Sustainability programmes for business: Place and practice within the context of relevant developments in organisation theory

Lesley-Joan Stone (*née* Roger-Lund)

Acknowledgments

Abstract

Keywords: sustainability, sustainable development, business, voluntary initiative, demonstration project, cleaner production, pollution prevention, environmental management, organisation/organization theory[1], organisational/organizational change, organisational/organizational learning, Target Zero, New Zealand.

Sustainable development requires that all human activities be carried out without causing permanent damage to the life-supporting capacity of the natural environment. In order to progress towards sustainability, fundamental changes need to be made to the way human activities are carried out. Businesses have a significant role to play in the transition to sustainability. However, environmental concerns have not traditionally been incorporated into business practice. A wide range of methods have been developed and applied to encourage businesses to adopt sustainable practices. This thesis focuses on voluntary initiatives that encourage businesses to systematically identify and tackle the sources of their environmental effects, rather than the symptoms. These types of initiatives are encapsulated by concepts such as "pollution prevention" (PP) and "cleaner production" (CP).

Programmes that encourage CP/PP have been very successful in getting businesses to prevent or reduce wastes by making changes to the resources and processes they use, and, to a lesser extent, the products they make. However, they appear to have been less successful in getting them to make changes at an organisational level. This is not surprising, given that their focus has tended to be elsewhere. However, evidence suggests that the changes undertaken by businesses involved in such programmes have tended to be 'one-off' and their involvement short-term. This is of concern because of the magnitude of some of the changes that are required and the need, therefore, for incremental and continuing improvement.

My thesis is that these types of sustainability programmes could benefit from critical examination of their place and practice within the context of developments in organisation theory. The thesis is tested by: 1) identifying developments in organisation

---

[1] Note that the repetition is to enhance the potential for the thesis to be found when searching using NZ, as well as other spelling.

theory that are of relevance to organisational change; 2) evaluating the effectiveness of an example of a sustainability programme for business, and 3) considering the results of the evaluation within the context of relevant theoretical developments and change management models.

A literature search identifies key developments in organisation theory. They are presented in terms of five approaches that are commonly distinguished in the literature: rational or mechanistic approaches; humanist or social approaches; contingency approaches; political approaches, and cultural approaches. In addition, developments specific to organisational change theory, particularly in terms of change management and models for managing change, are considered.

The example chosen is the Target Zero (TZ) project - a two-year, multi-company project designed to demonstrate the value and applicability of cleaner production in New Zealand (NZ). Participants included the Electricity Corporation of NZ (ECNZ), the NZ Ministry for the Environment, local authorities (councils) and power retailers in two regions, and 25 "demonstration" organisations.

The evaluation is presented in three parts. Part I uses staff perceptions regarding the success, benefits and value of the project. Part II uses key indicators of environmental management (EM) and CP, as well as relevant indicators of organisational culture and staff attitudes to track changes in the demonstration group and compares them with a control group. Part III uses monthly progress reports for each demonstration organisation to identify organisational factors that influence change.

Together, the results emphasise the importance of social factors in the implementation of cleaner production/pollution prevention projects. They suggest two primary and three secondary areas for improving the effectiveness of such projects. Commitment and continuous improvement are identified as primary areas because of their primacy in the literature and the critical roles they have to play in sustainability programmes. Leadership, support, communication, involvement and compatibility of the project are identified