compare our energy usage with theirs'. (EM1)

This intra-organizational benchmarking activity between Iceco and Heppenheim was something that Iceco's head accountant wanted to actively develop, and to do so, he saw the need to involve the environmental manager:

'On the basis of the benchmarking data that was already available to me, I could see some areas of discussion with the German factory. So I went there and started a discussion with them and we worked through the ABC categories, each one, looking at the drivers underneath. When we got to utilities, we looked at the usages, compared them and then that led me to talk to Paul [the environmental manager] and say, well, how come their usage of this is different to ours; how come our usage is different? We are two big ice cream factories making the same product mix by and large. They [usage of utilities] should be similar. You get a better understanding of why it is; there are genuine reasons for some of the differences'. (MA1)

The other project that the head accountant was working with the environmental manager over was the proposal to introduce a combined heat and power (CHP) system:

'Combining heat and power for us is an opportunity. We can reduce and manage more closely our requirements, also fulfil those requirements at lower cost and we can also sell back surplus to the grid.

So, all in all, that adds up to an attractive picture and we should be able to manage it more closely'. (MA1)

Surprisingly, at the Iceco factory, heat, power and energy costs were a small element of total manufacturing cost, but it was believed that such costs were increasing and could be controlled:

'We spend four times as much employing people making ice cream, despite the level of mechanisation'. (MA1)

'It is difficult to control, [but] within twelve months it's all controllable. We spend on utilities [water and energy] about £3.4M. To run this site, open the door on the 1st of January, make ice cream for a year, you're taking about spending something like £40-45M, so it's [utility costs as a percentage of cost] a joke. They are not as big as you think'. (MA1)

Following privatisation of the utilities, Iceco found that it could manage its energy costs by obtaining discounts from its suppliers:

'It's easier to go and say look, we're a big user, let's negotiate a decent rate. We've done that'. (EM1)

Installing a combined heat and power (CHP) system at the site was something that the Unifood group had previously rejected due to cost considerations. However, energy management was becoming a strategically, as well as environmentally, important issue at the site since its cost was increasing and was the perceived target of future environmental taxes and regulation. As a result both the accountant and the environmental manager were liaising over the case for investing in CHP at the factory:

'We [together with the environmental manager] are currently talking to a number of potential contractors to provide a CHP facility within the next eighteen months, but we have not decided that we're going to do it. We are looking at the proposal and the opportunity with the accountants'. (EM1)

'It has been done elsewhere in Unifood but there's no sort of general thrust towards it. Each site has to be taken on its merits, and previously when it's been examined here and elsewhere there have not been enough benefits to do it. In fact, we entered the discussion somewhat sceptical that there would be any benefits for us to do it. Now, thankfully, it is possible given that prices are going up, including taxes and so on, the environmental taxes, that those implications mean that it's more likely that the price would go up, so if we're generating our own we'll get a cheaper rate. In purist terms, I suppose it's using the tax system to manage an externality'. (MA1)

This fleeting reference to social cost externalities was the closest the management accountant came to talking about Iceco's impact on either the sustainability of natural resources or the social welfare of the local community. He did not account for such issues, and neither did he mention the term environment-related accounting or reporting.

In addition to the interview data obtained from various respondents at the site, the researcher was able to conduct site visits, observe the environmental manager at work

and also attended one meeting of the production teams and the environmental manager. The site and the factory were both extremely clean, and all rubbish and waste was allocated a specific container or disposal site. Manufacturing was process-driven, with each member of a production team detailed to undertake specific tasks in a specific manner for a specific period of time. Raw materials, waste ingredients and finished products were documented and recorded at the end of each shift. Spillages were cleaned up using the procedures from the EMS, and the researcher did not observe one incident that led him to question the commitment to environmental and quality management at the plant. The production staff and other functional staff, including the accountant, seemed 'aware' of the need to implement environmental management. Finally, the environmental manager appeared extremely dedicated and committed to his role, and was the major force behind fostering environmental awareness alongside the key issue of product quality. At the end of one of the interviews, the environmental manager gave his honest view of environmental management activities at the Iceco:

'I find it difficult to [know if we are proactive] make those comparisons, but I think we've taken steps to keep the issue at the front of things. I wouldn't say that we proactively look at our plans for next year and say right, what we're going to do for the environment? We don't do that. But, as we go through the year, I think we keep each of the steps. We say, what will be the impact of that? I think that's a fair reflection. That's not a great deal, but it is something.' (EM1)

At the end of approximately eleven months of access to the site, the environmental manager, the researcher's main contact at Iceco, retired. Shortly after that, Unifood announced the first in a series of major redundancies at the Iceco factory. Together, these two events effectively ended research access to the site. It would obviously have been useful to revisit the site and re-interview the same respondents in order to obtain further and more longitudinal empirical data, but this opportunity was not available.

8.2.1 Applying the 'Skeletal' Theoretical Models at Iceco

Corporate 'greening' at Iceco can be explained by a number of the theories contained within the 'envelope of greening' developed in chapter 4. The adoption of 'green' EMS allowed the company to demonstrate the environmental 'legitimacy' of its operations and provided it with a way to increase both its 'green' and 'non-green' effectiveness. The factory has a long history of 'unintentional environmental improvement', since the control of waste ingredients and energy are critical competitive issues in the manufacture of food-based products, such as ice cream. Thus, the desire to undertake certain aspects of

environmental management at Iceco occurs as a direct consequence of efforts to increase business efficiency. In essence, environmental improvements were often a 'by-product' of Iceco's actions to reduce the cost of ice cream manufactured at the site.

In terms of the 'external' pressures for greening at Iceco, organizational respondents referred to the influence of environmental regulation, the general public, green pressure groups and green business networks. Suppliers were not a specific 'external' pressure in this case, since Iceco had to source its packaging and other manufacturing inputs from Unifood companies. Customer pressure was not perceived as a major driver for introducing environmental management at the site since the main competitive issues in selling ice cream were product quality, healthy recipes and even 'fashion'. Whilst the environmental manager saw a link between environment and health in products (such as the use of genetically modified ingredients) these 'overall' management issues were handled by Unifood. In contrast to ice cream, other Unifood products, such as fish based products, faced strong customer desire for environmentally manufactured products, especially regarding the humane capture and sustainable use of fish stocks.

In contrast to the other case studies, Iceco's environmental manager specifically mentioned the threat from 'green' pressure groups, such as Friends of the Earth, if the site did not act on environmental management:

'I know it's their intention to name and shame, and I've been in their company where they have been very rude about certain companies'. (EM1)

In addition, the environmental manager made a specific point of visiting the Internet sites of certain pressure groups looking for references to Iceco and Unifood. He was "reassured by the fact ... that ice cream is not on their hit list" (EM1).

The Iceco site has experienced no adverse environmental publicity, has not been prosecuted for environmental impacts, produces ice cream products that have a comparatively low environmental impact and was a major local employer. As a result of these characteristics, the site had a naturally low 'environmental visibility'. Being part of the large multinational Unifood group of companies increases Iceco's 'environmental visibility', but Iceco's environmental management initiatives have allowed it to enact and reduce its 'environmental visibility' by actively promoting its achievements in the media and through hosting events of the GGBC at the site.

A major internal catalyst for ‘greening’ was the presence of intra-organizational linkages at the firm. Unifood, Iceco’s parent company, wanted the whole group to be ‘world-class’ forcing the group to commit itself to an environmental policy that lead to the formation of the Environmental Steering group and implementation of the ISO 14001 EMS at Iceco. Unifood provided substantial financial and management resources for environmental management activities at the site, and continue to provide environmental expertise and support to Iceco’s environmental manager.

The organizational structure of the environmental management at Iceco was a major influence on how environmental management was conducted. There was no dedicated environmental unit at the site, since the four members of the environmental steering group were “cross-assigned” to the role from their normal manufacturing quality and technical management functional areas. Responsibilities for environmental management were allocated to those managers perceived as possessing knowledge of environmental impacts at the site. For example, the site services engineer was given the role of environmental manager, despite being an engineer with no prior experience of environmental management. An experienced environmental manager was not recruited, and it was left to existing technical and quality managers to undertake environmental management.

Another internal influence on ‘greening’ was that organizational management perceived its existing ‘process driven’ ISO 9001 quality management system as an appropriate method for introducing EMS. As a result, the company implemented ISO 14001 EMS, and these introduced a ‘routine process-driven’ approach to environmental management at the site. Whilst such an approach has produced tangible benefits at the site, it has been supported by the activities of an extremely committed environmental manager. Iceco’s environmental manager acted as a powerful internal catalyst for greening. Despite being an engineer, he was strongly committed to environmentalism and was extremely knowledgeable about environmental impacts and issues related to the site and Unifood in general. He believed in what he was doing, and, along with the procedures introduced by the EMS, was a major influence behind the development of an “environmental awareness” throughout all organizational participants, even the accounting function. He

worked on collaborative environmental projects with the site accountants, and even visited other Unifood sites to conduct environmental benchmarking and spread best practice. He frequently attended environmental conferences and events of the GGCB in order to disseminate and obtain new ideas about environmental management in manufacturing.

Iceco appears to exhibit an ‘experimenter’ type of ‘dominant attitude’ towards environmental management. Primary level ‘greening’ has not occurred at Iceco, but change does appear to have gone beyond a mere secondary level change to the design archetype. Environmental systems and structures have been implemented at the site, but are accompanied by an embedded “environmental awareness” and organizational commitment to site specific environmental targets and objectives, such as reducing water usage. The environmental manager has succeeded in promoting the need for environmental awareness in the mindset of production staff, and they are genuinely motivated by efforts to reduce environmental impacts during manufacturing. Even the site accountants appreciate the environmental dimension to operations, since the head accountant works collaboratively with the environmental manager on benchmarking projects designed to find ways to cut ‘environment type’ costs, such as energy and waste. Overall, Iceco has undergone ‘intermediate’ level greening since the company routinely recognises environmental issues during decision-making, such as in capital investment decisions. ‘Greening’ is obviously driven by the Unifoods parent company, but is also influenced by the actions and commitment of Iceco’s management. Whilst there are financial controls on environmental management activities, they are now part of “general management” at the site. As the researcher was only granted eleven months of access to Iceco, it is difficult to identify the “track” that intermediate change followed, but it seems that it followed the *stable emergent* track, due to the powerful influences of the Unifood parent and Iceco’s environmental manager.

In order to support its ‘experimenter’ attitude towards the environment, Iceco generates stage 2 level environmental information that is mainly supplied by the EMS and the environmental manager. Whilst the ABC accounting system was used to tackle certain aspects of waste and energy management, the EMS and the environmental manager supplied the majority of the other environmental performance information needed at the

site. Iceco's management accounting systems have *not* changed as a result of environmental management. In terms of environment-related forms of management accounting, the head accountant had not adopted such an approach, was unaware of the literature describing such approaches and did not elicit any desire or need to develop such an approach. Site accountants did not undertake measurements of sustainability and social cost externalities. However, both the commercial manager and environmental manager mentioned that life cycle analysis/costing of new products did take place at the Unifood head office, but site management was not involved in its application. Non-financial environmental performance information was not routinely collected by the management accounting systems. Furthermore, the ABC system was not used to identify, allocate and apportion specific 'environmental costs', such as the costs of the steering group or regulatory compliance costs, to products or cost centres. However, even before the introduction of environmental management, the management accountants routinely measured and managed the factory waste materials and energy usage at the factory as part of 'efficient' business management. They still encountered specific problems in identifying where certain environmental impacts were being generated in the factory, and were working with the environmental manager to better manage such issues. Overall, even though accounting systems had not changed as a result of 'greening', site accountants were knowledgeable and "aware" of environmental management, and even undertook cross-functional interactions with the environmental manager to tackle such issues. Furthermore, environmental issues were now routinely documented in capital investment proposals drawn up by the head accountant.

The environmental manager and the EMS provide, and facilitate the generation of, environmental information within the firm. Environmental information is generated and processed in a number of different organizational systems, structures and activities within the organization, including: the operation of the EMS; the site activities of the four members of the EMS Steering Group; during meetings of the site's SHE committee; and from cross-functional interactions about environmental issues. The environmental manager uses the environmental information as an "answer" and "learning" machine for site improvements. In certain instances, the head accountant also used environmental information as a "learning" machine to 'supplement' the existing data from the conventional management accounting systems, and recruited the help of the

environmental manager in obtaining new ‘visibilities’ regarding the causality of product and site costs. There was also evidence of environmental information being used as “ammunition”, helping to convince organizational participants to engage in environmental management even where there are no obvious cost savings from doing so:

‘There are some things you can frighten people into doing; and there are some things you can’t frighten them into. So, it isn’t always just totally a cost case’. (EM1)

Such information was also routinely used as “ammunition” to support and “rationalise” the strategic case for investing in capital projects, although the environmental manager believed that the accountants were often discounting such claims:

‘I think, by now, they’re a bit jaundiced about the claims regarding environmental and quality benefits ... the same old arguments keep coming up’. (EM1)

Thus, environmental information was used in a variety of ways throughout the firm.

One final point to mention is whilst Iceco management made no reference to issues of sustainability, the Unifood parent has been promoting its focus on the environmental sustainability of its operations. For example, the following is an extract of a speech from March 2002 by the Unifood Business Director for Frozen Foods:

‘Our stated *raison d’être* is to meet the everyday needs of people everywhere, and to do that consistently we need to know where all our raw materials are coming from - not just next year, but in a decade’s time. That is why our drive for sustainability covers three key areas: water management, fisheries, and agriculture’.

However, from the same speech, it appears that ‘sustainability’ is not thought to be a major competitive factor for the company:

‘Unless sustainable produce has a competitive advantage over whatever else is available, consumers will not buy it anyway. The fact is that while many people do have genuine concerns about global warming or over-fishing, they do not relate these issues to their own desire to drive their car to the supermarket or buy Unifood products when they get there. Sure, they will accept a theoretical link between the two if it is pointed out to them. But a significant emotional bridge between people’s concerns over sustainability and their buying habits has yet to be built. Until it has, sustainability as a branding concept will not sell more peas, fish fingers or anything else’.

Despite such concerns, Unifood has initiated a “sustainable pea project” as a trial for further attempts to increase the sustainability of the natural raw materials used in manufacture. Overall, sustainability appears to be something that is being tackled by Unifood, and is not regarded as something that Iceco’s managers need to consider.

8.3 The Copyco UK Case Study

The second of the main case studies was the Copyco UK manufacturing site in the West of England. Copyco UK has been a wholly owned subsidiary of the US Copyco Corporation since 1997. Its primary operations at the site include the manufacture and remanufacture of photocopiers, printers and other similar products.

The Copyco Corporation Group heavily promotes its commitment to environmental management and responsibility in its corporate literature. As part this group, Copyco UK has to adopt and share the same environmental strategy and policy as its parent. The environmental policy of the US Copyco Corporation is shown in figure 8-1.

Figure 8-1 The Environment, Health and Safety Policy of Copyco US Corporation

COPYCO CORPORATION ENVIRONMENT, HEALTH AND SAFETY POLICY

Copyco Corporation is committed to the protection of the environment and the health and safety of its employees, customers, and neighbors. This commitment is applied worldwide. The following principles shall govern all business practices in the design, manufacture, procurement, marketing, distribution, maintenance, reuse/recycling and disposal of products and related services:

1. Protection of the environment and the health and safety of our employees, customers and neighbors from unacceptable risks takes priority over economic considerations and will not be compromised.
2. Copyco operations must be conducted in a manner that safeguards health, protects the environment, conserves valuable materials and resources, and minimizes risk of asset losses.
3. Copyco is committed to designing, manufacturing, distributing and marketing products and processes to optimize resource utilization and minimize environmental impact.
4. All Copyco operations and products are, at a minimum, in full compliance with applicable governmental requirements and Copyco standards.
5. Copyco is dedicated to continuous improvement of its performance in Environment, Health and Safety.

At Copyco, responsibility for the EMS and environmental management is given to a specific functional unit, the Environmental, Health and Safety Unit (EHSU). The head of the environmental unit at the Copyco site was the 'Environmental Health and Safety Officer' (EHSO) (referred to as EM1 in the quotes in the case). He is a professionally qualified chemist, and has had no accounting training. An assistant EHSO (referred to as EM2 in the quotes in the case), a recent graduate in environmental science, aided in day-to-day environmental management activities of the EHSU.

At Copyco UK, integrating environmental management and the EMS into the existing health & safety function seemed like a logical way to proceed. Despite having no environmental management expertise, the health and safety manager was appointed to the role of EHSO, and given a small team to implement an EMS:

‘I was just [the] Health and Safety [manager]’. (EM1)

‘It was decided that we would fit this extra task in Health and Safety because we were used to dealing with legislation and we hadn’t any environmental experience as such. So I was given a small amount of people to go out and have a go at getting BS7750 [the predecessor to ISO 14001]. So, that’s how it started. We were given a target [in January 1995] of achieving it by the end of the year and we did it by December 1995’. (EM1)

‘Health and safety was more prominent in environment [management] in those [early] days’ (EM1).

This is extremely revealing since it highlights the fact that environmental management was viewed as an issue that was an ‘appropriate’ fit with the management of health and safety issues. This is still the structure at the site, as the EHSO manager has dual responsibility for health and safety and environmental issues. Copyco has adopted a commonly used, ‘institutionally accepted’, structuring of its functional management of environment, health and safety. If one applies the theoretical envelope of greening responses developed in chapter 4, the incorporation of environmental issues within health and safety may be seen as a ‘legitimate’ way to manage such issues. ‘Legitimate’ firms must possess systems for managing health and safety, and this existing institutionalised management structure appears to be the most popular interface for incorporating environmental management within the firm. Although differences in the corporate structuring of environmental management can occur, such as was seen in the Iceco case, Copyco’s EHSU structure appears to be the ‘institutional norm’ for UK and US firms. It is vital to recognise such differences in environmental management structure, since they directly influence how environmental information is collected, interpreted and used to manage environmental issues within the firm. For example, an EHSU type structure is said to reduce environmental management to a largely ‘checklist’ process driven form of management, with it acting in a supporting ‘specialist’ or ‘consulting’ type role (see Walley & Whitehead, 1994).

The organizational genesis for environmental management at Copyco UK occurred in 1990, and originated from initiatives being introduced by its US parent company:

‘I think we’ve got to go back to 1990. Copyco Corporate Management [in the US] realised that the environment was going to become more important’. (EM1)

This realisation was driven by a number of ‘external’ pressures for greening, but was primarily influenced by increased levels of environmental regulation in the US:

‘It was driven by legislation in the States. They’re more litigious than they are over here, and they [US management] were concerned about legislative compliance’. (EM1)

‘In 1988 they started to be concerned about contamination at their manufacturing sites, soil, ground water. As a result of that, we’ve [Copyco] always had an Environmental Health and Safety Vice-President. Health and Safety was perhaps more prominent in environment in those days. But Copyco in 1988 initiated a programme worldwide to look at the manufacturing sites and look for contamination. They found contamination in all their manufacturing sites, so that focused in minds that they had to take the environment more seriously’. (EM1)

As a result of this legislative pressure, Copyco Corporation decided to undertake environmental decontamination of all manufacturing sites, including the UK one:

‘We looked at all the past manufacturing processes and we looked for contamination and found it and then we put a plan together to clean up the soil and ground water at all the sites where they found contamination; and that’s still going on. We started cleaning [the site] up in 1995, and it will go on another 18 months perhaps’. (EM1)

US top management quickly realised that environmental management did not have to be a reactive and defensive thing, and could be used to enact ‘external’ demands for greening and even be used to attract customers:

‘They also realised that perhaps they could use environment as a marketing tool so that they set up environmental management systems’. (EM1)

In order to further this environmental ‘enactment’, in 1990 the Copyco Corporation introduced a worldwide “Environmental Leadership” manufacturing programme with two specific goals:

‘One was waste-minimisation; we thought we should produce our machines in factories which were aiming towards zero landfill. And [two,] we should also manufacture products which could be recycled and re-used more easily, and be environmentally friendly. So, use less toner, use less electricity, use less ozone. So there was a manufacturing strategy for the products; and a strategy for the factories which built them. Which was quite good at the time. So, from 1990, the machines have been designed to be re-manufactured more easily’. (EM1)

Thus, the US parent “cascades down decisions from corporate level to the various manufacturing sites” (EM1) and the site director at Copyco UK has to implement them.

Thus, for the UK-based Copyco, its US ownership structure meant that *US environmental legislation* and head office initiatives was key drivers of corporate ‘greening’ at the site.

The US parent heavily influenced the level of environmental compliance and environmental management at the site, and this often went beyond the requirements of comparative UK legislation. Despite this ‘driver’ for environmental management at the

site, activities now seen as part of ‘environmentally friendly’ management at Copyco were not originally developed with that aim in mind:

‘Copyco [Corporation] originally had a world patent domination for photocopiers, so if you wanted a photocopier you had to have a Copyco. So in those days we didn't sell machines - we leased them. So, it was in the company's interest to take the machines back when they had reached the end of their useful life, and we refurbished them. We didn't do what we do now, but it was you could say a start of a re-manufacturing type process. All we did initially, we took all the sensitive components - that's the leading photo-receptors, fuse rolls - brought those back and we re-manufactured them. We also took back machines that had been in customers' premises and we re-manufactured them to a sort of as-new condition, and put them out again. So, we've been bringing back machines and doing all that sort of thing for years'. (EM1)

This “asset recovery” activity expanded over time, and was driven by the increased non-green pressure in the market:

‘Most of this activity [recycling old copiers] was not the company wanting to be green. Basically, it's to do with cost. Once our patents ran out we came under very severe Japanese competition from Canon and Minolta, and we were more expensive than they were. We had to do things quite drastically to reduce the cost. (EM1)

Thus, from the early 1980s, Japanese competition made cost control a vital strategic issue that had to be addressed in the early 1980s. Clearly, cost leadership was seen as a vital way of securing customers, and ‘remanufacture’ of copier machines was a new procedure introduced in an effort to reduce cost. It was only later, when social pressures for greening grew, that Copyco's management saw the ‘joint-benefit’ of having low cost products that could also be marketed to customers for their ‘environmentally friendly’ characteristics.

In terms of the implementation of EMS, the Copyco UK site was the first of Copyco Corporation's sites to be audited to BS7750 EMS accreditation in 1995 (BS7750 became ISO 14001 in 1996), and now:

‘all Copyco manufacturing sites are registered to IS14001’. (EM1)

One of the key drivers behind Copyco's decision to use the ISO14001 standard as the basis for EMS was the firm's existing ISO 9001 quality management system:

‘We already had [an] ISO 9001 [quality system] at the company, so that influenced us down the BSI ISO route’. We had all the quality things. Ours is called Leadership through Quality. The whole company was trained in that in the Eighties with working teams. We had problem-solving, we had a conference room but we worked to all those Japanese-type ideas.

The influence of quality management systems in the design and operation of Copyco's EMS was further reinforced by the fact that the head EHSO was previously involved in quality management:

'I don't come from an environmental background but as part of one of my previous tasks I did work in Quality. So, I am used to non-conforming materials; I'm used to the document control. We have all these things in place, so we didn't have to - we just plugged into the existing systems'. (EM1)

'Well, I started off in manufacturing but then I was at a factory location which was closed down and I was tired of working shifts and doing that sort of.... and I wanted to get into Health and Safety. And they offered a chance for me training and doing that, and I came here to do it'. (EM1)

From these comments, it is clear that the head EHSO did not possess a strong personal belief in the need to preserve the natural environment. During interviews, he did not ever 'reveal' his personal attitude to the environment, but he seemed committed and motivated to his role, and wanted to find ways of improving the site's environmental performance.

Accreditation of the EMS to the 'competing' EMAS standard was originally rejected because it seemed "too European" for a US company, and also required the publication of an "onerous" environmental statement every three years:

Personally, I didn't see any point in going through the European standard [EMAS] as we were a multinational company. We can obtain ISO in Japan and the States, and our American masters were not keen on EMAS at all 'cos of the statement it needs to put out.

In contrast, ISO 14001 was recognised worldwide, and did not require the production of a publicly available environmental statement. The reluctance of the US parent to allow Copyco UK to adopt an EMAS certified EMS is interesting, as an analysis of Copyco Corporation documentation provides evidence in 1996 that the company worldwide was *already publishing voluntary* "Environmental Progress Reports" about their environmental management activities. Furthermore, the information within these reports covered a majority of the minimum requirements of an EMAS environmental statement, which are as follows (CEC, 2000b, p.19):

- a) a clear and unambiguous description of the organization and a summary of its activities, products and services and its relationship to any parent organization;
- b) the environmental policy, and a brief description of the EMS of the organization;
- c) a description of all the significant environmental aspects which result in significant environmental impacts of the organization and an explanation of the nature of the impacts;
- d) a description of the environmental objectives and targets, along with the audit arrangements for the EMS;
- e) a summary of the data available on the performance of the organization against its objectives and targets. The summary may include figures on pollutant emissions, waste generation, consumption of raw material, energy and water, noise as well as other aspects. The data should allow for year-by-year comparison to assess the development of the environmental performance of the organization.
- f) Other factors regarding environmental performance including performance against legal provisions.

However, Copyco UK found that European customers were *specifically asking* whether their EMS was certified to the EMAS standard. Thus, the ISO 14001 accreditation of the

EMS was not widely understood in areas of Europe, and customers wanted to see that Copyco complied with EMAS:

'In the early days there was a lot of pressure from [customers from] Scandinavia and Germany about the time when we were getting BS7750 certification. It got to the stage where we had to go down the EMAS route even though BS7750 was being changed into ISO 14001 by then. In Germany in particular, we weren't getting on to tender list because we haven't got EMAS. The fact that it was virtually the same thing [as ISO 14001]- we were being discriminated by not having it, so we had to have it'. (EM1)

'We really didn't want to do it (adopt EMAS) but we had marketing demanding it. [They said] You've got all this [a certified EMS], but that's no good to them, we still can't sell our copiers in Germany! (EM1)'

Because of this customer pressure, the site's EMS were certified to both EMAS and ISO 14001 'institutional' standards by 1997. This site now publishes a site-specific environmental statement every 3 years. Upon examination, this statement provided a brief overview of the EMS and environmental management activities in line with the minimum EMAS requirements shown above.

Copyco's manufacturing site covers 27 hectares and has been occupied by Copyco and eleven independent companies since 1960. Copyco's operations occupy eight buildings, comprise 140,000 square metres of production and office space, and employ over two thousand individuals at the site. In 2000, the total manufacturing output at the site exceeded £275 million, and included the following activities:

1. **Systems Assembly:** which produces a range of convenience copiers and printing systems.
2. **European Electronics Manufacturing:** which produces electronic assemblies for use in all Copyco products.
3. **European Interconnects Manufacturing:** which produces harness assemblies.
4. **European Fuser Roll and Pressure Manufacturing:** which produces precision fuser and pressure rolls for copiers and printers.
5. **Asset Recovery:** where previously used copiers are striped, parts repaired to "as new" condition, carcasses dismantled to previously defined levels, and segregates non-repairable parts are segregated for recycling or disposal. In 2000, this function remanufactured over 30,000 copiers.

For business and accounting purposes, the operations at the site are divided into five core "business centres":

1. Colour digital assembly centre
2. Electronics business assembly centre
3. Asset management and recovery centre
4. Fusers and Frames delivery unit
5. Site services (including the EHSU, the Finance unit and Human Resources)

In terms of its position in the organizational structure, the environment health and safety unit (EHSU) is included within the site services business area. As such, it is largely seen within the organization as a support or consulting service, largely divorced from the

every-day running of each business unit. This is the view expressed by the manufacturing managers responsible for the asset recovery and fusers business centres (referred to as PM1 and PM2 respectively in the quotes in the case):

‘They [the EHSU] set us yearly environmental objectives for our building, but I do not speak to him [the EHSO] unless I have a specific problem he can help me with’. (PM1)

‘I see them buzzing around the site. We are aware of our [environmental] responsibility, and don’t need to speak to them on a regular basis. They do come to me from time-to-time about waste issues’. (PM2)

The EMS at the site has created a routine ‘proceduralisation’ of environmental management within all actions at the site. Business managers know their environmental management responsibilities and targets, reducing their need for day-to-day contact with the EHSU unless specific additional help is required. Thus, the EHSU acts as a service centre of ‘environmental expertise’ that can primarily focus on dealing with new forms of environment-induced ‘uncertainty’.

All business centres have their own Environment, Health and Safety (EHS) committee that is given building-specific targets and responsibilities by the EHSU. Each business centre EHS committee elects their own “environmental champion for the environment”, and meet monthly to discuss environmental targets and their plans to achieve them:

‘Each business centre has a meeting on Environment Health and Safety every month. The committees may approve safety reps and people volunteer to be environment champions. There is a lot of enthusiasm in the environment. Health and Safety, it’s a bit of a ‘turn-off’, but environment, re-cycling, there is a whole lot of interest’. (EM1)

‘People are very keen, and we get no problem in getting people to work in the environment within the teams. So, these committees help us to work towards our site targets. We may have one target that we’re working to that year and we review how we did. So, each committee takes on projects’. (EM1)

‘Each business centre develops its own plans and they’re simple; we’re not spending money on insulation, it’s keeping roller shutter doors shut. It’s turning off lights when not using them, it’s turning copiers & computers off. It’s simple things, it’s using less compressed air. Simple things that they’ve taken on themselves, done in their buildings’. (EM1)

The EHSO clearly believed that Copyco’s employees possessed a strong interest in participating in environmental management. The researcher undertook participant observation of a meeting of the Environment Health and Safety committee for the “Asset Management” business centre. Very little attention was given to issues of health and safety. The meeting primarily discussed the environmental targets at the site, and the eleven participants spent two hours of valuable company time discussing ways to reduce plastic waste in asset recovery. Participants even wanted to reduce the level of water

usage in their building in order to ‘compete’ with the usage at the nearby “Fusers” business centre. At this meeting, even the non-management production staff seemed heavily motivated by environmental issues, with various “environmental champions” providing new solutions to recover further components from mini-copiers, and even suggested the use of metal cutlery in the canteen to reduce the use of plastic on site. In summary, the meeting demonstrated a strong commitment and awareness of environmental issues at the site from all types of personnel.

The business centre manager for asset recovery clearly describes the role of the production staff in making environmental improvements at the site:

‘Every year, our environmental champion has to prepare a one-page outline of how we are going to improve environmental performance in our area. The staff enjoy pulling this together, and it is up to us to achieve this target’. (PM1)

Each building has an “environmental champion”, who tries to establish ways of reducing the waste and impacts from operations, as the manager of the fusers business centre describes:

‘Darren is our environmental champion. He does this in addition to his normal job, but it's a good way of getting noticed. Maybe we give it to a young, keen graduate and if he does well on this sort of thing he doesn't get any extra pay, but it's a good grounding in our work. He looks at all the material that comes into our building. He looks at whether we'll re-use, recycle, or scrap. His target is to quantify what we scrap. He says, can I find out how much I've got in scrapping; can I reduce that, can I get rid of the material? He will go back to our purchasing people and ask them to try to eliminate those materials at source. He then works up his plan for how our manufacturing area can reduced scrap. It's quite simple’. (PM2)

The environmental action plans prepared by the “environmental champion” in business centre are all documented in a standard manner, since this allows the EHSU to compile an overall plan and set appropriate targets for the site.

Whilst the activities of each business centre's EHS committee is overseen by the EHSU, they are also directed by the activities of the “Environmental Steering Committee”. The membership of this committee includes the environmental champion from each business centre, the section managers responsible for building health & safety, the members of the EHSU, but did not currently include any accountants. The Steering Committee provided a co-ordinating and support role for environmental management at the site:

‘We have a Steering Committee, where we all get together every three months, so there's a champion from each committee for the environment, and we all get together - it happened last week. We review the figures we've got, so far, this is how it's going. They go through their plans so we've got an overview. We share best practices between the different business units. We confirm to them that we've

got this new legislation coming along - this is what we're going to have to do, so it's an interactive thing'. (EM2)

Finally, in order to “quality” check the overall environmental management in each business centre, the assistant EHSO conducts a six-monthly “internal environmental audit” of each building and business centre:

‘I carry out audits. It's like the quality audit that already happens. I go around twice a year and audit performance against a environmental checklist and standards for each building. Corrective actions go to the site director so that people know what is wrong. That's the stick part. Sometimes performance does slip; it all depends upon people being keen and enthusiastic and keeping their meetings going’. (EM2)

In summary, the EHSO saw the EHSU as the “co-ordinator” of environmental management at the site, with the improvements in environmental performance driven by the awareness and actions of organizational participants:

‘I co-ordinate the environment Health and Safety performance, but the "doo-ers" are out there. I can chivvy them along if we're not going to meet a target, but the initiatives, the actions come from people that are there. So, at those meetings we go back to them. We collate the [environmental] performance every three months, and we go back to them with a series of graphs and so on; [saying] this is how we're doing, chaps. And we follow it along like that’. (EM1)

As with all EMS certified to ISO 14001 and EMAS standards, Copyco's includes environmental targets and objectives for continuous improvement (see the earlier Cobe case for details for how this concept is defined in ISO 14001) that are imposed by Copyco Corporation in the US:

‘We have targets imposed upon us from Corporate. Our targets are set up as a management review meeting somewhere in the States that our Director, who is now the European Director, will be party to. There is a top level target which, in our case, is waste of landfill. On the environmental side, we get targets for everything. I look after Health and Safety in the Environment, so the targets we have all relate to our accident performance. We're aiming towards zero accidents, but we live in the real world and we do have accidents. We're given a task to improve our accident performance year on year. We're given a task to improve our waste to landfill metric, which is getting very difficult. Perhaps we need to talk to the people’. (EM1)

These environmental targets from head office were not subject to local negotiation with the European Director, but the EHSO thought that the waste reduction target was becoming impossible to achieve:

‘They're not negotiated, no. He only sets the one, but I think we're going to have to at some stage negotiate, 'cos we can't keep on improving’. (EM1)

Despite this, to the EHSO the most critical aspect of the EMS was its requirement for continuous improvement. This had to be demonstrated to the auditor of the EMS in order to retain the EMAS and ISO 14001 accreditation:

'I think what it does do is the continual improvement aspect or continuous improvement; it really focuses the mind, 'cos it gets harder and harder to keep your auditor happy'. (EM1)

As part of this continuous improvement, the site sets its own local environmental targets to supplement the targets imposed by the US parent company:

'The other targets we set ourselves say, four or five each year. They're based on our effect register [part of the EMS] or what we regard as being important to us. We took a target to reduce special waste last year. That's working the Severn-Trent, doing some things to our processes to make them cleaner so we can put them down the drain. It's gone down the drain, but the material is clean enough to go down the drain; that is a big improvement.' (EM1)

Yearly performance against the specific environmental targets, such as the reduction in special waste, are measured and assessed by the EHSU from the environmental data obtained as part of the EMS. An example EHSU document showing the yearly targets and performance is shown in figure 8-2.

Figure 8-2 Environmental Targets and Yearly Progress at Copyco

| Target | Completed Actions | Outstanding | Performance |
|--|---|--|---|
| LANDFILL 91% Recycle / Reuse 9 % Landfill | <ul style="list-style-type: none"> Plastics recycling contract Supplier Packaging Initiatives Business Centre MBF Landfill investigations | <ul style="list-style-type: none"> Ongoing Packaging Initiatives Review use of open top skips Incorporate into Business Centre Metrics | 88.1 % Recycle / Reuse 11.9 % Landfill |
| SPECIAL WASTE 5 % Reduction in Volume | <ul style="list-style-type: none"> F&F Wash - Discharge and Process agreed and implemented | <ul style="list-style-type: none"> D&C effluent trials with Severn Trent Decreasing Effluent due to production Incorporate into Business Centre Metrics | 42.4 % Reduction |
| ENERGY 5% Reduction on Yearly consumption (KWhr / SThr) | <ul style="list-style-type: none"> Business Centre Action Plans developed Reduction in compressed air lines | <ul style="list-style-type: none"> Investigate alternative measurement with DTI Incorporate into Business Centre Metrics | 12.1 % Reduction |
| NOISE Less than 11 Complaints | <ul style="list-style-type: none"> Noise reduction equipment fitted to F&F Scrubbers F&F Low Mass silencer fitted Measurements of alarms completed - levels reduced as appropriate EiBC Abatement fitted on scrubbers Compressors serviced to minimise noise / optimise efficiency AMBC, noise suppression fitted to ROS Room | <ul style="list-style-type: none"> None | 9 complaints received from only 2 complainants (Compared to 7 in previous year) |
| REMEDATION 90% Uptime | <ul style="list-style-type: none"> 2 further wells completed Bedrock fracturing Improved recovery | <ul style="list-style-type: none"> Risk Assessment / decommission | 94 % Uptime |

Rather than assessing the overall performance in isolation, the site's environmental performance was also compared to benchmark information obtained from other Copyco sites, such as a sister plant in the Netherlands:

'We use those as a benchmark and so, I can show you a report showing how we are doing. We are not doing as well as Venguard, our sister plant in Holland. When we started off we were doing better than them. It's competitive'. (EM1)

The researcher was shown a comparison of performance between the two sites that included measurements of waste per employee, energy per standard production hour and other measures of environmental performance. This environmental benchmarking allowed the EHSU to identify particular areas for management attention, and created environmental 'competition' within the whole group of companies.

In order to achieve the overall environmental targets and objectives for the site, “each building is given its own targets” by the EHSU, “which they work at during the year” (EM1). These targets are conveyed to the relevant managers via presentations by the EHSO at a meeting of each Business Centre’s EHSC. An actual example of the environmental objectives for a building is shown in figure 8-3. Whilst the individual managers who operate in a building can discuss the environmental targets with the EHSO, it is ultimately the decision of the EHSO to set the targets. Individual building objectives are decided by the EHSO based upon past performance, benchmark information obtained from other Copyco Corporation sites and the overall environmental objectives for the site.

Figure 8-3 Yearly Environmental Objectives for a Copyco Building

| BUILDING ONE ENVIRONMENTAL OBJECTIVES | | | | | | | | | | | | | |
|--|--|---|----------------------------------|-----------|----------|-------------|-------|------------|----------|-----------------|--------------|---|--|
| OBJECTIVES & PERFORMANCE TRENDS | ROOT CAUSES & PRIORITISATION | COUNTERMEASURES & SOLUTIONS 'VITAL FEW' | ASSESSMENT OF PROCESS CAPABILITY | | | | | | | | | | |
| <p><u>Environmental & Energy Targets 2000:</u></p> <p><u>Landfill:</u></p> <p>Solid Waste - 92% Recycle - 8 % Landfill</p> <p>Current Landfill From Building One: General Waste Polythene with labels Polypropylene Polyethylene Plastic Strapping Coloured Polythene Plastic Glass Metal Rubber</p> <p><u>Energy:</u></p> <p>Energy Consumption for Building One: Gas - 3.7m Kwhrs / year Electricity - 9.4m Kwhrs / year</p> | <p><u>Landfill:</u></p> <ul style="list-style-type: none"> - Eliminate, recycle and reuse material that goes to landfill. - A lot of packaging from suppliers cannot be recycled / reused. - Waste not efficiently segregated at source. - Section managers not taking responsibility for environmental controls. <p><u>Reuse:</u></p> <ul style="list-style-type: none"> Plastic trays Protective Tubing Bubble wrap ESD Bags Hardboard - 3TM MN Boxes <p><u>Recycle</u></p> <table> <tr> <td>Polythene</td> <td>Wooden pallets</td> </tr> <tr> <td>Cardboard</td> <td>Plastics</td> </tr> <tr> <td>polystyrene</td> <td>Paper</td> </tr> <tr> <td>Silica Gel</td> <td>Aluminum</td> </tr> <tr> <td>Glass / Mirrors</td> <td>Plastic cups</td> </tr> </table> <p><u>Eliminate</u></p> <ul style="list-style-type: none"> Polypropylene Polyethylene <p><u>Energy</u></p> <ul style="list-style-type: none"> Lighting Sensors | Polythene | Wooden pallets | Cardboard | Plastics | polystyrene | Paper | Silica Gel | Aluminum | Glass / Mirrors | Plastic cups | <ul style="list-style-type: none"> • Develop & roll out environmental training to all staff • Waste segregation improvement as a personal / team objective in Managing for results handbook. • Identify all non standard / over packaged items and feed back to suppliers via Gerald Cookes packaging team. • Identify all packaging that cannot be recycled or reused. Push back on suppliers not to supply packaging made of polyethylene & polypropylene. • Make section managers responsible / accountable for enforcing environmental disciplines. • Identify waste streams / reuse opportunities for newly identified waste. • Develop building one waste metrics for: Metal Plastics Cardboard MN Boxes Landfill ESD Bags Polythene Bubble Wrap Hardboard Foam • Monthly environmental meeting to monitor / drive change. | <ul style="list-style-type: none"> • Training plan developed. Under review prior to roll out • Issues identified and reviewed at fortnightly environmental meeting. • Issues identified and reviewed at fortnightly environmental meeting. • Good section manager attendance to environmental meeting. Actions are taken and carried out. • Ongoing via environmental team. • Under pilot study on Empress. • Underway. |
| Polythene | Wooden pallets | | | | | | | | | | | | |
| Cardboard | Plastics | | | | | | | | | | | | |
| polystyrene | Paper | | | | | | | | | | | | |
| Silica Gel | Aluminum | | | | | | | | | | | | |
| Glass / Mirrors | Plastic cups | | | | | | | | | | | | |

In terms of the environmental performance data generated by the EMS and the EHSU, the company produces environmental information on materials, energy and utilities usage, waste and recycled items that pass through the site. As one of the key environmental objectives is to reduce the waste generated at the site, a specific quarterly waste report is generated. The remaining data is formally collated on a spreadsheet format dictated by the US parent company:

‘We generate the data on a spreadsheet. The design of the spreadsheet came from our Environment Corporate in the States. We all fill in the same one, it all has the same categories and materials based upon what we make’. (EM1)

In terms of materials, environmental information is captured for the EMS through weighbridge tickets, which prevents the site “fudging the data”:

Everything is generated by a weighbridge ticket, so we segregate wastepaper, cardboard, scrap metal, PVC, power supplies, wood pallets, glass, the weight of carcasses recycled etc. We keep a check on all those. It's all externally audited and we can produce weighbridge tickets, so, you can't really fudge this'. (EM1)

This environmental performance information is compiled into quarterly reports and is routinely sent to management in the business centres and the site director:

‘We produce figures every three months, and they go to the management of each business centre. Even the site director gets a copy; I don't go and talk to him other than if we've not done too well’. (EM1)

The quarterly data is also sent to the US parent and the European Director, and the EHSU has to explain performance at the site:

‘We have to stand and explain why it's going pear-shaped, or why it's going well’. (EM1)

In order to improve environmental performance at the site, the EMS had introduced two overall operational standards, “design-to-the-environment” and “waste minimisation”.

The assistant EHSO and head EHSO outline the impact of these standards:

‘We use two standards: design to the environment and waste minimisation; twin umbrellas we say. They go through our entire manufacturing supply chain, so we go through procurement’. (EM2)

‘We go back to our part suppliers and we say we've got a target, so we don't want a lot of waste. It helps with the packaging regulations [i.e. the legal requirements], everything. So, we say how packaging will be specified. We put standards on them to say well, we want to re-use the packaging’. (EM1)

‘In the early nineties we had 8,000 different boxes coming into this site. We reduced it to eight. So, we bought heavy duty packaging and sent it to our suppliers. They sent parts in to us, flat pack it and we use it maybe, eight to ten times. It goes round the loop. We invested in that packaging initially, and we still have to keep investing. The savings we've made from that initiative are huge. Every year we're making big savings’. (EM1)

‘Similarly, with pallets. We had lots of different sizes of pallets. Now, we've got two, so we had two heavy-duty pallets; we bought the pallets to stamp Copyco on them. They go round, back to us and then back again’. (EM1)

'We go right back to procurement, selecting materials for their durability and recyclability, the packaging. It's more an assembly operation that we conduct. As copiers come in from different parts from appliance manufacturers, we assemble them together'. (EM2)

As there was "no on-site design facility" and "assembly of components is the major activity", the emphasis of the EMS was to manage "the environmental impacts entering and exiting the site". As a result, procurement and suppliers were main areas for environmental management attention at site level. Copyco UK's EHSU organises a quarterly "Supplier Environmental Day" at the site, where local suppliers are invited to a meeting about the environmental requirements of Copyco's procurement policy. Over 50 suppliers attended the last event, and it forms a vital part of the "supplier audits" and minimum environmental requirements placed on local suppliers:

'What we do is we've gone back to our suppliers, we've taken fifty suppliers so far, and said, right: this is what we do at Copyco. This is good practice. What we'd like you to do in order to be a supplier to us; first of all, you must have an environmental policy. So, that's a must. Secondly, you must be able to demonstrate to us regulatory compliance. We'll send them questionnaires, and we ask them to be able to demonstrate to our engineers who visit them and audit them for quality, and so forth: can you demonstrate that you are aware of all the environmental legislation that appertains to you? So, we ask them for those two things'. (EM1)

In addition, the EHSU strongly encourages its suppliers to implement their own EMS:

'We also ask them to do is say, right: we'll give you some help. What we would like you to do - we're not saying you have to - is work towards having an environmental management system. So, we go back to our suppliers and it's putting pressure on them. I'll say, we're not saying that you will have to have ISO or EMAS but what we are saying is we want to go back and develop an environmental management system. In the future, it may be that the corporation will say: to supply Copyco you are going to have ISO14001. We're not saying that at the moment, 'cos I think some of them are small suppliers. We don't want to shoot ourselves in the foot'. (EM1)

'We paid for them to be surveyed so they get a report back telling them where they are. And we'll go back to them next year, knowing where they were this year, and we'll expect to see them moving forward, so it's a sort of carrot-and-stick, gentle push in the right direction'. (EM1)

The company has a worldwide purchasing standard questionnaire that it periodically asks suppliers to complete, and this now includes a section on the environment.

'We will rate you for your delivery performance, your cost, your quality. And now we've got into that standard questionnaire a section on the environment'. (EM1)

Despite this, environmental issues were subservient to cost and quality issues within procurement decisions:

'At the moment cost and quality take precedence. The environment is there, and we get to see the data but they're not at the moment being judged on that data, but everybody is being made aware that, in the future, that could well be an equally ranking criteria'. (EM1)

This ranking of cost and environment brings the case to specific consideration of the role of management accounting within the EMS at Copyco. Site management accountants were totally uninvolved in both the development and current day-to-day activities of the EMS. In terms of the relations between the EHSU and the finance function at the site, the lack of site management accounting involvement in the environmental management initiatives at Copyco is clear from the following quote from the EHSO:

‘Cost savings I find difficult, because I don’t really have handle on that - I could do, but we go for weights and we go for gallons or whatever. I’d have not had time to stick my head above the parapet and get costs. We occasionally do it for senior management but, on a regular basis no. We do get costs if we’re asking for money but it’s difficult on something like noise emissions to do that’. (EM1).

The EHSO admits that before his unit implemented the EMS, the environmental impacts of the site were not measured unless part of regulatory compliance:

‘Before we [the EHSU] were set up, [environmental] measurement was limited to a few bare pieces of compliance data. It wasn’t useful to site management or the regulator, as it came from a machine measuring certain site emissions’. (EM1)

Existing conventional information systems also proved deficient for environmental management, with the EHSO even claiming that the standard costing system at the site:

‘wasn’t helpful. We didn’t spend very long with the accountants. They couldn’t really help us to pinpoint where the [environmental] problems were’. (EM1)

He found the lack of environmental information generation at the site seriously hindered his ability to manage environmental performance at the site:

‘You can’t truly manage something that is inappropriately measured’. (EM1)

However, as a result of implementing the EMS, the setting of environmental targets at the site meant that the EHSU had to implement and maintain a system of environmental performance measurement:

‘Because you set yourselves targets, you measure them’. (EM1)

The EHSO had not formally calculated the total cost savings from implementing EMS at the site, but he did admit that such an estimate would be made by the US parent and would also be included in the first EMAS environmental statement:

‘I haven’t worked out the cost savings yet, but will do it for the EMAS statement. They will also work it out back in the States’. (EM1)

Although formal calculations of cost savings were not conducted by the EHSO or his assistant, they were “fully aware” of cost savings from environmental management at the site, despite the problem of setting and judging performance against targets:

‘Well, it certainly feeds through into the bottom line’. (EM1)

'I'm not too hot on finance, but we are making big savings'. (EM2)

'Take a simple one, energy. We took a five per cent target reduction. We chose to register it in terms of kilowatts per standard hour. We tried to get a handle on energy but it depends on how many boxes go out of the door. It's very difficult to get a good target, 'cos we use energy all the time even if we are not making much. So, we chose kilowatts per standard hour of production. We didn't do as well in certain years because production went down. We had put things in place [improvements], but because you made less boxes, it didn't help'. (EM1)

As figure 8-2 shows, environmental management at the site was 'responsible' for cutting yearly energy consumption by 12.1%:

'We did really well last year, cutting energy consumption by 12.1%, quite a financial saving. That's a lot of hard work, but it works'. (EM1)

However, the EHSO did acknowledge that environmental improvements may require substantial 'up-front' investment and it was difficult to quantify the resulting benefit in financial terms. For example, the site had an existing environmental problem with noise emissions:

'One of the biggest problems we have is that the site is closely bounded by our neighbours. The year before we had eleven noise complaints, including three from the District Council and one was from a local MP. They were quite serious complaints because we were on a seven-day a week, 24-hour day operation. We decided we didn't want a noise abatement process'. (EM1)

As a result of these complaints, the EHSU decided to ask for resources from the site accountants for capital improvements to install 'silencers' on-site. The request was "supported" and influenced by information about the previous environmental cost savings created by the EHSU:

'We asked for money – we have savings in other areas - so we were given money to put noise reduction equipment on our fuse scrubbers, silencers and optimiser compressors and small noise suppression. We spent about £20,000 to do that. We now have nine complaints but only from two people and they've all to do with fork-truck movements and vehicle movements; not so much you can do about that'. (EM1)

Thus, for the EHSO, the actual cost dimension of environmental management innovations was often "incidental" to his activities, but he possessed detailed knowledge of how important the potential cost savings obtained were, as was seen by reducing the amount of special waste. Special waste is generated from the phosphating, painting and wash plant operations at site, and its control has generated substantial cost savings:

It's a huge amount. We were discharging (can't remember in terms of gallons without looking at the figure), but we are talking about £450 for a 5000 gallon tanker to take our waste away. We saved maybe £30,000 on special waste last year. That's a big cost-saving to the company'. (EM1)

Whilst the EMHSO officer recognises that environmental improvements can result in cost benefits, for him, such concerns are secondary to the aim of reducing environmental

impacts at the site. However, the EHSO is fully aware of the political importance of being able to highlight and make 'visible' the environmental costs savings of his projects. In many instances (see for example the earlier details about the noise abatement project) he can only get organizational support for environmental improvement projects if he can generate sufficient evidence of financial benefits to the accountants:

'Take special waste. We've had to put some filtration kit in there, and it wouldn't get approved unless we could estimate that we would have a saving in a normal payback period'. (EM1)

During a period of participant observation "shadowing" of the assistant EHSO, the researcher had considerable access to a vast database of environmental information that revealed specific details about cost causalities at the site. However, the information collected by the EMS and the EHSU is not routinely sent to, or used by, the site management accountants:

'Well, we don't feed it back to the accounting functions'. (EM1)

This is a very interesting observation for the role of management accounting within environmental management, since the environmental information has identified areas for cost reductions and savings at the site. When asked about this, the EHSO gave the following response:

'Well, we put out figures that we saved - they're [the accountants] aware that they are getting a good deal since we've been doing this. For us, the bottom line is one of the pressures for doing it, definitely'. (EM1)

In the opinion of the EHSO "there is interest from the management accountants" in environmental management, since environmental targets often "fit" within overall targets for cost reductions.

'I'm in the environment and there is interest in what we are doing. The Facilities Manager is given a target each year for cost reductions in energy. My Environment, Health and Safety unit is not financially figure-driven, but we are aiming to reduce energy usage. I'm helping him to achieve his target. My target is to use less energy. His target is to pay less'. (EM1)

'He's achieved his targets by re-negotiating his gas contracts, but the fact is everybody could have got that; but we actually use less energy as well, so he has a double bonus sort of thing. As far as he's concerned, his main target is to reduce the cost of his gas'. (EM1)

However, he thinks that this accounting interest in environmental management is largely ad-hoc, due to the EHSU merely being a "tacked on" (EM1) part of, and 'loosely coupled' with, the financial planning cycle:

It's difficult. I think we are very much tacked on, we are not part of their main planning cycle. We get targets and then we very much generate our own targets. We then go back to them [the accountants] and say: this is what I think we can do next year; we are not asking for a lot of money or anything'. (EM1)

During one interview, the EHSO was particularly frustrated about the involvement he has had with accountants in the control of packaging costs:

Accountants, oh God [he sighs]. The biggest one [project] we're working with the accountants on is packaging. We are aiming to save the company a lot of money in packaging.

In order to obtain the estimate for cost savings, the EHSU worked "closely" with the Copyco's buyers, but also had help from the Business Analyst (a management accountant) for the building. The result was the elimination of 'environmentally unfriendly' polystyrene packaging, and a cost saving of £2 million over three years:

'Through our work on packaging in building No. 1, we think we can save nearly £2M next two/three years just by getting rid of this polystyrene packaging. We've asked the buyers and they get costs. We suggest they use this corrapad which is actually cheaper than polystyrene and we won't have the disposal costs. A huge saving'. (EM1)

To the EHSO and his assistant, the most difficult part of getting management accountants and finance personnel involved in environmental management was to make them "aware" of its importance for cost control, but this "awareness" was improving:

It's getting them aware, I mean they then come out of their offices and you can get them to help with our projects'. (EM1)

'It's getting better [the awareness of accountants about environmental management]'. (EM2)

'If you take the more polluting issues, I think they are aware of them. Before we generate our plans we go back to them and say we're generating those targets, can you help us out with money'. (EM1)

Even the accounting apportionment of the cost of the EHSU itself seemed to cause 'operational' problems for the EHSO. The EHSU unit was a "site service" whose overhead cost was apportioned and allocated between the business centres. To the EHSO, this accounting treatment was "a pain in the backside" (EM1) as it meant that business centres were always complaining about their share of the EHSU costs:

'Here everything is in business units, so it's a pain in the backside, but everything has its bucket, so they're continually fighting back at the costs of our area 'cos we're a site service'. (EM1)

In addition to the apportionment of the EHSU, each unit had to pay its own waste disposal and energy costs:

We cost them money, but they pick up their own electricity bill, pay their own waste disposal bill, so that it's all allocated to individual business units. (EM1)

However, even the non-accounting trained EHSO was aware of specific problems in how the management accounts allocated and apportioned certain site environmental costs, such as special waste:

The problem is, we don't meter it [special waste]. So, we collect it centrally. (EM1)

The total cost for the site is probably divided up on a square footage basis. That is not done on what they actually generate. It's more the size of a building [that the business centre occupies]'. (EM1)

It would be to their benefit to produce less but I think the way the accounts, the level of the breakdown at the moment, is they pick up a proportion and that proportion is for the Business Analyst to work out. (EM1)

'Its [the cost of special waste] split up round the site. I know that the Business Analysts argue amongst themselves over the split, and they fight back to say we're not accepting that. (EM1)

It appears that site accountants have never undertaken a detailed analysis of the cost of special waste, even after the EMS has produced environmental information that revealed its cost causality and how it could be reduced. This evidence of the 'inappropriate' accounting treatment of special waste overhead is surprising, especially since management accounting appears to possess the techniques to capture the activities that drive such environmental costs. The disposal costs of special waste were substantial and rising, so management accounting could not have regarded them as simply unimportant and immaterial. The absence of management accounting interest in the control of special waste costs is not easy to comprehend, but there seem to be organizational boundaries on who is (and who is not) responsible for the management of environmental issues even where such issues have a substantially impact on costs and cost control. Only with the creation of the EHSU, the EMS and the generation of non-financial environmental information has the company even revealed that it could have greater control of its expenditure on special waste. Even now, the management accounting function leaves the detailed management of special waste issues to the EHSU, appears uninterested in the EMS information on the issue and still apportions the cost using floor area rather than usage.

During one interview, the researcher specifically asked whether the EHSO believed that his environmental information could aid the apportionment of certain waste and other environmental costs between business centres:

'Yes, but I am not sure it is. I haven't thought about investigating it with the accountants, but it is just my point of view. (EM1)

'We know what's being taken away. It's not quite like water metering. We've got meters on that sort of thing. We've got electricity, they pay for what they use, whereas waste, because of the way it's collected into a central storage area it's not quite as easy'. (EM1)

To the EHSO, it would be interesting to compare his figures of the waste produced by each business centre with how the accountants actually allocated the waste costs between business units:

‘Yes, it would’. (EM1)

It is possible it is [already done by an accountant], but I doubt it, because I don't know that they've come back and asked the right questions to me. I could break it down further for them, 'cos we have a series of tanks around the site. Each picks up waste and delivers it to the central collection point. It's picked up there so we know how much is going out in total. Going back to his individual pickups we could go back to say how much is used at each business centre'. (EM1)

Thus, the accounting apportionment of the special waste overhead for the site directly reduced the incentive for certain business centres to reduce the amount of special waste they created. This same problem was also apparent in the way that environmental regulatory compliance costs for the site were apportioned between business centres. However, the EHSO did mention that improving the allocation of such costs was something the Copyco Corporation was trying to achieve:

‘We are moving back all the time to give more producer pays or polluter pays responsibility for cost. We have a central budget for say, safety glass, a central budget for footwear; and we try to push those costs back to individual business centres. The idea is there’. (EM1)

In addition to the cost ‘visibilities’ revealed by their environmental information, the EMHSO and the EHSU also acted as ‘facilitators’ of intra-organizational and cross-functional “team efforts” and projects to reduce environmental costs, such as special waste:

‘Well, it [special waste] was measured because we have a contract with CSG [the disposal firm] to take it away and this cost was in the Facilities Manager's budget. I talked to him and said that we can reduce waste disposal costs by installing filters’. (EM1)

‘It's my job to facilitate these sorts of improvements. I'll go along and sit down with them [business centre managers] and say, I think we can save you money - have you thought about putting filtration in there? It works. It's a team effort’. (EM1)

In most instances, the EHSU is not involved in the generation of the capital expenditure proposals sent to the finance unit for approval, since this is left to the individual business centres:

‘I don't generate the CERs [corporate expenditure requests] to get the capital approval so somebody in their department will have to sit down, look at how its done and then talk to the accountants about money.’ (EM1)

Overall, in the opinion of the EHSO, interactions between him and the site accountants were still relatively rare, and the Business Analysts and other accountants at the site rarely consulted the environmental information his unit generated:

'We go to them to get information, so they know we exist, 'cos we get standard hours data and so forth'. (EM1)

'Apart from the packaging project, none of the analysts [and accountants] ever come to us in our department, but then again, we all live in our own little boxes. I don't really talk to the business analysts about that sort of thing [cost apportionment and cost control]'. (EM1)

In terms of site management accountants interviewed, the researcher was able to conduct a series of interviews with the head of the finance unit (MA1) and one of the business analysts (MA2). The Head of Finance was a CIMA qualified management accountant, had worked at the site for thirteen years and was responsible for all accounting activity at the site. The Business Analyst was jointly responsible for the cost accounting in the Asset Recovery, Electronic Assembly and Site Services centres, and had aided the EHSO in the packaging project mentioned earlier. She was a part-qualified CIMA accountant. Neither of the accountants interviewed expressed any personal commitment to environmental issues. Furthermore, in the interviews and conversations conducted with the Business Analyst, she preferred to talk about the professional courses run by the researcher's academic institution rather than the role of environmental management at the site.

The Finance unit was part of the "Site Services" centre, and its offices were located in the neighbouring building to that of the EHSU. In the opinion of the Head of Finance, environmental management was:

'something we do anyway running an efficient business'. (MA1)

However, in thirteen years of working for the company, the Head of Finance had seen the development of environmental management at the site, and acknowledged that it was important to spend money on such activities in order to remedy past environmental damage and fulfil the corporation's responsibility on the environment:

'I'm aware of things we do. We're in an industry that has to take its environmental responsibility seriously. I've only been with the company 13 years, so I don't know what went on in the earlier days, but going back 15-20 years ago, then obviously there were processes going on on-site and chemicals being used which probably wouldn't have been allowed today, because of the changes in legislation'. (MA1)

'Last year we did certain things on one part of the site where we do some clean up activities which relate to things that had gone on on-site some time ago; so we're incurring the cost today of things which had gone on in the past'. (MA1)

'Knowledge on some of these things has changed and standards have changed. And, then things like water monitoring, we have a brook which goes through the site. Now, we spend money on monitoring that; at the end of the day, there's no economic gain to us ... it's a corporate responsibility to the local ecology'. (MA1)

In the view of the Business Analyst, a key success of the environmental management unit at Copyco UK was that they:

'go beyond the standard product cost data and give us a better management understanding of the cost implications of supplying a product and running a site'. (MA2)

In the opinion of the Head of Finance, the ISO 14001 EMS has been a powerful "enabler" for both environmental management and increased cost control at the site:

'I think it's an enabler'. (MA1)

'I think if you take, say, utilities and electricity, for example. We said at the start, we would try to reduce those costs I guess because at the end of the day it's in our interests to reduce our cost base. I guess if there are pressures from environmental considerations then I think any information - it sort of heightens people's awareness I think'. (MA1)

Although no accountant was a member of either the Environmental Steering Committee or the EHSU at the site, the Head of Finance chairs the meeting of the EHS committee for the Site Services centre of the site. For him, the powerful aspect of his meetings, and those of the other EHS committees, is to raise "awareness" of the need for environmental management at the site and its links with cost control:

'For example this morning I've been to a meeting. I look after these two buildings, Building 7 and 8 and we have a monthly meeting where we discuss Health and Safety and Environmental issues. And, today, those discussions – we talk about environment and there's limits to what we can do in an office area, but we talk about things like making sure that the recycling bins are used correctly and making sure that people don't put plastic papers into the recycling bin and those type of things. It heightens people's awareness and obviously it does have a benefit really because if you heighten people's awareness then, you know, we do produce saleable waste which helps us; so the two run in parallel. I think in this environment [the office] it's limits to what can be done, really, but the very fact that people are aware of it and looking at it and therefore take an interest in it, is probably a positive note'. (MA1)

These issues are not big cost drivers. But, at the end of the day, it's still saving, it will still save the company money, and it also gives, I think ... if you get a group of people together, they do take a genuine interest because, well, not everyone, but certain members of the group do take an interest because they feel as though they are doing something positive; and at the end of the day if it's saving the company money and they are making a contribution, then it's a sort of win-win situation. (MA1)

In terms of responsibility for environmental management, the Head of Finance believed that "you've got to cascade that down and let the people on the ground take control of their own parts of the business" (MA1), since the EHSU could not control everything themselves. The researcher was later allowed to attend one meeting of the Site Services EHS committee. This meeting was chaired by the head of the finance unit, and included, amongst its attendance of twelve, four business analysts with accounting training and the assistant EHSO. One of the subjects was the 'power down' settings on the office PCs, and reminding everyone to set the automatic power down on their PCs.

Despite the fact that Copyco Corporation is introducing ABC accounting at certain international sites, Copyco UK still uses a standard costing system as the basis for its management accounting.

'I think certain areas are trying to move into activity based costing, but standard costing is the general approach within Copyco at this moment in time'. (MA1)

The rationale for using standard costing at the site was that the majority of total manufacturing cost arose through the purchase of *finished* components from suppliers:

... bear in mind that most of the cost of what we do, what we produce, is in the cost of the components we buy in, so if we ship a digital printer for (I don't know) ten thousand dollars, probably eight thousand dollars of that is the parts we bought in basically'. (MA1)

Since a high proportion of the cost of manufacture was 'locked-in' through the decision to buy components from a certain supplier, the Head of Finance was fully aware of company procedures, including the activities of the EHSU, to "vet" suppliers based upon cost, quality and environmental criteria:

'We have what we call supply of quality assurance engineers, okay? We tend to deal with a relatively small supplier base of companies, you have to go through a fairly robust selection process. Obviously one of the key criteria is cost, in terms of the cost of the components, but, at the end of the day, other aspects are taken into consideration'. (MA1)

'It's further down the line from here [the finance unit], but the relationship is such that we're doing quite big business with a few suppliers, and we have our quality assurance engineers go out to visit these suppliers regularly. We check the quality of the parts; certainly, when the parts are designed then, obviously, things like environmental recyclability and things like that are taken into consideration. Some of it, again, is economics driven; for example, if you look at say some of the plastic mouldings, for example, then, at the end of the day, if the design is such that you minimise the amount of plastic you use, it's probably more environmentally friendly, but it also gives us a cheaper component price anyway, so quite often the two work together'. (MA1)

These Copyco "supplier audits" are intended to reduce cost, increase product quality and reduce the environmental impacts of components at the point of procurement. In the opinion of the Business Analyst, these activities have substantially reduced the role of accountants in the day-to-day management of supply chain issues:

'At the end of the day, we no longer need to be heavily involved with procurement. At most, I speak to Corporate buyers, not the suppliers'. (MA2)

At Copyco UK, costs are collected at both site and cost centre level, and are then traced, attributed, allocated and apportioned between the individual business centres. The standard cost data produced by the accounting system is used to determine annually the "manufacturing transfer price" for each of a business centre's products. The firm is actively trying to make each business centre or service centre "totally responsible" for the

costs they generate, and, as a result, each centre must recognise the environmental costs, such as waste disposal, associated with their activities:

'The way we're moving it now is, we try to make the business areas totally responsible for their costs. In fuses, for example, they have liquid waste which they have to dispose of in an environmentally friendly way, and they would have to plan that within their costs basically. So when they produce the price of their goods (we set the prices annually) so they will set the manufacturing transfer price, for their goods on an annualised basis; then they will have to capture within their cost base those type of costs, if it's specific to their process. So, as much as possible, they will go to the business area concerned'. (MA1)

Each of the business areas will have their own environmental costs which will be captured as part of their business area costs. If we take, a good example would be asset management, where we bring old equipment back from the field. Part of their core activity will be to dismantle that machine and take from it some good components which will then be re-used and obviously to then dispose of the rest of the parts in an environmentally friendly way. They might segregate, for example, the various waste streams like the plastics and metals, and so on; and obviously from a financial point of view, within that area then they will endeavour to - they will segregate the waste - negotiate with local contractors to get as much money back for that waste as they can'. (MA2)

So, process-specific 'environmental costs' are *supposed* to be charged to the business centre responsible for causing them, similar to a 'polluter pays principle'. However, as was documented earlier with regard to special waste, this was not happening with certain environmental costs as they were simply being treated as "generic overheads" of the site. For accounting purposes, the EHSU was treated as a cost centre, and all the environment-related "generic overheads" would be routinely charged to it:

'For us, Environment, Health and Safety is just another cost centre'. (MA2)

The Head of Finance identified a number of environment-related "generic" overheads at the site, and these included environmental compliance costs and the cost of supplying the EHSU "site services":

'Now, obviously, there are certain generic type activities which [EM1] and his department [EHSU] would be responsible for, such as compliance and interfacing with legal bodies, that type of thing'. Those costs would generally sit within the account forming his [EM1] cost centre budget'. (MA1)

These environment-related "generic" overheads would be charged to the EHSU cost centre, and then recharged to individual business centres through:

'a process of allocation and apportionment they would then find their way through to the business areas. But obviously it's not a specific cost; it's for allocation and apportionment that those costs would finish up in the product cost'.

In terms of accounting for the special waste "overhead", the Business Analyst confirmed that the apportionment between business centres was based on the size of the building each occupied:

'Special waste is treated as a generic site level overhead. Two years ago, let me find, here it is, - it cost us over £300,000 for tanker removal from the site. As with other site overheads, it is apportioned to site buildings using the square feet occupied'. (MA2)

She was aware of the success of the special waste filtration project initiated by the EHSU, but did not suggest that the accounting function was going to further analyse or investigate which business centres were responsible for this "considerable" cost:

'I know that this overhead decreased by around 10% last year because of an environmental project, but it is still a considerable cost to the site'. (MA2)

In terms of financial resources available for environmental management at the site, the annual budget for the EHSU "cost centre" was determined through discussions with the Finance unit. In order to establish a basis for this, the Finance unit utilises a zero-based approach to budgeting:

'We use a zero-based budgeting sort of approach, so each year the business centres will pull together what they need to spend on all aspects of their business. Now, [EM1] within his own cost centre obviously pulls together the cost that he believes he needs to spend in the following year for his annual plan. And, contained within that would be the generic [overhead] costs. (MA2)

However, the cost of planned environmental management projects would not necessarily be charged to the budget of the EHSU cost centre, especially where the project was focused on a problem in a specific business centre:

If, for example, somebody in Fuses and Frames [a business centre] have a scrap or waste issue which they need to address, then they would plan that within their area but, to be honest, it's a two-way conversation – it ought to be a two-way conversation between that business area and the [EHSU]: how do I dispose of this and what company should I use, and maybe they go away and get a quote. The business centre should take responsibility. At the end of the day, you've got this advisory specialist group sitting in the middle, and between them they should plan all the elements of costs associated with maintaining the environmental standard to the level we want them to maintain. And whether it's planned in the business area or whether it's planned in [the EHSU] area has to sort of agree through a dialogue process'. (MA2)

The Finance unit works together with the EHSU to produce a yearly "control plan" of "how much they are going to spend on salaries and then all the other things the EHSU might need to spend money on" (EM1).

During one of the interviews, the researcher asked the Head of the Finance unit about the accounting codes used to categorise cost at the site, and whether there was a specific "environmental cost" category. He looked at a cost sheet and said:

'The account codes we have are fairly generic and there are no, I'm not sure whether there are any particular....oh, there is a line for environment! (MA1)

He seemed genuinely surprised to find a specific accounting coding and line in the accounts for showing "environmental" cost. The researcher asked about what would be

included within the line for “environmental” cost in the accounting system, and the head of the finance unit replied:

‘Oh, good question. I don't think a lot, to be quite honest’. (MA1)

If it was something specific say, the water monitoring, for example. Maybe that would appear, but generally most of it would not appear on the environmental line; it would be all the things we do. Take the sorting of waste in asset management. The labour associated with sorting that waste would sit in the direct labour line. The transport for moving the waste out would appear in the transport line, and so on, really. So, none of that would appear in the environmental line.

So, even though the structure and coding of the management accounts allow the identification of “environmental cost” from other costs, such a separation is not routinely undertaken by the accountants. To the Head of Finance including, for example, “environment-related labour costs” with “non-environment related labour costs was not important as:

‘At the end of the day, it's the environmental thing we're doing there’. (MA1)

In a similar vein, both the Head of Finance and the Business Analyst thought that it was possible to separately identify the “environmental costs” for every operation at the site, but did not believe that the resulting “environmental cost” data would aid decision-making:

‘It wouldn't help me run this business any better, I don't think. It would add cost to the business because I'd have to have somebody sit there going through it all and doing the administration associated with it. What it would find me --- I'm not sure it would find me much at all, to be honest with you’. (MA1)

‘Well, we could do it. We know every single element which goes into that plan by line. You are talking thousands and thousands of pieces of data and we wouldn't choose to do it for any practical reason. From a point of view of running our business it wouldn't do much for me, really in a sense’. (MA2)

In terms of benchmarking performance, none of the accountants had attempted to benchmark any of the environmental costs of running the site:

‘I don't go and benchmark with other companies or Copyco sites how much I spend on environment compared with them’. (MA1)

Neither of the accountants was aware that the EHSU routinely benchmarked environmental performance on energy and waste with Copyco's sister plant in the Netherlands (see earlier in the case). In terms of normal “non-green” benchmarking of products and costs, the Head of Finance was involved in this activity:

‘If we talk about other companies, the benchmark is the market place, because at the end of the day if I don't get our costs down to competitive levels we'd go out of business. So, I've got to get my unit manufacturing costs down so far as I can and that is it. That is at the end of the day, the benchmark. We will compare our products with comparable products of my competitors, so we know what it costs to build and sell our machines, and I get feedback from the market place. Feedback saying we can't sell

your machines because they are too expensive. And that's why we have to keep pressing on the prices'. (MA1)

'At the end of the day our marketing guys do that, and feedback to us'. (MA1)

As no design work was conducted at the site, activities were limited to building existing designs as cheaply as possible, although "we can do certain things to reduce the cost of the design" (EM1). This meant that the competitive benchmarking was limited in scope, and even obtaining the data for this was difficult:

'We're given a product in a certain design and figuration to build and we would do our utmost to build that as cheaply as we can. Detail cost comparisons - no, because the problem is often getting the data anyway. I wouldn't want to share with HP or Canon what my labour costs are. I wouldn't do it; it would be financial suicide'. (MA1)

The majority of non-green benchmarking was directed at establishing the competitive position of the Copyco UK site relative to other Copyco sites, but was also aimed at spreading best practice throughout the Corporation:

My goal is for the site to do well, and the only way I can do that is to make sure that we can produce product as cheap as any of the other Copyco plants so that when the next product comes along there's a good chance that it will be placed here. (MA1)

Within the European context, we have a sister plant in Holland and a sister plant which has just been developed in Ireland. What you have to worry about is the benefits of the competitive environment versus the benefits of having a more team-orientated environment, and the benefits you get by sharing best practice. In the past, there has been a competitive element but right now we're more towards sharing best practice. (MA1)

Benchmarking with other Copyco sites focused on different benchmarks depending on the type of products each site produced:

'We compare things like the value-added rate, labour and overhead rates, so although we're not producing the same product there are some benchmark comparisons that we do. When we compare with the US sites: they're producing exactly the same product as we are. So we can go through bit by bit and do a precise cost comparison with what their doing. And we do that, we do that on a regular basis. We share information between us and the US, so again, yes, it's best practice sharing and there is an element of competitiveness in there as well I think. We like to consider ourselves in Europe more cost efficient than the Americans'. (MA1)

Thus, the management accountants carried out benchmarking in a similar way to the EHSO, but no integration of these two sets of benchmarks was undertaken.

In terms of investment appraisal, "anything that goes on the balance sheet has to go through a fairly robust authorisation process" (MA2). Where capital expenditure is necessary to comply with environmental regulations this would be classified as "programme expenditure" and funds would be made available from the US parent. However, if environmental projects are discretionary, "non-programme" capital

expenditure they must compete for funding with ordinary projects. A capital expenditure request (CER) is drafted for each project proposal, and this is sent to the EHSU for consideration of its environmental, health and safety impacts. If the proposal is agreed by the EHSU, the CER is then sent to the Head of Finance for his approval:

‘A business centre has to put a proposal together. It firstly goes to the EHSU people to get their agreement for the proposal. It then comes to me, and I would expect to see an estimate of what we are going to spend and what the benefit is. We put these numbers through a discounted cash flow model to measure the NPV and we would also calculate the payback’. (MA1)

The “hurdle criteria” applied to each proposal is confidential, but, to the researcher, appeared quite normal. All the proposals that exceed the hurdle rates are deemed “financially justifiable”, but it is up to the Head of Finance to determine which ones he should spend his yearly “non-programme” capital expenditure budget on:

‘If I’m only allowed £3.2M in the whole year and people come up with lots of projects which exceed those hurdles, then I still can’t approve them because I haven’t got enough money’. (MA1)

The decision to accept a specific project is obviously influenced by financial criteria, but also recognises an array of other characteristics, such as the strategic and environmental benefits of the project:

‘So we get into a prioritisation which will take into account other factors. It is strategically the thing we want to do? Is this the business we want to be in? Those types of things’. (MA1)

‘If there were some environmentally financially justifiable benefits, then people can throw those into the hat: I’ve no problem with that. However, we have projects which we can not cost justify; things we need to do because we either think they are strategically the right thing to do, because they have environment, health and safety implications or because they are the right thing to do. Those things you can never cost justify’. (MA1)

Where projects cannot be justified on financial grounds, and “a lot of environment projects would fit within that category” (MA1), Copyco tried to implement a “balanced portfolio” of projects that uphold the corporate citizenship responsibilities of Copyco:

‘Environmental projects on their own you would find nigh on impossible to cost justify. You have to take a view which says: ... I’m looking to produce a balanced portfolio of investment. Within that balanced portfolio, as good corporate citizens, we would say, well, we ought to invest and make sure we are doing the right things as far as the environment is concerned’. (MA1)

In the opinion of the Head of Finance, over the last five to ten years an increasing number of proposals routinely highlight the environmental benefits from a project:

‘If you went back a few years, then I would say when people are trying to cost justify projects, they’ll look for every angle if you like and if there were environmental angles in there. If there were a cost element in there, be it environmental, they would put it in there whether they recognise it as being environmental is another thing’. (MA1)

'I think there is certainly more awareness [about environmental impacts]. If somebody puts one in front of me and it says environmental, then I'm more likely to see one today than I would have been five years ago'. (MA1)

'When you get to the qualitative detail backup [non-financial information in the proposal], then today if you get to those sort of paragraphs, if there are some good environmental impacts then people will allude to them and maybe that as support for the project. I'm not quite sure whether that would have played such a key role five or ten years ago. I don't know, I suspect probably not'. (MA1)

The ultimate decision to accept a specific project is reached through "dialogue" between the Head of Finance and the Site Director:

Well, at the end of the day, it's a sort of dialogue really. I discuss it with my boss [the Site Director]; we sort of weigh up the pros and cons really. I haven't got a set of rules to work to in that sense. I've got the financial rules to work to but once we go beyond those then, as I say, it's a whole plethora of things like environment, health, safety, strategy, those types of things. Then we weigh it up – we weigh up where we are in the year, you know, we've got £3M to spend during the course of the year; if I'm underspent half way through the year, I think we've probably got a little bit of room we can put that one through ... it's a subjective thing. (MA1)

Once a project is implemented, the Finance unit do not conduct routinely conduct post-implementation audits as "it costs you more to gather the information that what you are potentially going to save, and by that time you've spent your money any way" (EM1).

From the evidence in this case study, it appears that Copyco's conventional management accounting systems *have not changed* in response to Corporate 'greening'. Costing and budgeting remain unchanged. Environmental costs are not separately identified in the accounts, despite the accounting system providing a specific coding line for "environmental" cost. A further issue is that certain 'environmental' costs, such as special waste and regulatory compliance expenditure, are simply treated as "generic overheads" and inappropriately apportioned between business centres. Thus, the management accounting function at Copyco has not even begun to evolve into an environment-related form of management accounting. The accountants do not produce information that accords with the prescriptions of environment-related information in the literature, and, during interviews, did not even mention the need to measure sustainability issues, life-cycle costs or the social costs of site operations.

Although the accountants are not generating information that conforms to prescriptions of environment-related management accounting, the EHSU is doing so. The ISO14001 EMS and the EHSU at the site generate an array of non-financial environmental performance measurements and information that *should* be useful to site accountants. However, during

interviews with two site accountants, there was no specific mention of using this data for management accounting purposes. Modern management accounting is urged to make greater use of non-financial measures of performance, but this rarely occurs at Copyco UK. The largely non-financial environmental performance measurements produced by the EHSU are either ignored or used in a non-routine, *ad hoc* manner by the management accountants. This is surprising when such information has revealed new ‘visibilities’ about cost control, cost savings and performance at the site. However, as the EHSU becomes further ‘embedded’ and ‘valued’ within the organization, it could become involved with cross-functional interactions and information sharing with the Finance unit. For example, the Business Analyst described how experience of working with the EHSU during a packaging project had given her an “untapped” source of information:

‘Well, I helped the EHSO on a recent packaging project. With the help of our buyers, I provided him with cost estimates of alternative packaging options. He and various members of the electronic assembly team were then able to show me how the packaging costs and waste costs could be reduced or eliminated. He [EM1, the EHSO] seems to have an “untapped” source of information for us [the accountants]. It is something we want to exploit in the future’. (MA2)

This suggests that the Copyco accountants are slowly developing an “awareness” of how environmental management information can be useful to them, an observation that agrees with the earlier view of the EHSU. During interviews with the head of the finance unit, the researcher found him to be very “aware” and knowledgeable about environmental issues at the site, even though the accountants did not generate environmental information or specific environmental cost data. He chaired his building’s monthly meeting of the EHS committee, and liaised with the EHSU during the assessment of capital expenditure requests. Such an environmental awareness is obviously ‘fuelled’ by the EHSU being able to produce “bottom-line” cost savings, but, in the future, it may also be influenced by the way that environmental information can improve the apportionment and allocation of overheads at the site (e.g. special waste overheads).

At present, environmental management and environmental management information appears, at best, to be ‘loosely coupled’ with the accounting information generated by site accountants. It is certainly an “untapped” resource for the decision-making of management accountants. The EHSU is the centre of environmental management, controlling the management of environmental impacts and costs. In contrast, the

management accounting function currently plays little role in environmental management, despite the increasing environmental “awareness” of site accountants.

The main influence of management accounting in environmental management derives from its control of the budget for the EHSU cost centre. The budget for the EHSU is determined by interactions between the Finance unit and the EHSU, and the result of these discussions determines the level of environmental management at the site. Similarly, in investment appraisal decisions, it is the Finance unit that determines the level of importance to attach to environmental projects and environmental benefits, especially where the project cannot be justified on financial grounds. Thus, the Finance unit has to balance ‘financial rationality’ with environmental ‘responsibility’ at the site. This is a difficult task, but the site accountants appear to possess an adequate, if under-used, awareness of environmental issues at the site.

At present, the EMS and EHSU ‘buffer’ management accounting from having to cope with environmental management issues, since they provide the necessary management expertise and environmental information for decision-making. As a result of this ‘buffering’, existing accounting systems remain unchanged by environmental management, despite the fact that the EMS is generating environmental information that has revealed new ‘visibilities’ on environmental costs and performance. Management accountants at the site are slowly becoming aware of the value of such ‘visibilities’, and may increase their cross-functional interactions with the EHSU because of them. However, it is difficult to determine whether Copyco’s management accounting systems will change into an environment-related form of management accounting as the literature prescriptions predict.

The case study at Copyco only granted the researcher a twelve month ‘snap shop in time’ understanding of the role of management accounting within environmental management. It would be interesting to see how the EMS and the management accounting systems interact with each other in the future. As it currently stands, management accounting has effectively remained unchanged despite the introduction of an EMS and EHSU that have generated a substantial amount of new management information. This case study has shown that an apparently technical management accounting problem concerning the

deficient measurement of environmental performance can be solved through a 'non-accounting' organizational solution. Thus, the new EMS 'supplements' existing management accounting measurements and information, and allows the ESHU to manage environmental costs and impacts. The management accounting systems at Copyco have not changed as a result of 'greening', and are, at best, 'loosely coupled' to the environmental information generated by the EMS. The extent to which the observed 'loose coupling' between the two systems could remain in situ is uncertain, and can only be understood through more longitudinal access at the site. Although accounting systems have not changed, site management accountants are "environmentally aware" and knowledgeable about environmental issues and costs, and appear to be slowly developing a cross-functional relationship with the EHSU in cost reduction projects. The EHSO believes that his work can help the site accountants to control costs. Over time, accountants may make greater use of such work especially if 'green' issues begin to further increase the cost of manufacture at the site. Ultimately, any change in management accounting systems will be shaped by interactions within both organizational and social contexts.

Although management accounting appears to play little direct role in environmental management at Copyco, the case highlights that the introduction of environmental management at the site has fundamentally raised "environmental awareness" throughout the activities at the site. The EHSO acts as an environmental champion, and has helped to facilitate environmental cost savings and impact reductions in many different areas. A key role of the environmental manager at Copyco was to raise 'awareness' of environmental management:

'We raise the awareness at the site' (EM1).

This corporate environmental awareness was actively promoted in order to 'legitimise' corporate behaviour to both the US management and to prevent further 'external' greening pressures from the social context. The corporate culture at Copyco UK was that environmental management was a fundamental part of efficient management:

'All this environmental stuff is just efficient management' (EM1)

Thus, the environmental information generated by the EMS and the activities of the EHSU have helped to pinpoint environmental performance issues that can be solved by *reducing* expenditure on normal business costs, such as packaging.

During the researcher's visits to the site, it was always clean and tidy and there was no visible pollution being emitted from the manufacturing buildings. Waste was collected in the prescribed containers, and there were clear signage reminding organizational participants of the need to dispose of waste and other refuse in the correct manner. The car parking passes were made from the waste paper generated and recycled from operations at the *actual* site. Furthermore, staff who cycled to the site were granted an annual subsidy towards protective clothing and maintenance of their bicycles. During participant observation of the two EHSU managers, the researcher was able to experience the day-to-day environmental management at the site, which involved a mixture of desk work collecting and interpreting environmental information as part of the EMS, and also the provision of an environmental "site services" consulting function for all areas of the site.

After approximately twelve months of access at Copyco, the researcher was no longer allowed access, with contacts stating that "we're just going to retreat and try to look after ourselves for a little while" due to a "forthcoming management restructuring" (EM1). It subsequently emerged that Copyco Corporation in the US were experiencing financial problems, and had decided to move a majority of existing operations away from the UK site. Eventually, approximately 90% of over 2,000 employees at the site were made redundant, leaving just a temporary skeleton staff involved in asset recovery. Rather surprisingly, in early 2004, Copyco Corporation publicised on its website that the remaining staff at the UK site had just won one of 14 'Earth Awards' for thinking green and saving the firm money. Specific details of these 'green' activities were not disclosed, but it must have been little comfort to the local population affected by the major redundancies at the site.

8.3.1 Applying the 'Skeletal' theoretical Models at Copyco

Corporate 'greening' at Copyco can be explained by a number of the theories contained within the 'envelope of greening' developed in chapter 4. The adoption of 'green' EMS

allowed the company to achieve external legitimacy, increase both its ‘green’ and ‘non-green’ effectiveness and retain access to its customer base. However, certain of the Copyco actions now deemed as part of environmental management, such as asset recovery, were originally undertaken in an effort to remain cost competitive in the market-place. This history of ‘unintentional environmental improvement’ is important, and highlights that the desire to undertake elements of environmental management may simply occur as a direct consequence of efforts to increase business efficiency. In essence, environmental improvements were a by-product of Copyco’s actions to recover assets and reduce costs.

The Copyco UK site had been a major local employer since the 1970s, and the economic importance of the site appears to reduce the importance of its ‘environmental visibility’ in interactions with the local population and media. However, Copyco UK’s ‘environmental visibility’ is increased by it being part of a large multinational organization, and also because of the type of products it manufactures. This means that it encounters an increased level of ‘external’ greening pressure than most UK-based manufacturers. Despite this, the Copyco organization has actively attempted to *enact* its ‘environmental visibility’ by developing its ‘green’ reputation through the implementation of a worldwide environmental policy and introducing EMS at all its manufacturing sites. Even at local level, Copyco UK was actively promoting its green reputation by hosting an event of the GGBC, and the EHSO actively shared environmental management ideas at other events of this green business network. The EHSO was allowed to publicise the environmental management activities at the site, and genuinely thought that this was part of his job description. As a result of such activities, Copyco UK had not received any complaints from environmental pressure groups, although the local media had documented a complaint from the local Member of Parliament about noise from the site.

In addition to the normal ‘external’ greening pressure from customers, legislation and the competition, Copyco participants highlighted how suppliers were a major influence on the ‘environmental visibility’ of the firm. As a high percentage of the cost of manufacture came from purchased components, the environmental impacts of Copyco’s finished products are heavily determined by elements of their suppliers’ value chain. Actions taken by suppliers can increase or decrease environmental impacts, especially regarding

the amount of assets that could be recovered or recycled at the site. As a result, the company had to specifically “audit” its suppliers in order to eliminate environmental impacts during purchasing decisions.

In terms of the internal catalysts for ‘greening’, the intra-organizational linkages of Copyco UK and Copyco US have actively influenced the level of environmental compliance at the UK site. As part of the corporation’s worldwide environmental policy and strategy, Copyco UK has to comply with the requirements of *US environmental regulation*, which are more stringent than the comparative requirements of UK legislation. This means that the ownership structure of Copyco UK is a major influence on the level of environmental management at the site, leaving little discretion for UK managers to determine the extent of environmental management. However, the large size of the firm appeared to increase the level of management and financial resources devoted to environmental management at the site, especially as the Head of Finance was given an annual budget of over £3 million for “non-programme” capital projects.

Another internal characteristic affecting greening was the type of products being produced, since they directly increased the environmental impacts at the site. As there was no design facility at the site, management had only a small ability to “design out” environmental impacts, but the AMT utilised at the site provided scope for process and technological changes in order to eliminate some of these impacts during manufacture. Additional reductions were made through the internal “audit” of component suppliers.

The structure of the EHSU, EMS and environmental management also influenced the level of ‘greening’ within the firm. Being part of the existing health and safety function effectively defined its role and ‘meaning’ at the site, as did the links between the ISO14001 EMS and the site’s existing ISO 90001 quality management systems. Whilst the EHSU was a “site service” that acted as a consultant, it was supported by a structure of EHS committees and “environmental champions” at the site. The aim was to raise environmental awareness throughout the organization. Whilst the EHSU is not routinely involved in the day-to-day activities of each business centres, it influences activities by imposing environmental targets and has an influence with investment appraisal decisions. Despite his non-environmental background, the EHSO was a committed “environmental

champion”, and believed in what he was doing at the site. Without his considerable passion for his job, a number of environmental projects would not have been implemented.

The existing management control and information systems did not seem to affect the EHSU aside from negotiating with it over funding. The Finance unit accepted the value of the EHSU, but treated it like any other cost centre and controlled its budget and spending. Thus, the EHSU had a budget that limited its environmental plans and targets, restricting the pace of ‘greening’ at the site.

Copyco UK exhibits the ‘experimenter’ type of ‘dominant attitude’ towards the environment as it sees environmental management as a fundamental part of efficient business management. ‘Greening’ at Copyco is much more than an exercise in achieving ‘legitimacy’, as the site has embedded environmental management within its design archetype, and there is an “environmental awareness” within the majority of organizational participants, even the management accountants. Copyco UK seems to have gone beyond a simple ‘secondary’ level of greening, since the interpretative schemes of the firm routinely appreciate the need for environmental management. However, ‘primary’ level change has not occurred since the company is still orientated towards minimising the cost of manufacture and is not a ‘true green’ firm. Thus, it seems that the company has undergone ‘intermediate’ level change that was initiated through ‘greening’ initiatives from the US parent company. The creation of the EHSU, the EMS and other environmental structures within the firm has made concern for environmental management a routine part of the interpretative schemes that influence organizational participants. One of the key drivers for the continuing development of this culture of environment awareness is the EHSO, who acts as an independent environmental champion at the site. As the researcher was not at the organizational genesis of ‘greening’ at the site it is difficult to establish the specific ‘track’ that intermediate greening change followed. However, as greening occurred as a direct result of the Copyco Corporation adopting an environmental policy, it seems that the intermediate change emerged from a *stable emergent track*, as change did not appear contested by organizational participants.

In order to support its 'experimenter' attitude, Copyco UK generates stage 2 level environmental information. Stage 3 data is not generated since the site does not produce information on the 'sustainability', life-cycle costs or social costs of its operations. Management accountants and accounting techniques do not appear involved in generating the stage 2 environmental information. Thus, it is left to the EHSU and the EMS to provide, and facilitate the generation of, such information. Environmental information is generated and processed in a number of different organizational systems, structures and activities within the organization, including: the operation of the EMS; the activities of the EHSU; during meetings of the EHS committees; and during meetings of the Environmental Steering committee. The environmental information obtained from the EMS is used in a variety of ways, and appears to perform the role of an "answer machine" and "learning machine" for the environmental managers at the site. Environmental information is also used as "ammunition", helping to convince organizational participants to engage in environmental management. For example, evidence of the cost savings created by the EHSU were used to justify a further capital project on noise reduction, and such information is also used by the EHSU to elicit business manager support for indulging in environmental projects. Environmental information is also used to "rationalise" the environmental characteristics of the activities at the site, since the EHSU generates a public EMAS environmental statement of how the company is performing on the environment.

8.4 The Paperco Case Study

The final UK manufacturing site studied was Paperco, located in the West of England. Paperco UK is a medium-sized paper mill business that manufactures various types of filter paper, filtration media and glass fibre separators for the automotive filtration and battery separator markets. The mill employs 186 full-time employees and had been operating at its present location for thirty years. Although Paperco UK was a profitable business, the relatively small scale of its operations had started to reduce its competitiveness in the fiercely competitive paper industry. As a direct result of this and the need for further investment at the plant, the independent Paperco UK agreed to a “rescue” takeover by the US Paperco Corporation nine months before the case study commenced. Established in 1843, the US Paperco Corporation (turnover \$192 million in 2003) supplies speciality, industrial and technical papers and nonwovens. Prior to the takeover, Paperco UK had worked closely with US Paperco for six years on a number of projects, so the two companies had existing business and corporate links. For the US Paperco Corporation, the UK site was attractive since it was inexpensive to buy, offered access to new paper products, had a good customer base and offered it a mill located in the “lucrative” European paper market. As a result of its corporate “rescue”, Paperco UK had just undergone a restructuring that had resulted in 20% of the workforce being made redundant in an effort to eliminate costs.

The “Mission Statement” of the US Paperco Corporation is:

‘It is the mission and purpose of [the Paperco Group] to provide the highest quality speciality industrial fibrous composite and nonwoven materials to our customers. Our existence is based on providing value-added products and services that result in a return on investment sufficient to reward our stockholders and provide funds for continued growth. We intend to provide a quality work life for our employees, to serve as an outstanding supplier to our customers, and to operate as a responsible corporate citizen in our communities’.

In addition, one of the Corporation’s “Core Values” focuses on the environment:

Environment: We respect the environment and act responsibly to preserve it.

Other than these two statements, the US Paperco Group does not have a specific environmental policy or strategy. As a result of its takeover, Paperco UK was to adopt the mission statement and core values of its parent, but according to the Technical and Site Director (TSD1): “we were trying to do all this anyway”. However, when the case study commenced, Paperco UK did not have an EMS, an environmental manager or even

a “reliable means of ensuring compliance with environmental legislation” (TSD1). This is a situation that the Technical and Site Director wanted to improve at the site, and he had personally initiated discussions with other site managers about introducing an environmental management structure at the site.

Due to Paperco’s restructuring, there had been a fundamental change in management responsibilities:

‘We had basically a change of management structure, at the time of making I think, something like 20% of the staff redundant. So, several bits of jobs were combined together’. (TSD1)

As a result, the Technical and Site Director found himself with overall management responsibility for the environmental management, health & safety, accounting functions and certain other technical functions at the site. He was an ICAEW qualified accountant with considerable engineering and management expertise, and had worked at Paperco UK for fifteen years. In contrast to the other case studies, he was the line manager in charge of the management accounting/finance function *and also the* manager responsible for the overall implementation of the EMS and environmental function.

At the time of the case study, the US parent *had not* requested that the UK site implement ISO 14001 EMS or any other environmental initiatives. Furthermore, specific funding for environmental management was not made available by the US parent, which was currently concerned with cutting manufacturing costs at the site. Thus, the management and financial resources available for environmental management at the UK site seemed limited:

“We are busy with our restructuring, so don’t have a lot of time and money to throw at it. However, it is something that we need to do ... with regulation increasing.’ (TSD1)

During the interviews and site visits to Paperco, the Technical and Site Director was the primary ‘driving force’ behind the decision to implement EMS at the site, and the researcher saw him attend many of the events organised by the Gloucestershire Green Business Club. His personal view of the environment was:

‘I live in the countryside, enjoy it, and respect it. If we, as a business, can do anything about our environmental impacts without harming our cost base, then we do so’. (TSD1)

Plans to implement an environmental management structure and EMS at Paperco had been underway “for a few months” (TSD1). The Technical and Site Director has just appointed the health and safety manager, a qualified chemist, to a new role of Health,

Safety and Environment Manager (HSEM, referred to as EM1 in the quotes). It was the task of the HSEM to liaise with the Technical and Site Director, and implement EMS at the site.

Whilst the US takeover of the company was one reason behind Paperco's decision to improve its environmental management, the Technical and Site Director highlighted another reason:

'I think, in recent years, there's been certainly increasing pressure on businesses in general to be more active in terms of their environmental performance'. (TSD1)

Communication with UK environmental regulatory bodies was also a major influence on the decision to try and implement an EMS.

'We have had long links with people like the Environment Agency ... so we were sort of active in the environmental sphere from a long time ago'. (TSD1)

I would say, because of the noticeable amount of legislation brought in recent years, we are deciding whether this is the best way to handle it, and integrate into the mills overall activity'. (TSD1)

Thus, ensuring compliance with legislation, rather than the potential to save cost, appeared to be a major influence behind the attempt to implement an EMS:

'I agree with the overall concept that it can save money for business. And, I'm sure it will be the case here, but, because of what we do, the products we make, we are actually having to spend quite a bit of capital on various projects to ensure compliance with legislation which in itself, isn't going to bring much of a return. A good example of that is we have a BOC oxidiser just about to come on stream; this is to meet current legislation. It's costing the best part of £300,000 - there will be zero return from that!' (TSD1)

Surprisingly, organizational respondents did not perceive Paperco's customers to be a major influence on the decision to develop an ISO 14001 EMS at the site:

'We haven't had much in the way of pressurising from customers - yet. I think it will come, but not too much at the moment'. (TSD1)

'I think it will come in time. We've been more under pressure on the quality side being in the automotive market; early in the chain, so to speak'. (EM1)

For customers, issues of product quality and cost were still the paramount reasons to select Paperco, with the environmental characteristics of its products playing little role in such decisions. However, Paperco was a member of the Paper Federation of GB, and this industry body was strongly promoting to its membership how enhancing their "green credentials" could attract customers and even cut manufacturing costs. For example, in the six-months prior to the case study, The Paper Federation issued eight reports and other publications about how paper manufacturers could protect the environment by

cutting packaging and recycling waste paper. The influence of this industry body was clearly a factor in the thinking of the Technical and Site Director:

'We're a member of the Paper Federation. They help with various meetings and publications about environmental issues. I went to a meeting last month that discussed packaging waste ... very helpful to me'. (TSD1)

Whilst Paperco's customers did not provide 'external' pressure for environmental management at the site, public perception about the raw materials it used did:

Some of the raw materials we use, for instance, wood pulps; paper generally has a bad name environmentally. I was only reading something the other day... can't remember where it was - oh! I know. It was the local council collection scheme and they were painting a bad picture for paper by saying that every year each household is responsible for the cutting down of thirty trees or something like that. Now, okay, in terms of hard facts that's probably true, but those trees have been specifically planted to supply the paper industry, and there's no better tree to aid the environment today than a young healthy growing tree, that are present in these managed plantations.' (TSD1)

Thus, Paperco UK's 'environmental visibility' was influenced by the very raw materials it used, and this in turn, increased its desire to undertake environmental management at the site, even if these activities did not directly involve the planting of trees. Despite the fact that the Technical and Site Director acknowledged the environmental problems associated with raw materials, the site *did not* appear to audit its suppliers about the sustainability of the pulp it was buying. This *might* be done once the EMS was fully operational, but up to the end of the researcher's access to the site, no such environmental audit was done. This observation is all the more surprising when one considers that Paperco's existing ISO 9001 quality system already assessed suppliers for the quality of their materials, and the Technical and Site Director wanted to extend this 'audit' to cover environmental issues:

'Our quality system here is doing a good job for us, because it brings our suppliers into line across the board. We say: well, look, we prefer our suppliers to do this, that and the other. ... We will try and hook in the environmental side of it'. (TSD1)

To the Technical and Site Director, the implementation of an ISO 14001 EMS at the site was not seen as problematic: "It's not rocket science you know" (TSD1). Paperco already possessed an ISO 9001 certified quality management system and this was perceived to be a major aid to the introduction of an ISO 14001 EMS. However, organizational participants were aware of the additional work they needed to undertake to implement EMS:

'We've got ISO9001 so we are well advanced in those terms, but we're only really beginning to pick up the idea in terms of, say, ISO14001. (TSD1)

'It helps [to have an ISO9001 quality management system]. You have the basic things like document control and various other disciplines that you can latch on to but, from our point of view, we still have got an awful lot to do'. (EM1)

Environmental management had just been incorporated within the existing health & safety unit, and renamed the "Health & Safety and Environment" (HSE) unit. The ultimate intention was to link the EMS with the existing ISO 9001 quality management system. However, there seemed to be a difference of opinion on whether it was a 'bolt-on' approach or an 'integration':

'The way we're approaching it is we are actually integrating Health & Safety and environmental, with a target of bringing along those two combined management systems with ultimate integration into the quality system - but, as such, the quality system isn't drawing us along, no'. (EM1)

'We've got to build our Health & Safety and Environment management systems and then, as we move along; it 'bolts on' [to quality systems] - is the term I use, rather than integration'. (TSD1)

This confusion about the design, operation and aims of the EMS were apparent in all the interviews conducted at the firm. This seems to have hindered the progress of implementing the ISO 14001 system, as different managers appeared to desire different things from the system. The Technical and Site Director wanted one system that covered environment, quality issues and health & safety. The HSEM seemed to want an EMS that could supply 'bolt on' information to the separate ISO 9001 quality systems.

Apart from the professional accounting training of the Technical and Site Director, the site management accountants in the Finance department had not been involved in any of the discussions regarding the implementation of EMS at the site:

'She [the Financial Controller] has not really been involved at all. It is not something that she really needs to focus upon right now.' (TSD1)

The Financial Controller in charge of the Finance department at the site (MA1) was CIMA qualified and had worked at Paperco for three years. The Financial Controller reports to the Technical and Site Services Director, and controls a team of two accountants in the Finance Department. Due to the corporate restructuring and the implementation of a new accounting system, the researcher was only able to conduct two fifty-minute interviews with the Financial Controller at the site:

'We've got a new business and accounting system coming in that needs to be in place and working well before the end of the year as you can imagine'. (MA1)

This new accounting system was being implemented in order to integrate with the systems in place at the US Paperco Corporation. Paperco UK had long used an “antiquated, but entirely functional” standard costing system, but the US Paperco Corporation mills used a more ‘modern’ “hybrid ABC costing system” that utilised “a specially tailored piece of costing software” (MA1). The Financial Controller thought that the move towards this new system would aid both cost control and the accuracy of contract tendering. Whilst the resources for the system change were being supplied from the US, it meant considerable work for the Finance department at the site. It also suggested that management accountants had no slack time to devote towards playing a role within the implementation of EMS at the site, even if they thought that they ought to do so.

Another problem for the researcher was that specific cost data could not be revealed to him due to its highly confidential nature. As mentioned earlier, the paper industry is extremely cost competitive, so it was not surprising that the accountant was cautious about revealing cost information even though the researcher assured him of complete confidentiality. Despite this, the researcher was able to ascertain details about the current accounting system in operation at the site, and the way it dealt with ‘environmental costs’.

The Financial Controller acknowledged that she was not involved in the planning or implementation of EMS, but thought that she may be interested in examining the information it eventually generates:

‘I have not been involved with plans to implement the EMS, but if it provides useful information I may be interested’. (MA1)

The Financial Controller admitted that budgets throughout the company were being re-examined in an effort to reduce costs in line with the requirements of the US parent company:

‘We are trying to make cost savings at the site, and have already reduced our workforce by 20%. Unfortunately, we will have to make more redundancies to remain competitive’. (MA1)

In terms of funding for the EMS project, the Financial Controller has this to say:

‘The aim is to keep discretionary expenditure to a minimum for the next two years and then see where our cost base is’. (MA1)

Thus, as was identified in earlier comments by the Technical and Site Director, cost was an issue that would inhibit the progress of EMS implementation at the firm. Despite an apparent need for it at the site, EMS was currently a low management priority.

As mentioned above, when the case study commenced the company used a standard costing accounting system. In terms of Paperco's cost structure, the major component was the raw material used for products: "the cost of raw material is our greatest problem" (MA1). For example, many of Paperco's products, such as technical papers, had to use "virgin fibre" and could not be made from recycled wastepaper:

'In manufacturing what we call technical papers - they don't lend themselves very easily to go back into the system. If you take something like tissue or wrapping paper, newsprint, they use a high proportion of wastepaper. We don't - we use virtually 100% virgin fibre'. (EM1)

In order to establish the standard material cost for a product, site accountants had to liaise with the production staff and technical engineers in order to establish the yield and conversion rate for each grade of product and raw material. Whilst such calculations appeared complex, the Financial Controller suggested that:

'When you are costing a product, you have to understand the production process. Costing is as much a production and engineering effort as it is a financial one'. (MA1)

In addition to the original cost of raw materials, production processes often prevented the company from being able to reuse the waste paper from the mill as it was chemically contaminated:

'We do re-use what we can, but when you learn that a lot of the treatments we put on the paper, such as the phenolic resin, renders that unusable as a paper to go back into the system so it does mean that we have a disproportionately high amount of solid waste going to landfill'. (EM1)

The company simply did not possess the technology necessary to decontaminate and reuse its solid waste:

'We'd like to reduce the solid waste, but it would take a lot of new technology. Even if such technology existed, we probably couldn't afford it'. (PM1)

As a result, paying for this 'solid waste' to be sent to landfill was an:

"increasing overhead cost for the company" (MA1).

In addition to the cost of raw materials and waste, the Paperco mill had substantial costs relating to machinery, energy usage, water usage and manufacturing support overheads. According to the Financial Controller, the "ideal objective" was to operate the mill "continuously", in order to minimise costs:

'Parts of the mill are run continuously, sometimes 24 hours a day. It is very costly to turn off the machines ... many costs decrease as we operate more.' (MA1)

Direct labour costs were a small part of total manufacturing cost due to heavy investment in AMT. From site visits, the researcher observed that the mill was heavily automated with a small number of production staff on hand to maintain and operate the machinery. The assistant production manager (PM1) for the day-shift believed that automation would continue, and the amount of production staff would continue to reduce:

'We are in the middle of a five-year rolling programme of machine upgrades, but money is currently a bit tight'. Head count is slowly decreasing ... five people went last year'. (PM1)

In addition to the manufacturing costs, packaging costs also represented a considerable proportion of the total cost of certain products:

'You're talking of some of our finer products being of the order of £12-£15 a kilo. It is that high tech, and y'know you don't want it to be damaged, so it tends to go out as slit coils in a plastic bag inside a cardboard carton and then maybe four cartons on a pallet and then stretch-wrapped on the ends'. (EM1)

For accounting purposes, manufacturing at the mill was organised into three "paper machine" cost centres and various smaller cost centre for the array of "after-processes":

'The whole site process is quite complex and there are a number of inputs. We have three paper machine lines; we then have after-processes, such as the solvent saturation; such as slitting'. (MA1)

The mill manufactured an array of different products:

There's lots of variants of the different [product] families. For example, for the cellulose automotive product we probably have 30 or 40 variants on that one type. Likewise with the glass fibre filter and the battery separator [products]. So, it's probably simpler to talk of just those three or four product groups'. (TSD1)

'We produce a number of generic products, but also a range of custom products to meet individual customer requirements'. (MA1)

Because of this range of product variants, "product costing can be complex" (MA1), but standard product costs were established over time through direct observation of the production process:

'It's purely through experience, really. It is literally like a mass-balance type of approach. We've got so many tonnes of this fibre, that fibre, and these chemicals, and so on going in and we've got this much product coming out.' (TSD1)

It was vital to provide accurate estimates of product cost, especially for decisions regarding tenders for long-term contracts. Standard costs were reassessed quarterly, but were normally valid "for a year" (MA1). Within the standard costing system, the aim was to assign process-specific costs to the specific products that caused them. Overheads were traced, assigned and apportioned to cost centres and products using:

'A variety of different bases ... including the number of machine hours used'. (MA1)

In the final interview with the Financial Controller, she mentioned that the implementation of new costing system was virtually complete, and was currently being tested "alongside" the standard costing system. In her opinion the new system provided:

'A more flexible and timely view on costs. We can produce what-ifs, and can more accurately assess the cost of custom products. We need to conduct further work on our cost drivers, but the system should also allow us to control and measure our costs more accurately'. (MA1)

Neither this new costing system nor the current standard costing system attempted to systematically 'capture' or measure all of the 'environmental costs' of operations. The Financial Controller did not really see any reason to do this:

'Unless there was a legal requirement to calculate this, I can't see any point'. (MA1)

In the opinion of the Financial Controller, many environmental costs, such as energy and waste disposal costs were already being charged to product cost as part of the standard costing system:

'That happens from the standard accounting of materials-in and materials-out process....we also charge products for energy, liquid waste, water usage and other similar overheads'. (MA1)

She believed that separately identifying environmental costs from "normal" costs would not aid the Finance department in controlling cost, and would be more work:

'Many of our costs could be classified as environmental costs. If we reduce, for example, our utility usage we are managing our environmental costs. There is no need to call them environmental costs. We know what they are and what is causing them. Reclassifying them does nothing for me'. (MA1)

'To do it [identifying the environmental cost of operations] would mean a lot of work'. (MA1)

The total expenditure on environmental regulatory compliance costs was also not measured or monitored by Paperco's costing system, remaining 'hidden' within the various overhead costs at the site:

'Yes, we pay for certain environmental licenses and other regulatory costs. These are normally included as site overheads and allocated and apportioned in the normal manner'. I suppose we could calculate a total for environmental compliance, but I don't. (MA1)

The Financial Controller did not believe that it would be worthwhile to provide a specific breakdown of which product group or product caused environmental regulatory compliance costs at the site:

'I don't think it would be worth the effort, quite frankly'. They are not that substantial, mainly water discharge. We are charged according to the amount we discharge. I would estimate the total at less than £10,000 a year'. (MA1)

This response is interesting, since the Financial Controller's view of 'environmental regulatory compliance' costs *exclude* the requirements to pay landfill tax. This is included within Paperco's total disposal costs of solid waste, despite the fact that the tax was introduced by government as an environmental tax to encourage recycling and discourage dumping to landfill.

Since the formation of the EHS unit, the Financial Controller thought that environmental compliance overhead costs would be routinely charged to it as part of the annual budgeting process:

'The health & safety unit was a cost centre, so they [the EHS unit] will be asked to estimate such costs as part of their budget'. (MA1)

In summary, both the standard and new costing systems did not specifically identify environmental costs or environmental regulatory compliance costs at the site. Furthermore, many environmental costs are 'hidden' as "overheads" and allocated and apportioned to products using methods that do not always reflect the underlying causality of the costs. It is impossible to ascertain whether this accounting treatment is due to a lack of environmental management information or the specific nature of the production process itself. For example, the Financial Controller states how it is almost impossible to identify which products cause the environmental-related costs of disposing of solid waste and wastewater at the site:

'It would be very difficult to do, because - I suppose basically because the waste streams, if you look at it from that point of view, are combined early on. So, for instance, a skip-load of waste paper, of our paper, would go to landfill. It could have glass fibre, it could have cellulose with various treatments of it. The water - the waste-water streams again get combined quite early on, so you can't say: right, we're removing that pool of water from that product and this from the water because of that product. You're treating it all together, so you just clean out the water contaminants as a whole'. (EM1)

The Finance department also controlled capital investment at the site. All potential environmental projects had to be "financially viable" unless they are needed for compliance with legislation:

'There's a number of aspects behind such capital investment. One is of course to meet current or future legislation. It could be that there are some ultimate cost savings. For instance, an example that we have now is that some of our waste sludge goes to landfill. A project that we have in hand is to remove a proportion of that water, so that we reduce the tonnage to landfill, which is of course an immediate saving, and therefore that particular project has been justified purely on financial grounds, even though it's good environmentally as well'. (MA1)

Furthermore, even if site management supports such a project it requires authorisation by the US parent company:

'The ultimate sanction would be from Head Office in the States - and therefore any project like that would need the full justification whatever that maybe - be it legislation, be it cost saving, be it new business, whatever. It would have to run the gauntlet in the States, once we'd approved it between ourselves' (MA1)

According to the HSEM, the initiative for specific environmental projects came from the management at the UK site, rather than from the US parent:

'No, I think it's more from here. Being more appreciative of what the UK legislation or European legislation is, we would go to them and say: look, we need to do this in order to comply with that'. (EM1)

Furthermore, the US environmental regulations that faced Paperco Corporation's three US manufacturing sites were not being used to drive the level of environmental management at its UK site:

'It hasn't directed us specifically because they've gone down a certain route from pressure from the environmental people. It doesn't mean to say that they've got us ready for that, no'. (TSD1)

In summary then, the Finance department and the accountants at Paperco UK were not involved in environmental management at the site. Furthermore, they did *not* undertake activities that are normally expected from environment-related accounting and neither did they suggest a desire to do so. Issues of environmental costing, sustainability and social accounting were far beyond the thoughts of Paperco's accountants, especially as they already had to cope with accounting change arising from a 'non-green' takeover of the firm.

When the case study commenced, unless there was a regulatory requirement to do so, the company did not systematically measure its environmental impacts. For example, the generation of solid waste was simply measured by:

'We monitor it roughly in terms of numbers of skips that goes to landfill per week'. (TSD1)

And, even though the company generated 'special waste', it was only monitored "every so often":

'One of our processes involves the coating of filter paper with a phenolic resin. And that comes in a solvent which is Methanol. So that particular product is classed as special waste when there is any waste. We monitor the amount that we send for disposal, every so often. That's about the limit'. (TSD1)

A specific aim of implementing EMS was to remedy these deficiencies in monitoring the environmental impacts of the site. As the site was a paper mill, such impacts can be quite complex, for example:

'We are a fairly complex site as a paper mill generally is. If you start with air machines, we have boiler-stacking machines, we have certain emissions from the paper machines, as the paper is being dried. We have the EOC emissions, which are about to be taken care of with this oxidiser. Those are the main air

emissions. Then we go onto water. Water is a significant commodity for paper-making. We abstract quite a high volume of water from the river and discharge a high volume back to the river, suitably cleaned up. So there are materials that can and do get into the waste-water stream.' (TSD1)

We generate special waste, but it's not really considered that significant. We will have about 20 drums (200-litre drums) of waste, resin, in methanol, in a six-month period. It's not a lot. Our major waste outlet is from paper that's unusable. This is either off-specification or paper can't be used for final product'. (EM1)

As part of implementation of EMS under ISO 14001, a site must identify its environmental aspects and impacts, and this identification process was completed during the researcher's time at the site. Paperco had produced a "register of effects" for the site, and this showed that water usage, liquid effluent, solid waste, air and steam emissions, special waste and packaging-related issues were the major environmental aspects at the site. None of this information about environmental impacts was that surprising to the Technical and Site Director:

'I'm not saying that we are super-efficient; far from it, but I will say that we are aware of our weaknesses.' (TSD1)

However, the environmental impact assessment and other work on the EMS had rendered 'visible' the actual extent of the solid waste problem at the site:

'It is quite a large factor for the site. Has been there for a long time.' (EM1)

'We've now got a fair idea about the extent of the [solid waste] problem. Our output is basically reels of paper; of the hundred reels of paper that we produce in a given time, five, six, seven, eight, nine, ten of those will effectively go to landfill. There are still certain aspects of paper wastage that aren't actually measured in terms of weight, because for instance, when we make a large reel, we'll slit it down and we'll trim off the edges because they tend to be a bit fuzzy. Again, it goes to landfill but we don't actually weigh that, so it's a bit in the air, but it gives us a fairly good handle of the issue'. (TSD1)

Whilst the Technical and Site Director thought that the EMS would "help to identify and manage solid waste", he did not believe that substantial reductions in the generation of solid waste could be made without making prerequisite changes to the production processes at the mill:

'You hear of these examples [of EMS being used to substantially reduce waste levels] in various business sectors, but that certainly isn't what's happening here. We've conducted fairly in-depth studies of the waste that we're producing; the bottom line is that, yes, it's wonderful to be able to reduce what we are wasting now, but there are very definite reasons and constraints to doing that'. (TSD1)

During the assessment of solid waste it was apparent that the ISO 9001 quality system had actually increased its generation at the site. This observation tends to contradict the notion that quality management systems could be 'modified' to incorporate the management of environmental issues:

'It could be argued that it [the ISO 9000 quality system] helps to increase it [solid waste]. Because, again, we are making technical papers to a geared specification and if the quality department get a bit 'hard-nosed' and say, sorry, that does not meet specification, we've got no alternative but to dump it. So it could have a negative effect [on the control of environmental impacts]'. (TSD1)

Apart from the extent of the solid waste issue, the partially implemented EMS had not revealed any "surprises" for the company. However, the key issue was to complete the EMS so that environmental management procedures could be used to tackle the site's environmental issues, ensure regulatory compliance and even reduce environmental costs.

At the start of the case study, the Technical and Site Director described that he had spent "a few months" working on the EMS and the HSE structures at the site. At this time, the objective for the EMS to be certified to the ISO 14001 standard in nine months time:

'My objective is to get the basis of an EMS in place and then 'fine tune' for qualification to 14001. Well, if all goes to plan as things are today, we will have this structure in place by the end of the year [six months into the case study]. I think we need to be operating it properly for at least three months [a total of nine months into the case study] before we apply for qualification'. (TSD1)

However, at the end of eleven months of access to the site, the company had still not fully implemented or certified its ISO 14001 EMS system. The Finance department was still not involved in the project, and progress on it was slow. The Technical and Site Director had a progress chart for the EMS on his office wall, and the 'black line' of progress had not advanced for certain aspects of the EMS. However, he remained committed to the need for a formal EMS:

'I think we need it because it is a discipline'. (TSD1)

He and the HSEM both provided their view of the current progress with the site's EMS:

'I just don't feel that we have [made progress]. I know, basically, what we've got to go through to get there. To me there's a big mountain up there even though we've climbed up a certain height'. (TSD1)

'Just needs the effort to turn the wheels'. (TSD1)

'To put the whole site under your internal management system is quite involved.' (EM1)

This lack of progress towards full ISO 14001 certification was clearly a result of it being given low management priority, 'starved' of resources and being initiated during a period of considerable organizational change. Thus, environmental change was subservient to business and operational changes designed to ensure the survival and continued competitiveness of the Paperco mill. Whilst the company had completed its initial assessment of its environmental aspects and impacts, it still needed to "generate some procedural documents" (TSD1) for the EMS:

'That's the slog. We've done some of them. The [register of] environmental effects has been done and I'm reviewing it, according to current situation. We've got an environmental policy written. I've just reviewed that. So, we're sort of - we've done a bit and we're doing a bit more, and we've got a lot to do still! That's how I'd describe it'. (TSD1)

A more fundamental problem was that the company had still not trained the production staff in environmental management procedures or appointed "environmental champions" for each production team in the mill:

'Not as such, not yet anyway. We need to get into that fairly soon and sort of broaden it out. Get more people active on-board in that sort of way'. (EM1)

He thought that the production staff would "in, general" be receptive to environmental management, but:

'It's down in the bowels of the mill where things are going on where education is needed; the responsibility needs spreading around to the people who are actively involved in the various parts of the process. And, today, they are not that aware. That's one of the tasks ahead, of bringing them up to speed and getting a bit of training done and so on. Training and awareness. It's just one of those perpetual things'. (EM1)

A production manager provided an appropriate summary of the environmental management initiatives at the site:

'They [the Technical and Site Director and the HSEM] are trying to do something about our [environmental] problems, but I don't know much about it. They have asked some of my colleagues for help, but are really doing it themselves. We are supposed to give team training on it, but I am still waiting for a briefing... there is too much other stuff going on at the moment [i.e. the restructuring and cost reduction efforts]'. (PM1)

This summarises the situation regarding the implementation of the EMS at the end of eleven months of access to the site. Organizational respondents provide a clear description of slow progress with environmental management, and this is supported by evidence obtained from site visits to the mill. During the site visits to Paperco, the researcher observed a number of environmental 'problems' and issues. On approaching the site by car, the researcher could see brown smoke and steam emerging from the mill chimney. At each visit, waste paper was blowing around the site, since it was escaping from overflowing skips waiting to be taken to landfill. On the second visit it was raining and surface water was being allowed to freely drain off the buildings and flow into the public road. In terms of the mill operations, the plant seemed 'untidy' with waste paper and waste products left lying around unsorted into specific types. Furthermore, the production workers did not always seem to wear the appropriate clothing, although this is more of a health and safety issue. During site visits at the other companies used as case studies, the researcher observed none of these types of environmental problems.

Four months after the last visit to the site (a total of fifteen months from the start of the case study), the researcher attempted to contact the Technical and Site Director at Paperco UK to arrange a further visit about the EMS at the site. However, the researcher was told that the Technical and Site Director had accepted a voluntary redundancy package and had already left the company. As a result, the researcher lost his key source of access to the site, and was unable to continue the Paperco case study. Brief contact was established with the HSEM via telephone, and he said that the EMS was still not complete or ready for ISO 14001 certification:

'I wish progress was quicker, but it is quite a hard grind. Hopefully, we'll get there'. (EM1)

He also indicated that site accountants were still *not* involved in environmental management. However, during this brief conversation he apologetically told the researcher that the US parent company "no longer wished managers to divulge confidential operational information into the public domain". Three months after this last conversation, the researcher discovered details of a US court case that had just found the US Paperco Corporation guilty of an "elaborate cover up ... to hide the dangers of the Micronite filters" it *used* to produce for the tobacco industry. It was held that Paperco Corporation knew that its filter products leaked asbestos into tobacco smoke, but had deliberately "suppressed" this knowledge. A further three months after discovering this US court judgement, the researcher discovered from a conversation with the Head of the Gloucestershire Green Business Club that Paperco UK had not renewed its Club membership, and had still not completed its ISO 14001 certification. The researcher eventually discovered that formal certification of Paperco's ISO 14001 EMS occurred approximately twenty-three months from the start of the case study work. Adding on the three months of time that the Technical and Site Director had spent on the EMS before the case study commenced, the total gestation period was over two years, considerably longer than it took the firms in the other three case studies.

8.4.1 Applying the 'Skeletal' Theoretical Models at Paperco

The slow progress of corporate 'greening' at Paperco can be explained by a number of the theories contained within the 'envelope of greening' developed in chapter 4. Paperco UK had just been taken over and had undergone restructuring of its management systems

and structures in order to increase its effectiveness and competitiveness in the market place. As such, responding to the contingencies related to green 'effectiveness' appeared secondary to meeting those that increased 'economic' effectiveness. The Technical and Site Director believed the adoption of EMS necessary to ensure regulatory compliance and to achieve external legitimacy, but there was no urgent customer pressure for the company to do. Thus, responding to 'green' external pressures was not currently an urgent priority as the mill.

Paperco was a relatively 'small' local organization that had not been prosecuted for environmental breaches or received adverse media for its environmental performance. Even after its takeover, it was still only part of a relatively 'small' multinational paper group, which had an equally acceptable environmental record. However, because of the raw material requirements for its products, Paperco received indirect public concern about the sustainable use of these natural resources, and this increased its overall 'environmental visibility'. When the case study commenced, Paperco UK had not attempted to enact this visibility, except to comply with all existing environmental legislation.

In terms of 'external' greening pressures identified by respondents, Paperco did not perceive a strong customer demand for its products to possess 'green' characteristics. The main 'external' demand for greening was the need to ensure compliance with current and future environmental regulation. Paperco was a member of the Paper Federation of Great Britain, and this institutional body was encouraging its membership to adopt a responsible attitude towards the control of waste and packaging. The Federation provided help and support about environmental issues, and influenced Paperco's Technical and Site Director to take 'institutionally' approved actions on 'green' issues:

'I get quite a bit of support from the paper industry in general'. (TSD1)

'There's a new document [from the Paper Federation about environmental management] which is very good. Focused specifically at paper mills so you don't have to do quite so much interpretation to your own processes and so on'. (TSD1)

Whilst Paperco's products required the felling of trees, respondents did not identify any direct environmental pressure from the public or pressure groups for changes in their use and procurement of raw materials. Despite this, it was surprising to find that the paper mill did not currently "audit" its suppliers for their sustainable planting of replacement

trees, especially as the actions of these suppliers could potentially increase the environmental demands that Paperco faces. Thus, the company could not provide evidence to support the Technical and Site Director assertion that:

‘We’re not responsible for cutting down rainforests, as some people would have us believe’. (TSD1)

In terms of internal characteristics, the small size of the organization together with its lack of ‘slack’ resources seriously hindered the development of EMS at the site. The company had just undergone a financial takeover and management restructuring, and the new US owners sought to cut costs at the site. As a result, there seemed to be a lack of management and financial resources to devote to the environmental management project. In addition, apart from the “driving force” of the Technical and Site Director and the HSEM, organizational commitment to the environmental management project appeared to be lacking. 20% of the workforce had just been made redundant, and the threat of further redundancies was made apparent to the researcher. In such a context, it is not surprising to see a lack of enthusiasm for new management initiatives, especially from the production staff.

The structure of the HSE unit and the EMS also influenced the level of ‘greening’ within the firm. Being part of the existing health and safety function effectively defined its role and ‘meaning’ at the site, as did the links between EMS and the site’s existing ISO 90001 quality management systems. As the systems were currently being initiated, it was not possible to see how they functioned alongside other functional areas. The Technical and Site Director was the “environmental champion” at the site, and his voluntary redundancy appeared to further slow the laboured progress towards full ISO 14001 certification of the EMS.

Another internal factor influencing environmental management was the Finance department. Whilst the Finance department accepted the value of the HSE unit, it was treated like any other cost centre, and had its budget and spending tightly controlled. Since the takeover, the US parent had wanted cost reductions at the site and the Finance department was keen to reduce all “discretionary expenditure to a minimum” (MA1). Thus, the HSE unit had a budget that limited its environmental plans and targets, restricting the pace of ‘greening’ at the site. Furthermore, the site accountants were not

involved in the EMS or environmental management at the site, so were hardly receptive to 'environmental' projects unless they could be financially justified through cost savings.

An internal 'filter' for greening was the technology level at the mill. Whilst the company had a number of modern machines, it did not possess the ability to decontaminate its solid waste and had no other option but to pay for it to be sent to landfill. Thus, a combination of its technology and the type of products manufactured currently prevented the company from making substantial operational changes in order to reduce its environmental impacts.

Paperco appears to exhibit a 'reactor' type of dominant attitude towards environmental management. It seeks to comply with environmental legislation, but has only started to 'embed' environmental management within its operations at the site. Since the takeover, the US parent is more concerned with the operational efficiency of the site. Even though environmental issues can influence this, the parent company has not specifically required the company to implement ISO 14001 EMS. The original impetus for implementing EMS was the Technical and Site Director, who originally viewed it as a way to ensure legislative compliance rather than an opportunity to substantially reduce environmental costs at the mill. It seems that company management saw the EMS as offering a way for the company to shift to a 'defender' dominant attitude towards the environment. In addition, as the EMS became embedded at the site, it could also allow the company to eventually adopt an 'experimenter' attitude towards tackling 'green' operational issues. However, these plans were hindered by the voluntary redundancy of the Technical and Site Director, the lack of resources and management time for the EMS project and the corporate restructuring following the takeover. When access to the site ended, Paperco has still not completed ISO 14001 certification for its EMS, and it seemed that that the company still exhibited a 'reactor' dominant attitude towards the environment.

Paperco does not appear to have undergone fundamental 'greening' change. Prior to the EMS project, the company fully complied with environmental regulations. Although the Technical and Site Director believed that it was difficult to guarantee, compliance appears to have been achieved, certainly it had not been warned or prosecuted by the Environment Agency. The Technical and Site Director was trying to shift the company away from its 'retention' approach to green issues, but secondary level change at the site

was not complete. Whilst the company had appointed an HESM and had partially implemented EMS, the environmental 'reorientation' of its design archetype was far from complete. There appeared to be a number of reasons for this, but it was clearly influenced by the lack of commitment to EMS in a time of considerable organizational 'upheaval'. The researcher eventually discovered that Paperco UK has certified its ISO 14001, and this may indicate that secondary level 'greening' change eventually occurred, although it is impossible to ascertain which 'track' that this change followed.

As Paperco was only just implementing environmental management structures and systems at the site, it simply did not generate or use a substantial amount of environmental information. In terms of environmental information, the respondents initially provided the impression that Paperco was 'struggling' to produce stage 1 environmental information on regulatory compliance. By the end of the case study access, the company had succeeded in completing its initial ISO 14001 EMS assessment of environmental aspects and impacts, and the HSEM was confident that he had sufficient information to confirm the site's regulatory compliance. As the EMS was not fully implemented, Stage 2 environmental information was not being routinely generated and used at the site. Management accounting systems and techniques were not being used to systematically measure environmental costs or performance at the site, even though a new costing system offered an opportunity to try and do so. Finally, despite the fact the Paperco used virgin wood fibre in manufacturing its products, the company did not undertake any form of life-cycle costing, measure the environmental sustainability of its operations or account for its social cost externalities.

8.5 Discussion of the Six General Hypotheses & the ‘Skeletal’ Models

Using the empirical evidence obtained from the three main case studies, the preliminary case study and the other data documented during previous chapters of this thesis, it is now possible to discuss the acceptance or rejection of the six general hypotheses developed in chapter 5.

Hypothesis 1: Organizational size will affect the likelihood of an organization facing demands for, and actually engaging in, environmental change.

Size does appear to influence the demands for environmental management, but also provides access to the resources necessary for undertaking such activities. For example, Paperco and Cobe appeared to experience comparatively less ‘external’ pressure for greening than either Copyco or Iceco. However, because of the smaller size of Paperco and Cobe operations, each company could only afford to devote a relatively small amount of funding and management time towards environmental management. In contrast, Copyco seemed to invest a substantial amount of time and resources into supporting its EMS.

Although organizational size certainly appeared to influence a firm’s ‘environmental visibility’, the type of ‘external’ pressures it faced, and the level of resources it could invest in environmental initiatives, the presence of a committed organizational ‘environmental champion’ appeared a vital influence on greening. For example, Cobe had a manager who was committed to the EMS for its ability to save cost, Iceco had an environmental manager who was an environmentalist and Copyco possessed a strongly motivated and committed EHSO who was always trying to promote and manage environmental issues at the site. Even Paperco had a Technical and Site Director who wanted to ‘drive’ environmental management forward, despite a major corporate restructuring. Thus, it seems that the presence of an “environmental champion” can help to reduce the influence of size in determining the level of corporate greening. However, from the evidence in the case studies, it appears that hypothesis 1 can be accepted.

Hypothesis 2: The type of organizational products and/or services and the processes by which they are created will affect the demands for environmental change.

The case studies revealed that the type of product and process of manufacture did create subtle differences in the array of ‘external’ demands for greening. For example, Iceco

faced little customer pressure for ‘greening’, whilst Copyco and Cobe encountered customers requesting details about its EMS. However, it was surprising to find that Paperco, which used virgin wood fibre in its products, did not receive significant ‘external’ demands for greening from its customers or green pressure groups. As a result of these differences, hypothesis 2 is accepted.

Hypothesis 3: The level of adverse media attention on the organization will affect the level of demands for that firm to undertake environmental change.

In terms of the four firms studied, none of them had received adverse media attention due to their poor environmental performance. Copyco was mentioned in one newspaper report about a noise complaint about the site, but this was only reported because it was the local MP that made the complaint. As a result of this lack of case evidence about adverse media attention, it is impossible to either accept or reject hypothesis 3. However, respondents were aware of the power of the media, and just the *potential* threat of adverse media attention seemed to drive environmental management initiatives. In addition, there was evidence to suggest that certain companies were attempting to enact their media image on environmental issues. For example, Copyco, Iceco and Cobe all hosted open evenings of the Gloucestershire Green Business Club. Iceco’s environmental manager talked to the media about his firm’s EMS. Finally, Copyco UK published a yearly environmental progress report.

Hypothesis 4: The social importance of non-environmentally related characteristics of the firm affects the external pressures for ‘greening’ upon the firm.

Iceco, Copyco and Paperco were all major employers in the local economy where they operated. From reading the local press and talking to members of the public, the local community seemed more concerned about the jobs that each firm provided rather than the environmental impacts of their operations. The potential threat of job losses at each site received considerable press coverage, and this leads one to accept hypothesis 4.

Hypothesis 5: Organizations can enact their own environmental ‘visibility’.

On the basis of the case study evidence, organizations can enact and influence their own environmental visibility, and actively do so. As a result hypothesis 5 is accepted.

Hypothesis 6: The internal ‘catalysts’ and ‘filters’ for greening within the organization will differ:

- a) between organizations; and
- b) across industries.

Even though companies seemed to be introducing a standard ‘institutional’ ISO 14001 approach to EMS, the organizational functioning, structure, purpose and operation of such systems differed between each company. The specific internal characteristics that acted as ‘catalysts’ and ‘filters’ for greening seemed to differ between companies, although organizational size, the availability of resources, the existence of committed ‘environmental champions’, the links with quality systems, the links with health & safety and the role of management accounting seem to be consistent influences on the level of corporate greening in the UK. As a result, hypothesis 6 is accepted.

In terms of the ‘skeletal’ models, the case study evidence in this chapter has provided these with meaning. All of the models provide valid insights into practical examples of the process of greening. However, it is difficult to infer a generalised model of how greening is brought about in UK manufacturing firms, from such individual studies. Whilst this research is nomothetic, in that it seeks to generalise through formulating theories that apply to categories of phenomena, the study must also recognise the problems of method discussed in chapter 3 and the limitations on its ability to infer from these studies.

8.6 Conclusions

This chapter has outlined the development of environmental management and greening at four different UK manufacturing sites. In all cases, the management accounting function was, at best, on the fringes of such developments. Apart from the professional accounting training of the Technical and Site Director at Paperco, no accounting expertise was involved in the implementation or day-to-day operation of EMS within the firm. Thus, EMS and environmental management seemed to be an organizational function outside the realm of accounting, even though accountants seemed ‘aware’ of the environmental dimension to manufacturing operations and directly liaised with environmental managers over site issues such as energy, waste and capital budgeting. In all the case studies, there was absolutely *no evidence* of site management accountants preparing specific

environment-related management accounting information, such as estimates of the environmental sustainability of operations, life cycle costing of products, estimating the social cost externalities of the site or the physical monitoring of environmental impacts. Furthermore, site accountants *did not* prepare any specific environmental cost data for publication in an 'external' environmental accounting report, since benchmark information from EMS formed the basis of the public non-accounting reports of environmental progress.

Environmental managers did not doubt the central role of management accounting in the identification of efficiency and internal costs such as waste and energy, but even these roles were hampered by the accountants possessing a limited 'non-environmental' view of operations at the site. Thus, management accountants *did not* play an active day-to-day role in *environmental* management in any of the firms. This finding concurs with evidence from the small number of studies on UK practice:

'the most practical actions being taken at present are mainly relatively simple ones such as identifying and allocating energy and waste disposal costs which either did arise, or could well have arisen, for non-environmental reasons'. (Bennett & James, 1997, p.50)

'The majority of environmental managers felt that accountants did not seem motivated to actively help implement environmental policy'. (Wycherley, 1997, p. 181)

The evidence in this chapter also agrees with more recent results from a survey-based study on the role of management accounting in environmental management in Australia:

'Although a role can be prescribed, and actual environmental accounting techniques identified, there appears, as yet, no overwhelmingly active involvement by accountants in many companies' environmental management'. (Wilmshurst & Frost, 2001, p. 143)

Within the case studies, a great deal of the non-financial environmental information currently being generated by EMS seems to be identical to that produced by the literature prescriptions of environment-related forms of management accounting (see the various chapters 3 and 7). The case studies in this chapter suggest that the characteristics that have been ascribed to environment-related management accounting are likely to be already operating in firms that possess an ISO 14001 EMS and environmental management function. However, it appears that the management accountant does not need to be actively involved in their operation, nor does the necessary environmental information need to be quantified in accounting terms. It can be inferred from this evidence that the widely touted 'environment-related management accounting' is a

figment of academic and theoretical imagination. Indeed, it seems that environmental managers are partially fulfilling the role of environment-related management accountants, since they provide environmental performance measurements, identify environmental and non-environmental cost savings and use environmental information to promote environmental 'awareness' throughout the organization.

There are parallels between this discovery about environment-related management accounting and evidence suggesting that strategic management accounting information (SMA) is also produced without the involvement of management accountants or accounting quantification (see the discussion in chapter 3; Roslender, 1995; Lord, 1996). For example, Lord (1996) discovers evidence to suggest that SMA type information is produced by a range of different organizational functions, often outside the domain of accounting. She concludes her work with the question:

'Are tomorrow's management accountants going to find themselves naked, without yesterday's old clothes and with no substance in their new clothes?' (ibid, p. 364)

This same question can be asked about accounting involvement within environmental management. From the case studies, it appears that environmental management requires the ability to communicate cross-functionally, encourage environmental awareness, provide non-financial information on environmental issues, produce physical and financial quantification of environmental impacts, conduct interpretation of environment information on impacts, identify problematic environmental issues and provide environmental management responses that do not hinder operations at the site. Most UK accountants are "presently wholly ill-suited" to such a role in environmental management "as a consequence of their experience of an essentially quantitative, number crunching approach to accounting education and training" (Roslender, 1995, p. 52).

Environmental management is a strategic objective of the firm, and its information systems appear to produce financial and non-financial information that can reveal new 'visibilities' about the efficiency of the manufacturing operations. Such 'visibilities' can challenge the information generated by conventional accounting systems, which 'hide' environmental costs within site-wide overhead accounts. As a result, the management accountant requires the expertise of the environmental manager and supplemental information from the EMS in order to develop an 'awareness' of the full extent of cost

causality in a factory. Instead of an environment-related form of management accounting, what appears to be required is a “revitalised form of management accounting”, with more emphasis “on the qualitative aspects of organization and management ... a genuinely *managerial* form of accounting” (ibid, p. 55, emphasis in the original). Within this new *managerial* form of accounting, the accountant would have to co-operate with other disciplines in the organization and resolve, for example, “the continuing tension between the engineers’ objective efficiency perspective and the accountants’ more subjective economic perspective on business activity and on how to control performance” (Macve, 1995b, p. 196). The development of this new managerial form of accounting did seem to be happening at Iceco and Cobe, and was slowly developing at Copyco, since management accountants had developed, through their interactions with environmental managers, an ‘awareness’ of the environmental dimension to costs and manufacturing operations at the site. Whilst the environmental characteristics of costs and manufacturing operations were not routinely ‘captured’ and ‘identified’ within management accounting information systems, they were referred to by accountants during certain decision-making situations, including, for example, capital budgeting situations. Whilst it would be arrogant to suggest that management accountants should be ‘leaders’ in environmental management, these case studies provide evidence of an embryonic ‘mutual partnership’ between accountants and environmental managers in accepting the need to efficiently manage the environmental aspects of operations. This, in itself, may provide evidence for the evolution of this new form of *managerial* accounting.

Chapter 9: Conclusions

9.0 Introduction

The primary aim of this thesis has been to describe the role(s) of management accounting in the growth of environmental management initiatives within UK manufacturing operations. In order to do this, the research explored management accounting within the whole process of organizational ‘greening’, a process that is shaped by interactions and demands within social and organizational contexts. Thus, in order to study the specific role of management accounting in environmental management, the thesis had to explore why UK firms become ‘greener’ in their attitude towards the environment. The overarching research question addressed by the study was:

What role(s) do management accountants and management accounting play in the development and use of environmental initiatives within UK manufacturing organizations?

In order to answer this, the study had to address a more fundamental research question:

Why do Western manufacturing organizations decide to manage their impact on the natural environment?

9.0.1 Methodology

The study adopts a ‘middle range thinking’ research paradigm. Within such an approach, unlike the pure qualitative paradigm, it is believed that ‘skeletal’ theoretical generalisations of reality are possible, but require empirical data to make them meaningful. A case study methodology was used to support the development of such an array of ‘skeletal’ theoretical models. This theoretical triangulation (Easterby-Smith *et al*, 1991) overcomes the bias of using a single theory approach to the study of the role of accounting within greening, since existing research shows that no single theory appears to explain the rich array of different ‘greening’ responses of UK organizations.

The ‘skeletal’ theoretical models were used to derive six general hypotheses, and both the models and the hypotheses were applied to case studies of four manufacturing organizations located in the UK. The skeletal models were used to explain what happened in each case study and were also ‘fleshed out’ by the empirical detail discovered.

9.0.2 Limitations of the Study

All research has its limitations, and this study is no exception.

This study includes three main case studies and a further preliminary case study. Empirical data covered approximately a calendar year in each of the main case studies. Various reasons precluded more longitudinal observations. The preliminary case study was never intended to grant longitudinal access. In terms of the main case studies, at one site, the parent company decided to reduce operations at the site and make the majority of the workforce redundant. In another, the environmental manager retired, and the company was no longer willing to grant the researcher access to the site. In the third case, a director was given voluntary redundancy and the US parent company did not want outside parties obtaining access to confidential data. This lack of longitudinal data reduced the researcher's ability to uncover any further developments in the role of accounting in environmental management in each of the companies. Furthermore, it also limited the application of the 'skeletal' theoretical model of greening change "tracks" developed in chapter 6, although it was still possible to discover from respondents, from documents, and site visits how 'greening' change had, and continued to influence organizational actions.

Another limitation was that all the companies used as case studies were members of the Gloucestershire Green Business Club, since this introduced an element of bias into the empirical work and subsequent findings. However, during the course of the empirical work there emerged distinct differences in the corporate approach and attitude towards environmental management within each of the firms.

9.1 What Role do Management Accountants and Accounting play in Environmental Management?

The findings from all the empirical case studies suggest that management accountants were not involved in either the implementation of EMS or in the subsequent day-to-day activities of environmental management. Furthermore, management accounting techniques were not being used to generate environmental management or environment-related accounting information within the firm. This evidence is in direct contrast to calls

within various literatures for the involvement of management accounting and accountants within corporate environmental management.

In fact, management accountants seemed perfectly happy to allow responsibility for environmental management to remain with the environmental management unit within the firm. At Paperco, where a qualified accountant was the director responsible for implementing the EMS and in overall control of the Finance department, he did not document or even mention the need for an environment-related form of management accounting system.

As with the apparent failure of management accountants to be the organizational participants that generate strategic management accounting information, it seems that management accountants are not currently providing environment-related management accounting information. It is the environmental manager and the EMS that generate environmental performance information, and revealing new 'visibilities' about cost causality and cost reduction opportunities in the manufacturing processes. For example, at Copyco, it was the environmental manager who produced the environmental information that identified ways to substantially reduce the cost of disposing of special waste. Copyco's environmental manager also identified a way to save £2 million on packaging costs, even if he had to eventually involve a management accountant in the project. At Iceco, the environmental manager had an in-depth knowledge on environmental costs and impacts, and his knowledge and expertise was used in benchmarking exercises and cost reduction exercises by the head accountant.

In the case studies, environmental information was being primarily generated by the EMS and the environmental unit at the site, and although this information was available to site accountants, it was seldom used or even collected by them. At most, existing management accounting costing systems were used to manage 'normal' environmental costs such as waste materials, energy and other utilities, but their subsequent treatment of environmental "overheads" was often seen as inappropriate. For example, the environmental manager at Copyco had reservations about the accounting apportionment of special waste, and believed that he possessed a better understanding of the causality of this and other such costs.

Despite the accounting and management literature suggesting that management accounting has a role to play in environmental management, there was a surprising absence of environment-related accounting at all the sites. In none of the empirical work conducted for this thesis was evidence found of the development, implementation or use of specific environment-related accounting systems by site accountants. Organizational costing systems did not routinely 'capture' or provide separate information about environmental regulatory compliance costs. Neither did they routinely identify the environmental costs associated with site operations.

However, while site management accountants saw little utility from separately identifying the environmental costs or environmental regulatory compliance costs of the firm, they seemed to possess an 'awareness' of the environmental impacts that faced the firm. For example, management accountants were involved in cross-functional teams and meetings designed to manage certain corporate environmental impacts, and Copyco's Head of Finance even chaired an environmental committee for his area of operations. At Cobe, Iceco and Copyco, site management accountants appeared to be slowly accepting the value of the environmental information generated within the firm, and were becoming involved with environmental managers in order to explore new ways of using environmental information to reduce costs and improve performance.

In terms of the environmental information generated within the firms studied, *none* of the firms were routinely producing stage 3 level information on the sustainability, social cost externalities or life cycle costs of operations or products. However, respondents at Iceco did mention that its Unifood parent undertook life-cycle analysis of new products, and Unifood was also concerned with the sustainability of its food-based raw materials. Overall, environmental information at the site was focused on ensuring environmental compliance and to identify win/win opportunities for reducing environmental impacts at the same time as reducing corporate costs.

It seems that further environmental 'pressure' is needed before UK companies or site accountants see the need to develop specific environment-related management accounting systems. Alternatively, it could be suggested that EMS are the systems by which non-

financial environmental information and performance measurements are to be generated, and there is no need for new corporate environment-related accounting systems.

9.2 Why do Manufacturing Organizations become ‘greener’, and how does it occur?

The study provided an array of ‘skeletal’ theoretical models that, in their totality, aimed to describe how organizational ‘greening’ emerged from interactions within and between social and organizational contexts. The primary role of these theoretical models was to “amplify” (Broadbent *et al*, 2001, p.577) the role of management accounting within the whole process of organizational greening rather than being used to derive a “formal set of propositions that are to be tested through empirical detail”. The specific role of management accounting and accounting within corporate greening were explored in the previous section, so this section will provide an overview of why manufacturing firms are adopting ‘greener’ attitudes and environmental management initiatives.

The case study evidence provided a rich array of different “internal” and “external” factors and pressures that either aided or prevented corporate greening at each site. In the case studies, organizational respondents identified an array of ‘external’ pressures that influenced the level of corporate ‘greening’ within organizational management. From the case evidence it appears that legislation is, not surprisingly, a primary driver of environmental management. Other pressures identified included customers, suppliers, competitors, the local community, the fear of adverse media attention, the influence of business community associations, the influence of green business networks and the threat of green pressure groups. The companies studied seemed genuinely concerned about their ‘environmental visibility’ and wanted to enact it where possible. This ‘visibility’ was clearly influenced by the size of the organization, its type of products and technology and the social importance of its non-green characteristics. However, as none of the companies had a poor record on environmental issues, it was impossible to establish whether this increased the ‘external’ demands for greening that it faced. What was clear is that the social importance of a firm as a local employer seemed far more important than its environmental record, as was seen by the press reaction to the redundancies at Iceco, Paperco and Copyco.

In the case studies, organizational size appeared to influence the level of resources available for environmental management and improvements. The larger organizations seemed to have resources available each year for environmental projects, and could instantly purchase any equipment needed for regulatory compliance. Alternatively, respondents in the smallest company identified the lack of resources to implement significant environmental improvements.

The ownership structure and intra-organizational linkages of the firm also seemed to be a key driver behind the introduction of EMS. Copyco and Iceco faced pressure from their parent companies to introduce and maintain EMS systems and other environmental management structures at the site. In contrast, Paperco faced pressure from its US parent company to cut costs, and this hindered the implementation of, and commitment to, EMS at the site.

The organizational structure of environmental management also influenced 'greening' within the firm. Copyco and Paperco chose to integrate environmental management within their existing health and safety function, while Iceco gave existing managers additional responsibility for environmental issues. Furthermore, existing management systems, such as the presence of ISO 9001 quality management systems, seemed to encourage a routine 'process-driven' type approach to EMS. EMS could be seen as an extension of such systems, and as a result, ISO 14001 was used as the standard for their design and implementation. All the firms studied used ISO 14001 as the means to implement EMS, and this appears to have become an 'institutionally appropriate' means of introducing such systems. Interestingly, Copyco had certified its EMS to both ISO 14001 *and* EMAS standards despite reluctance from its US parent, since its European customers specifically requested proof of EMAS certification.

A key internal catalyst for corporate greening was the presence of an environmental 'champion' or 'champions' within the firm. Iceco and Copyco both employed environmental managers who were extremely committed to their roles, despite their initial lack of environmental expertise. A passionate and active environmental manager could promote environmental awareness within the minds of organizational participants, even accountants. With the aid of supporting environmental structures, committees and

meetings, the environmental managers at Iceco and Copyco had succeeded in making everyone aware of the need to consider environmental issues.

Although environmental information was often ‘loosely-coupled’ to accounting data, such information formed an important source of information within many decision-making situations. For example, environmental information was routinely included with capital investment decisions at Iceco and Copyco. In fact the generation of environmental information had almost become “institutionalised” within Copyco and Iceco, and organizational respondents now expected it to be generated. Whilst site accountants did not routinely use this data, they seemed to be increasingly realising its value to the company.

Many of the respondents within the case studies saw EMS as means to provide customers, its parent company and the local community with reassurance about the ‘green’ credentials of operations at each site. Thus, the EMS was seen as a way to secure ‘legitimacy’ for the site. However, this was not the primary role of such systems, as they appeared designed to raise ‘environmental awareness’ of the need to include environmental management as part of “general management” or “efficient management” at the site. The environmental managers at Cobe, Iceco and Copyco all suggested that environmental management was simply part of good management, rather than a fundamental desire to protect the environment. Of the companies studied, Copyco and Iceco appear to adopt an ‘experimenter’ dominant attitude towards the environment. Whilst it was more difficult to assess the dominant attitude of Cobe due to the limited data, this company also seems to exhibit an ‘experimenter’ attitude. In contrast, Paperco seems to be struggling with corporate ‘greening’, and appears to still possess the dominant attitude of an environmental ‘reactor’ type of company despite certain management who want to adopt a ‘defender’ attitude.

Based upon the evidence of the four case studies, corporate ‘greening’ seems to be limited to either ‘secondary’ or ‘intermediate’ level greening. In none of the case studies did a company undergo primary level greening. Management of sustainability and social cost externalities is far from the agenda of alleged ‘green’ UK manufacturing companies.

9.3 Overall Contribution of the study

This study has provided much needed empirical evidence of the role of management accountants within the process of environmental management. As Burritt (2004, p.13) suggests there is a need for “further case based research studies into investment appraisal, costing and performance management aspects of environmental management accounting”. This study makes one such contribution to knowledge, although it too suffers from limitations.

The theoretical models cannot be classified as generalised theories, but are simply ‘skeletal’ theoretical models, where “empirical data will always be of importance to make the skeleton complete in particular contexts” (Laughlin, 1995, p.81). However, within this thesis, they contribute to environment-related management accounting, management accounting and environmental management theory by developing an array of theoretical propositions that have been tested within four empirical case studies of manufacturing organizations operating in the UK. This work has established the models as plausible descriptions of the process of ‘greening’, meriting further study. They can be accepted as a valid explanation, worthy of further testing.

The results of this study improve our understanding concerning the role of management accountants within the overall process of corporate ‘greening’. More specifically, they extend present thinking about the *apparent need* for environment-related form of management accounting within firms, and add to our knowledge about the generation and use of new types of environmental information within UK manufacturers. The results of this study should be of interest to a number of parties:

- the professional accountancy bodies and their members working in manufacturing and other similar companies;
- companies considering the introduction of EMS
- environmental, health & safety and other managers responsible for environmental management in their company
- academics interested in teaching or researching environment-related management accounting and environmental management

The limitations of this study provide scope for other studies to further extend the ‘skeletal’ theoretical framework developed in this thesis. For example, it will be interesting to conduct research describing how the new EU Directive on Environmental

Liability, that includes a wider application of the ‘polluter pays principle’, will influence companies to widen the type of environmental information they consider within decision-making. Furthermore, these models can be used in research into different industries and across different countries

9.4 Conclusions and Implications

The original impetus for this thesis was to seek an understanding of the role of management accountants and management accounting within environmental management systems.

Evidence was found that challenges literature prescriptions of an urgent need to develop environment-related management accounting, since none of the organizations within the case studies had made any demands on management accountants to carry out such activities. Indeed, organizational accounting systems were left largely unchanged after the implementation of EMS, and the site accountants were largely on the ‘outside’ of such initiatives.

Despite the above, evidence from certain case studies does point to organizational management accountants possessing, and developing, a strong ‘awareness’ and knowledge about the management of environmental issues. It does seem that certain management accountants are actively trying to establish cross-functional relationships with environmental managers in order to obtain access to further ‘visibilities’ and information about cost causality and cost management within manufacturing. Clearly, more work is needed if we are to further our understanding of the role of management accounting within environmental management. However, despite the literature prescriptions of environment-related management accounting, this study suggests that organizational management accounting is not becoming “what it should be” (Hopwood, 1987, p. 208). In fact, it is environmental managers, rather than accountants, producing environment-related management accounting information. As a result, management accountants may have to liaise with environmental managers in order to obtain decision-relevant information, which may lead to “a genuinely *managerial* form of management accounting” (Roslender, 1995, p. 52).

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APPENDICES

Appendix 1: Strategy Literature Review

1.0 Defining Strategy

The term 'strategy' has acquired many meanings over time. Within the conventional strategy literature, Evered (1980, p. 3) demonstrates how the term developed from militaristic origins:

'Initially strategos referred to a role (a general in command of an army). Later it came to mean "the art of the general" which is to say the psychological and behavioural skills with which he occupied the role. By the time of Pericles (450 B.C) it came to mean managerial skill (administration, leadership, oration, power). And by Alexander's time (330 B.C) it referred to the skill of employing forces to overcome opposition and to create a unified system of global governance'.

'Still later Von Clausewitz expounded on the paramountcy of *clear major objectives* in war and on developing war strategies as a component of the nation's *broadier goals* with *time horizons* extending beyond the war itself. Within this context he postulated that an effective strategy should be focused around a relatively *few central principles*, which can *create, guide* and *maintain dominance* despite the enormous frictions that occur as one tries to position or manoeuvre large forces in war'.

From these militaristic origins, organizational strategy can be seen to be clearly different from tactics. Strategy can be seen as a "grand design" which somehow directs the overall pattern of an organization's activities towards broadly conceived objectives.

Within the modern management literature, definitions remain ambiguous. Drucker (1954) was one of the first to address the strategy issue, although only implicitly. To Drucker (1954), an organization's strategy was the answer to the dual questions: what is our business, and what should it be? Chandler (1962, p. 13) defined the concept of strategy more explicitly as:

'The determination of the basic long term goals and objectives of an enterprise, and the adoption of courses of action and the allocation of resources necessary for carrying out these goals'.

This definition combines the strategic planning process with the concept itself. In contrast, the definitions by Andrews (1987) and Ansoff (1965) focus exclusively on the concept itself. Andrews (1987, p. 12) proposes a broad definition of strategy, including both the ends, in the sense of goals and objectives, and the means for their achievement, which include courses of action and allocation of resources:

'strategy is the pattern of objectives, purposes or goals and major policies and plans for achieving these goals, stated in such a way as to define what business the company is in or is to be in and the kind of company it is or is to be'.

Ansoff (1965), in contrast, narrowed the concept to means, as a 'common thread' amongst an organization's activities and product/markets that defined the essential nature of the business that the organizations was in and planned to be in. Ansoff (1965) identified four components of such a "common thread". They included a product/market scope (the firm's current operations), a growth vector (the changes planned to current operations), competitive advantage, and synergy.

Hofer & Schendel (1978, p. 25) also argue the case for limiting the definition to means, as they define strategy as:

'the fundamental pattern of present and planned resource deployments and environmental interactions that indicated how the organization will achieve its objectives'.

Their work identifies four distinct components of organizational strategy: scope, distinctive competence, competitive advantages, and synergy. Porter (1985, p. 1) limited the definition of strategy still further with the notion of 'competitive strategy':

'Competitive strategy is the search for a favourable competitive position in an industry. It aims to establish a profitable and sustainable position against the forces that determine industry competition'.

Many others definitions could be listed, but most represent a common theme. Mintzberg's article *Five Ps for Strategy* summarises the five major definitions used within the strategy literature. Strategy is seen as a plan, ploy, position, pattern, and or a perspective (Mintzberg 1987a). Strategy as a plan is the most widely used definition across many differing fields of knowledge. Closely allied to this is the notion of strategy being a ploy to either threaten or outwit a competitor. Strategy can also be a position or stance, whereby it determines the positioning of the organization within an industry and against its competitors (Porter, 1980, 1985). Strategy may also be seen as a pattern in a stream of actions, whether or not intended. Thus, according to the writings of Mintzberg and Mintzberg and Waters, plans can go unrealised and patterns of actions can emerge within organizational actions without any preconceived plans (Mintzberg, 1978; Mintzberg and Waters, 1982). Strategy as a perspective relies heavily on the writings on organisational culture. Lorsch (1986) identifies how organizational culture can act as an "invisible barrier" to strategic change by limiting the strategic perspectives that top management consider (Lorsch 1986).

Mintzberg clearly states that the five definitions are all interrelated and compatible with each other, so for example the writings of Porter (1980, 1985) see strategy as shaping ploys, plans and helping to position companies against their competitors.

The large majority of writers have avoided the ill-defined uses of the term, thereby minimising confusion, but also creating a plethora of different concepts. Despite this, Dent (1990) describes a common theme running throughout the normative literature:

'Strategy is thought to constitute a logic underlying an organisation's interactions with its environment; and this in turn guides its deployment of resources' (ibid., p.3)'.

Mintzberg (1978) however, draws a distinction between *intended* strategy and *realised* strategy. The normative literature on strategy (see Porter, 1980, 1985; Hofer & Schendel, 1978 and Ansoff, 1965) views strategy "as a statement of intent, or a plan, sometimes formalised in a statement of mission, objectives and intended actions." (Dent, 1990, p. 5). Such strategy is a formal and analytical process undertaken before actions and decisions. Mintzberg sees things differently, he sees strategy as a "pattern in a stream of decisions" (Mintzberg 1978 pp935) and "actions" (Mintzberg and McHugh 1985). Realised strategies emerge as events unfold over time. Organizational activities and decisions can be seen to follow a pattern or trend. Thus, intended strategies, as prescribed by the normative writers, may not be realised. This may be brought about by initial strategic planning information being incorrect, or by unforeseen changes in the organizational environment. More importantly, realised strategies may emerge unintentionally, as minor decisions and actions may accumulate together within the organization. Mintzberg (1992, p. 2) is highly critical of the normative literature on strategy, including the work of both Porter (1980, 1985) and Hofer & Schendel (1978):

'Strategy is not just a notion of how to deal with an enemy or a set of competitors or a market, as it is treated in so much of the literature and in its popular usage. It also draws us into some of the most fundamental issues about organisations as instruments for collective perception and action'.

Thus the normative strategy literature assumes a "mechanistic metaphor of organization" (Dent 1990, p. 6), with strategy making being an rational, orderly and unproblematic activity being controlled by a powerful executive or group. Such research stands in direct contrast to the behavioural and organizational literature on decision making and action, which promote a more complex, political and less rational strategy arena. Because of these differences within the strategy literature, the chapter will now distinguish between the different strategy 'schools' in an effort to see what each may offer the study of the links between strategy, management accounting and the environment.

1.1 The Schools of Strategic Thought

The early strategic management literature largely described the strategy process as being unique and highly organizationally specific (see Andrews, 1987). More recently, however, certain theorists have provided taxonomies of 'generic' strategies, which are believed to be universally applicable across both firms and industries (see for example, Porter, 1980, 1985). In addition to these differences over the existence of 'generic' and 'unique' strategies, theorists also distinguish between strategies that operate at either corporate or business level of organizations strategies. As a result of these differences, the strategy literature provides generic theories of both corporate strategy and business strategy.

The seminal work of Chandler (1962) has lead to taxonomies of corporate level strategies around patterns of diversification. Later, Rumelt (1974) extended Chandler's analysis to specify four patterns of increasing product diversification within corporations.

Business level 'taxonomies' of strategy are based upon the alternative methods of competing in an industry. Porter (1980, 1985), for example, defines three viable generic strategies: differentiation of products from competitors; overall cost leadership in the industry; and focus on a particular segment of the market or product group. An alternative taxonomy has been put forward by Miles and Snow (1978). They distinguish between viable and non viable firms by the rate of product-market innovation; prospectors who are proactive and flexible in their product/market environment; defenders who emphasis efficiency and stability; analyzers who are the midpoint between defenders and prospectors; and reactors who do nothing to respond to environmental change until forced to do so. These taxonomies, their required competence, and the associated empirical research will be discussed in more detail below.

The classification of the strategy literature into distinct groups is very difficult to achieve, as many writings are both diverse and at the same time contain elements of each other. Despite this, Mintzberg (1990) identifies ten schools of strategy formation, which can be divided into three separate groups. The first group, containing six schools, is prescriptive in nature, and is concerned with how strategies should be formulated rather than with how they necessarily do form (see Porter, 1980, 1985 and Hofer & Schendel, 1978). The second of the Mintzberg's groups, containing three schools, focuses on specific aspects of the process of strategy formation and are concerned less with prescribing ideal strategic behaviour than with describing how strategies do get made (e.g. Pettigrew 1985; Mintzberg 1978, 1987b). The final group, containing the remaining school, really consists of a combination of the first two groups into a single perspective, that of configuration. Writers from this school see strategies as episodes - patterns in action sustained for identifiable periods of time. These

strategies could then be used to identify different periods in the history of the organization (Chandler, 1962).

In contrast to Mintzberg, Whittington (1988) adopts a much simpler, although more confusing, classification of four approaches to strategy. The first of these is the 'Classical' school (see Porter, 1980, 1985), the second the 'Processual' School (Mintzberg, 1987a), which seem to equate with Mintzberg's prescriptive and descriptive groupings respectively. The third and fourth of Whittington's groups are the 'Evolutionary' and 'Systemic' schools, which are identical to Mintzberg's environmental and cultural schools respectively.

The various strategic schools chart the history of strategic management and business policy, with some declining in popularity and being replaced by school that are more in 'fashion'. Each of the most important schools will now be briefly reviewed in turn, with the aim of discussing their potential for establishing a role for management accounting and the environment within the strategy process.

1.1.1 The Prescriptive or Classical School of Strategy

The normative literature on strategy formulation and analysis has developed over time, and can be classified broadly as the 'Prescriptive' school. This literature draws heavily from both industrial economics and from the study of business policy, which are concerned with business unit strategies and corporate level strategies respectively. Ansoff (1965) undertook one of the first studies of corporate level strategic choice. He identified that the key component of corporate strategy was to maximise the synergies flowing from a portfolio of business units after considering the company's capabilities. For Ansoff, these synergies were based in part on the economic benefits gained from economies of scale. In addition, however, synergy also consists of more abstract benefits, such as 'managerial synergy', which Ansoff describes as comprising the advantage of having existing management expertise that can be applied to newly acquired business units. Andrews (1987, p. 12) also discusses corporate strategy formulation and implementation, but with a definition comprehensive enough to also include the business strategies guiding the divisions of a diversified company:

'As we ascend from a specific strategy (business unit) to corporate strategy, we pass from specific economic objectives to broader organizational goals. More weight is given to such characteristics as unity, coherence, consistency, purpose and concern for the future'.

Thus, Andrew's strategic framework advocates a highly situational and unique system whereby the organisation formulates a corporate strategy which allows it to mobilise and use its resources in the most favourable way against its environment:

'The principal sub-activities of strategy formulation as a logical activity include identifying opportunities and threats in the company's environment and attaching some estimate or risk to the discernible alternatives. Before a choice can be made, the company's strengths and weaknesses should be appraised together with the resources on hand and available (ibid, p. 14)'.

The literature on business level strategy assumes that whilst economic performance is ultimately determined by a firm's conduct, this conduct is itself determined by market structure. Applying this concept to business strategy means that a firm tries to achieve a sustainable competitive position within a market by restricting its competitors power, either by strategic alliances or by erecting barriers to entry. Porter (1980, 1985) and Gilbert & Strebel (1992) *inter alia*, collectively called the "Positioning" school, have taken the

fundamental framework developed by Andrews and developed a structure for the analysis and formalisation of business unit strategy. A characteristic of this work is that it focuses more on the content of strategies than the processes by which they are to be formulated. Porter's (1980, 1985) work also added substance to the traditional prescriptive literature. Researchers could now study the specific strategies available to the organization and the contexts in which each worked best (Hambrick 1983).

Porter's (1980, 1985) strategic framework identifies strategy making as an analytical process which calculates and selects the optimum strategic position for the organization. This analysis has to balance the five competitive forces within an industry against the distinctive internal abilities of the organization. Porter identifies the five external forces as including competitors, suppliers, customers, the threat of new entrants and the threat of product substitutes. Strangely, governmental intervention is not included as a competitive force, but Porter (1980, p. 13) does say that:

'government can limit or even foreclose entry into businesses with such controls as licensing requirements and limits on access to raw materials (ibid, p. 13)'.

Interestingly, although Porter (1985, p. 7) sees strategy as determining organizational structure, and no reverse relationship, he comments on how an organisation can actually use its strategy to reshape an industry:

'Firms, through their strategies, can influence the five forces. If a firm can shape structure, it can fundamentally change the attractiveness for better or worse. Strategies that change industry structure can be a double-edged sword, because a firm can destroy industry structure and profitability as readily as it can improve it'.

In contrast to the ideas of Andrews amongst others, Porter framework discards the ideas of strategies being unique to individual organizations. Porter (1985, p. 11) sees strategies as generic and the analyst must *select* a strategy:

'Though a firm can have a myriad of strengths and weaknesses vis-a-vis its competitors, there are two basic types of competitive advantage a firm can possess: low cost or differentiation. The significance of any strength or weakness a firm possesses is ultimately a function of its impact on relative cost or differentiation. Cost advantage and differentiation in turn stem from industry structure. The two basic types of competitive advantage combined with the scope of activities for which the firm seeks to achieve them lead to three generic strategies: Cost leadership, differentiation, and focus'.

So, for Porter, strategy opportunities are either overall cost leadership in the industry, or differentiation of products from competitors or focus on a particular buyer group, geographical market or product-market segment. Porter identifies that only under strict conditions can a business unit simultaneously pursue two generic strategies at the same time, otherwise they will get "stuck in the middle" and will not achieve a competitive advantage. In contrast to this view, Gilbert and Strebel (1992, p. 120) introduced a more iterative model with 'outpacing strategies' designed to achieve a successful mix of product differentiation and cost leadership:

'Successful strategies generally consist of a planned sequence of moves from one position to another, at the right time. The sequential implementation of competitive moves should not be seen as strategy changes. It must be planned, one move creating the conditions for the implementation of the next. The dynamic nature of successful strategies is reflected in their description as *outpacing strategies*. Outpacing strategies can be pre-emptive or proactive'.

Thus, Gilbert and Strebel's strategies are designed to get an organization "stuck in the

middle" and get the best of two strategic postures. They argue that over time, through a "dynamic path", successful firms manage to be both efficient in their delivery of low cost products and effective in their capacity to create high perceived value through differentiation. Gilbert and Strebel give the Swedish firm IKEA as an example of a firm following a proactive "outpacing strategy". IKEA eliminated or modified the activities that increased the delivered cost and did not increase perceived value added for the consumer, whilst at the same time adding value added where this could be done for a low delivered cost.

A critique of the 'positioning' school is that it is biased towards conventional, big established business, the 'machine bureaucracy' (Mintzberg, 1978). Of the industries Porter (1980) studied, only 11 out of 177 firms were capital goods manufacturers. Mintzberg (1990, p. 133) uses this fact to criticise the 'positioning school' ideas:

'Generic strategic thinking applies most readily to commodity, mass production industries, and mass service industries, not, for example, to producers of customised products, which turn out to be far more common than is suggested in this literature'.

Coupled to this problem of a bias towards mature and established businesses, is an additional bias towards conditions of stability, as in the earlier writings of Ansoff (1965). Instability is common in customising industries, and helps to break down barriers to entry and mobility. Such instability makes it difficult to find and develop 'hard' industry data, and thereby makes it very difficult to conduct the competitor and industrial analyses that the 'positioning school' depends upon.

In summary, the Positioning school focuses on strategies that have become generic, on already established industries, and on competitors that have already positioned themselves. As Mintzberg (1990) states:

'Some of the most famous battles of business and war have been won not by doing things correctly but by breaking the rules, by creating the categories'. (ibid, p. 135)

Complementary to the "positioning" or "classical" strategy literature developed from industrial economics are the new resource-based theories of the firm (Mahoney and Pandian 1992), which partly owe their origins from early research conducted by Chandler (1962) and Rumelt (1974). This literature sees the organization's internal pool of resources, skills and intangible or "invisible" assets (Itami 1987) as the foundations and determinants for organizational strategy. Prahalad and Hamel (1990, p. 81) define core competence as:

'The collective learning in the organization which creates the ability to consolidate corporate wide technologies and production skills into competencies that empower individual businesses to adapt quickly to changing opportunities'.

In contrast, Collis (1991) sees competence more in terms of physical assets. The resource based theory of strategy sees future strategy as being determined by the organization's past decisions and history, because they themselves have determined the current size and shape of the organizations resources. The combination of Porter's analytical framework with this resource based analysis may well provide great benefits, as described by Collis (1991, p. 65):

'A strategy formulated through a purely economic analysis is difficult to implement. It is the organizational readaptation and the administrative realities that constrain implementation. Firms' activities are multifaceted and interrelated, and an approach which looks inside those functions in some detail can better prescribe appropriate behaviour throughout the organization than one concerned with external competitive position. Core competence also contributes to corporate

strategy by helping to define appropriate patterns of diversification, and business interrelationships’.

Itami (1987) argues that ‘invisible assets’ (which may be a brand name, customer knowledge, expertise in technology and or a strong corporate culture that inspires employee commitment) are a companies best long term source of competitive advantage or the "synergy effect" because they are unique to the firm. They are very difficult to buy, and can be used in many differing ways to help a firm grow.

Although Porter's framework has received critical acclaim, it can be criticised from a number of perspectives. First, it can be attacked for being too narrow in focus, as Mintzberg (1992, p. 131) explains:

‘It is orientated to the economic and especially the quantifiable, as opposed to the social or political or even non-quantifiable economic. Thus, for example, there can be bias in the selection of strategies because cost leadership strategies may have more hard data to back them up than, say, those of quality differentiation. This can be seen clearly in the BCG (Boston Consulting Group) emphasis on experience curves, and in some other consulting firms' virtual obsession with perceiving strategy in terms of managing costs’.

Porter and other "positional" school writers clearly divide the formulation of strategy from its implementation. This separation is criticised by Mintzberg (1990, p. 175):

‘Consider the dichotomy of formulation and implementation, which by separating thinking from acting impedes the development of strategy as a learning process. The high failure rate of deliberate strategies has generally been attributed to problems of implementation. But this may only block recognition that the blame more typically belongs not in implementation, not even back in formulation itself, but in the very fact of having separating the two, and so impeding the natural processes of learning in an organisation’.

Despite problems with such a dichotomy, Andrews (1987, p. 82) does identify the potential problems of implementation:

‘The assumption that strategy is essentially a value-free appraisal and the choice of economic opportunity and evaluation of results without reference to company capability, personal values, and entrenched cultural loyalties has often led to strategic recommendations by staff departments and consulting firms that companies were neither able or willing to carry out’.

In contrast to Andrews, Porter's work makes no reference to either the process of strategy implementation or to the problems of such. In addition, Porter eco-rational analysis neglects to even consider the behavioural, ethical and environmental concerns that strategy affects, and is affected by. Writers such as Quinn (1980), *inter alia*, see such a ‘market focus’ as incomplete, and even go further to suggest the entire process, combining formulation and implementation, as essentially behavioural and political (Quinn, 1980). Hirsch, Friedman and Koza (1990, p. 90) highlight these problems when commenting on Porter's work:

‘How are we to believe an organisation goes through the processes of observing markets, deciding where it wants to be, and getting itself there? Not without some intra-organizational fighting and resistance by competitors’.

Porter's later work on competitive advantage (Porter, 1985) does rectify this problem to some extent, as it describes horizontal strategy and interrelationships among business units within an organisation. However, even this chapter is superficial and is all too brief. Strategic analysis supposes that decisions emerge through ordered and sequential procedures. The activity of choosing amongst alternatives is taken to be unproblematic. This notion is in direct contrast to the ‘bounded-rationality’ model of March and Simon (1958), where incremental satisficing decisions are often taken by decision makers. Strategic analysis also

fails to describe how strategies emerge over time (Mintzberg, 1978), and fails to describe less rational perspectives where solutions may precede and give rise to problems (March and Olsen, 1976). Economic analysis of this kind cannot hope to model and describe such behavioural and political aspects of the organisational strategy process. Despite such criticisms of strategic analysis, Porter's (1980, 1985) analytical framework does provide valuable direction for any manager formulating his or her strategic alternatives. However, no 'law of strategy analysis can be allowed to exist' (Mintzberg and Quinn 1992, p. 136), and strategic analysis of numbers should not keep strategists from looking at products and customers, and more importantly should not disrupt the blending of implementation with formulation. In order to explore these less rational perspectives on the strategy process, the 'descriptive' school of strategy formation will now be briefly reviewed.

1.1.2 Descriptive writings: The learning school

Mintzberg (1978) and Lindblom (1959) amongst others have identified that although strategic decision making has become to be seen as a rational exercise in formulation, it is rather formed by the complex "mangle" of an organizations cultural and political processes. Mintzberg (1992, p. 3) summarises the problems of strategy formation:

'Successful strategists can no more rely exclusively on such analysis (Porter's framework) than they can do without it. Effective strategy formation...is a sometimes deceptive and multifaceted affair, its complexity never to be underestimated'.

Lindblom's (1959) 'The Science of 'Muddling Through' was the first piece of work within Mintzberg's 'learning school' of strategic theory. Lindblom (1959) suggested that policy making in government was not conducted 'rationally', as the decision maker was always trying to cope with an environment that he or she did not fully understand. As a result, decisions were made through a process of 'muddling through' and violated every notion of rational management theory. Braybrooke & Lindblom (1963, p. 26) developed a similar notion which they labelled 'disjointed incrementalism', where policy making was seen as a 'socially fragmented', 'uncoordinated' and 'remedial' process in which decisions were made to solve problems, not to exploit opportunities:

'policy making is typically a never-ending process of successive steps in which continual nibbling is a substitute for a good bite'.

Quinn (1980) uses the work of Lindblom (1959) to develop the strategy of 'logical incrementalism', where:

'the real strategy tends to evolve as internal decisions and external events flow together to create a new, widely shared consensus for action among key members of the top management team. In a well run organization, managers proactively guide these streams of actions and events incrementally toward conscious strategies'. (ibid, p. 15)

Thus, strategic direction within any organization is ultimately controlled by top management, it can also be influenced by many other individuals or group of individuals. Each organizational participant has their own beliefs, and will want their interests to be furthered in the choice of the strategies adopted. These interests will help determine the bounds and limits for which strategic direction the firm will take, even if the decision may well lead to the erosion of competitive advantage. Bower (1970) and Burgelman (1983) both produce evidence suggesting that strategic initiatives may 'emerge' from lower in the organizational hierarchy.

The work of Pascale (1992) is highly critical of the entire approach of strategic analysis, especially by "strategic boutiques" such as the Boston Consulting Group. In addition, he doubts the very concept of strategy formulation. Pascale supports his argument by describing a Boston Consulting Group (BCG) study that sought to explain how U.S. manufacturers had lost the American motorcycle market to Japanese competitors such as the Honda Company. After interviewing Honda executives, Pascale (1992, p. 112) found that the BCG study was entirely wrong. Rather than having a brilliant initial strategy (as the BCG study concluded), Honda were just very flexible in correcting errors in their strategy:

'The Japanese don't use the term "strategy" to describe a crisp business definition or competitive master plan. They think more in terms of "strategic accommodation" or "adaptive persistence", underscoring their belief that corporate direction evolves from an incremental adjustment to unfolding events. Rarely, in their view, does one leader (or a strategic planning group) produce a bold strategy that guides a firm unerringly. Far more frequently, the input is from below'.

However, Kay (1993) remains unconvinced by either account, and suggests that the strategy was successful because it was based on Honda's own distinctive competence, and its realisation depended on a successful competitive strategy.

Brunsson (1990) sees decision making being more than just for the rational purpose of choice. Brunsson describes the role of decision making as mobilising organizational action, as an 'allocator' of organizational responsibility, and as a method of enhancing corporate legitimacy. Ansari and Euske (1987) also criticise the 'rational' view on strategic decision making. Ansari and Euske's (1987) findings from the use of management accounting in the public sector indicate that information produced by a strategic analysis may not actually be used in a way consistent with the technical rational perspective of strategic decision making. In addition, such information may be disregarded and may have different meanings over time. The resource allocation in organizations is seen as an important part of corporate strategy, and Bower (1970) describes this process as political and awash with conflict with competition between many differing groups. In summary, organizational researchers see strategic decision making as an irrational, disjointed and political process. Quinn (1980), however, does attempt to partially reconcile these ideas with those of Porter (1985), noting that while the strategies themselves 'emerge' from an incremental process, they have many of the characteristics of the formal and deliberate analyses of Porter's strategists:

'It (Strategy) involves forces of such great number, strength, and combinatory powers that one cannot predict events in a probabilistic sense. Hence logic dictates that one proceed flexibly and experimentally from broad concepts toward specific commitments, making the latter concrete as late as possible in order to narrow the bands of uncertainty and to benefit from the best available information. This is the process of "logical incrementalism". (ibid, p. 8)

Both the strategic analysis and, to a lesser extent, the strategic formation literature can be criticised for not articulating the idea of an organization being constrained and limited in the range of available strategic choices. Pfeffer and Salancik (1978) identify that past decisions made by an organisation can actually reduce the organizational possibilities for securing competitive advantage. Nelson & Winter (1982) also adopt a more deterministic stance, and show how organizations, through past decisions, are forced into inflexible "niche" positions where their capabilities are valued. Thus, there may not be a 'shelf of technologies' external to the organization from which it can choose as conditions dictate (Teece, 1989). Instead, an organizational strategy may be determined by past actions. Starbuck and Hedberg (1977, p. 250) also an organization partly creates its own environmental context:

'It is a habitat the organization partly creates by selecting geographic locations, technologies, product lines, legal structure, suppliers, and employees. It is also partly constructed through co-

operative agreements, research, capital expenditures, advertising, education, and employment policies’.

Starbuck and Hedberg go further to suggest that after the initial construction of the environment, interaction with it becomes stylised and the organization sets up behaviour programs that give consistent responses to expected cues. These programs eliminate hunts for new responses to the same familiar situations. However, Starbuck and Hedberg (1977) suggest that this can lead to problems, especially with strategic programs:

‘These programs can seduce an organization into misperceiving situations and acting inappropriately. Because situations appear equivalent as long as they can be handled by the same programs, programs remain in use after the situations they fit have faded away’. (ibid, p. 250).

Thus, current strategies become obsolete, but when assessing a new situation, an organization’s first response may be to adapt and use strategies already acceptable to its behavioural repertoire.

1.1.3 Differentiating the Theories - A need for Descriptive Work

This review of the major themes within the strategy literature has highlighted the array of different views held by researchers on strategy. Although the majority of such researchers agree that an organizations’ strategy largely determines its position within its operating environment, there can be significant differences in theoretical approach, as Dent (1990, p. 9) explains:

‘Some (researchers) see strategy as intended ex ante, others prefer to infer strategy through a stream of decisions and actions ex post. Strategy-structure linkages are brought to the fore in some analyses, content issues in others. Some focus on the process and emergence of strategic decisions. Others address the process and dynamics of strategic change’.

Thus, there is certainly no consensus on how an organization should undertake its strategy process. If theory cannot provide an incontestable understanding of the strategy process, then perhaps an appeal should also be made to the descriptive research on the subject. This descriptive research should reveal some insight into what determines and affects the strategic decision making process, and whether this does or does not include a role for management control systems. Furthermore, it should be able to prove the value of various strategic theories.

1.2 Strategy Field Research

There is a broad range of descriptive research on how the strategy process works in many different organisations (see a detailed reviews see Mintzberg, 1989; Dent, 1990). Chandler’s early studies of the strategy-structure relationship within organizations found that structure followed strategy, through a cycle of resource accumulation and then rationalisation (Chandler 1962). Chandler’s study was investigated the linkages between organizational growth strategies and structure. His methodology consisted of a historical analysis between 1909-1948 of the diversification patterns within a group of nearly 70 American organizations, and to see whether different growth strategies eventual lead to a change in an organizations’ structure. Chandler concluded that although there was no simple causal linkage, “a new strategy required a new or at least refashioned structure if the enlarged enterprise was to be operated efficiently” (Chandler 1962 p. 15). The strategy of diversification within American industry allowed the continuing expanded usage of

corporate resources, but did not ensure their efficient employment. Structural reorganization was needed, with the level being determined by the amount of new goods been produced. Where companies diversified into wholly new lines for quite different customers with different wants, then more reorganization was needed. For such companies, co-ordination and channels of communication and authority would grow more and more inadequate, until a multi-divisional structure was introduced. Chandler also describes how once a few pioneering organizations had set up successful multi-divisional structures around 1930, it encouraged others to adopt a strategy of diversification. This early work can be criticised by using the later work of Meyer and Rowan (1977), who suggest that the structure of the organization actually consists of both formal and informal elements. These elements can become decoupled, and the formal structure can become just a myth or ceremony. Thus, as Hall and Saias (1980, p. 161) identify, any study of the strategy-structure linkages must attempt to study the *real* structure of the organization:

‘It is necessary to recognise that in reality structure is the result of a complex play of variables other than strategy; culture, values, the past and present functioning of the organization, its history of success and failure, the psychological and sociological consequences of technological development, and so on. Structure, then, assumes a political content in the same way as strategy, and there is no reason to subordinate one to the other’.

Obviously, studying the ‘real’ as opposed to the ‘formal’ structure of an organization can be immensely difficult for the researcher with limited assess, time and resources. However, an attempt must be made if meaningful results are to be obtained from the research.

Descriptive work has also been directed towards exploring the role played by organizational structure in influencing and constraining strategic decision making. The cross industry research of Miles and Snow (1978) identified a typology of four distinct organisational types, with each adopting a unique strategy. These strategic types included the viable strategies of ‘defender’, ‘prospector’ and ‘analyzer’, and the non-viable strategy of a ‘reactor’. The defender is an organisation with a narrow product-market domain. It devotes primary attention to improving the efficiency of existing operations, and does not tend to search outside of their domains for new opportunities. Its organizational form is typically functional, with highly formalised and intensive planning, and high central involvement. In contrast, the prospector continually searches for market opportunities, creating change and uncertainty to which their competitors must respond. Its may well be inefficient, as the organization is decentralised, flexible and adaptive. Analyzers are a mix of prospector and defender, operating in stable and unstable areas, watching its competitors carefully. Its organizational form exhibits elements of a matrix design, with lateral and hierarchical information flows. So each of these organisational types had a particular configuration of technology, structure and process that is consistent with its strategy. Finally, the reactor is a ‘residual’ behaviour for an organization, in which top managers do not respond effectively to changes in their environment, and only adjust their strategy-structure relationship when forced to do so by environmental pressures. Miles and Snow conclude that reactors should not survive in the long term, although an organization may be a reactor at times, especially when a previously stable environment becomes turbulent.

Miles and Snow's conclusions were investigated further in research conducted by Snow and Hrebiniak (1980a). The research aimed to identify the distinctive competence, organizational structures, and management processes that are required to pursue the different strategies effectively. The findings concluded that managers in each industry perceived all four of the Miles and Snow's strategic types were being pursued. In addition, in contrast to Miles and

Snow's ideas of the distinctive competence needed to follow a certain generic strategy, it was found that organizations only developed some of the required competence that the Miles and Snow theory suggested. Snow and Hrebiniak (1980a, 1980b) were one of the first to study empirically the linkage between organizational strategy and competence, but since then further work on resource-based theories of the firm (Pfeffer and Salancik, 1978; Pfeffer, 1982) has been developed. This later work is used in chapters 4 and 5 of this thesis to illustrate how organizations may and may not need to respond to 'greening' demands from interested parties.

In contrast to many other studies of the strategy process, Goold and Campbell (1987a, 1987b, 1990) explored the role played by the centre of an organization in the strategy making of 16 United Kingdom organizations, and identified three prominent strategic 'styles': 'strategic planning', 'strategic control' and 'financial control'. The strategic planning style allows business unit managers to formulate proposals, but headquarters reserves the right to have the final say. In contrast, the financial control style is almost the opposite. Responsibility for the business unit strategies rest entirely with the unit managers, and central control is organised through the setting of strict short term financial controls. An organization following the 'strategic control' style hope to achieve the advantages of the previous two styles, but find it hard to achieve the delicate balance between control and decentralization. Goold and Campbell's findings are in direct contrast to the analytical framework of Porter who would suggest that each business unit should not have their strategy influenced by the centre of the organization in any way, and should be calculated from analysis of the competitive environment of each individual sub-unit. Goold and Campbell's research can also be criticised by referring to the work of Meyer and Rowan. The Goold and Campbell methodology was to interview 5 to 20 business managers and also to gather data about "the formal aspects of the company's strategic decision making process" (Goold and Campbell 1987b, p. 71). Obviously, one criticism of this approach is that it fails to account for the more 'informal' aspects of the strategic process, which have been found to be very important in certain cases (Meyer and Rowan, 1977). As a result of this, what Goold and Campbell identify as the formal strategic process may in fact be an organizational 'myth', intended to create 'external' legitimacy for the organization with its parent.

Attention will now be turned to the studies which seek to identify the organizational individuals who actually devise and develop organizational strategy. Whilst the great majority of the normative literature states that top executives should be the ones to actually make and formulate the strategy, there is empirical evidence to suggest that this is not always the case. From their study of the National Film Board of Canada (NFB), Mintzberg and McHugh (1985, p. 194) found evidence of a much more 'emergent' strategy process, whereby anyone in the organization who controls key or precedent setting actions can be a strategist:

'Sometimes an individual actor in touch with a particular market niche creates his or her own pattern (or a small, detached sub-unit does the same thing); sometimes he or she does not even do that, but simply takes an initial action that evokes its own pattern; other times, the external environment imposes a pattern on a unsuspecting organization; in some cases, many different actors converge around a theme, perhaps gradually, perhaps spontaneously; or sometimes senior managers fumble into strategies'.

Whilst the findings of the Mintzberg and McHugh (1985) study may have been obtained from an atypical case study, it does highlight some of the 'emergent' influences at work

within an organizational strategy process. Further evidence of the more 'emergent' nature of the strategy process comes Burgelman's (1983) study of the internal corporate venturing process (which transform R&D activities into new businesses) within a diversified firm. Burgelman (1983, p. 241) found that strategic initiatives originated from middle managers, and that these same managers were crucial in eventually turning the initiatives into corporate strategy:

'The findings suggest strongly that the motor of corporate entrepreneurship resides in the autonomous strategic initiatives of individuals at the operational levels in the organization. High technology ventures, usually at the group leader level, engage in strategic initiatives that fall outside the current concept of corporate strategy. This stream of autonomous strategic initiatives may be one of the most important resources for maintaining the corporate capability for renewal through internal development'.

Pascale (1992) also found that strategies may not formulated by one top executive, but emerge through a collective group process. Pascale's study of how Honda developed its strategies for the American motorcycle industry is another example of the emergent view of strategy making. Pascale was "told of a myopic and disorderly process in which they fumbled upon their realised strategy despite themselves" (Mintzberg and McHugh, 1985, p. 194). Thus, it is not easy to plan where and when strategies will emerge, let alone plan the strategies themselves. These empirical findings are highly valuable in the study of the influence of environmental management systems (EMS) on the organizational strategy process. The 'middle' managers in charge of the EMS may help to launch environmental strategic initiatives throughout the firm, leading to the emergence of an entirely new environmental strategy for the firm.

1.3 Linking Strategy, Management Accounting and Environmental Management Systems

This appendix provided reviewed the 'general' strategy literature in order to explore how strategy is both formalised and implemented with organizations. From this review, it is evident that the literature varies widely, both in terms of theory and empirical results. The next stage is to use the general findings from the literature review as the basis for describing the present relationship between strategy, environmental management and management accounting. This analysis is conducted in chapter 3 of the thesis.

Appendix 2: Typical Letter To Organizations

Mr Peter Trottmann
Cobe Laboratories
Athena 2
Olympus Business Park
Quedgeley
GL2 6NF

Dear Mr Trottmann,

Environmental Management Systems: The Role of Management Accounting

I am writing to you with regard to my interest in your firm's initiatives in the area of environmental management systems. These are some of the most ground breaking in the area, and I am interested in obtaining more information about their creation and operation for an academic project.

Whilst employed at Cheltenham & Gloucester College of Higher Education, I am completing a PhD thesis at The London School of Economics and Political Science on the above topic.

The Project sets out to investigate the processes by which environmental, "green", issues permeate organizational boundaries and become part of organizational action programmes. In particular, the research focuses on exploring the degree to which "green" issues are, and can be, rendered transparent through the function and design of management information systems.

UK manufacturing organizations are now generating internal information flows that are being specifically targeted towards dealing with 'environmental' induced uncertainty. Such information, and its uses, varies widely across organizations, with the little empirical research to date clearly giving a flavour of the differing ways that such information is collected, by whom and how it is used within the organization. Little is currently known about the way environmental information is, or is not, used in conjunction with more 'traditional' management information systems within the context of organizational decision making. My project aims to describe the organizational context surrounding the development and use of environmental information by management, with a particular focus on the role played by management accounting.

I am now at the stage where I need to undertake empirical work. Your business has come to my attention as a leading practitioner in the field of environmental management. I would like the opportunity to gain an understanding of how your EMS operates and to explore how it presently interacts with your management accounting function. I would, therefore, be most interested in discussing these issues with you. Anonymity is assured, should you wish it. In addition, if you were happy with the interview, I would like to discuss the possibility of studying your firm as a case study.

If you feel able to help me in the empirical part of my work in any manner, I would be most grateful if you could contact me on any of the numbers above, or e-mail me at Aholt2@Chelt.ac.uk

Thank you for your time.

Yours sincerely,

Andrew Holt
Lecturer in Accounting and Finance

Appendix 3: Interview Schedule

INTERVIEW SCHEDULE

Name:

Title:

Company:

Date:

Section 1: Background and Role

1. Professional Qualifications and Training
2. Organizational Role

Section 2: View on Environmentalism

1. Personal view
2. View on company attitude towards the environment

Section 3: The Impact of the Environment on Business Operations

1. Pressures for Greening
2. Impact on operations, inputs, outputs and products
3. Customer, Competitors and Suppliers

Section 4: Knowledge of Environmental Management Activities

1. Knowledge of Reasons behind these activities
2. Knowledge of past, present and planned changes in the firm
3. Knowledge of environmental information being used in decision-making

Section 5: Role of Environmental Unit in Environmental Management

1. Main activities
2. Management of environmental costs and impacts
3. Current Issues

Section 6: Role of Production Staff in Environmental Management

1. Main activities
2. Management of environmental costs and impacts
3. Current Issues

Section 7: Role of Management Accounting in Environmental Management

1. Main activities
2. Management of environmental costs and impacts
3. Current Issues

Section 8: Interactions with Accounting&Finance/Environmental Management/Production Functions Regarding Environment Issues

1. Interactions with other functional areas regarding environmental issues
2. Personnel interactions with other organizational participants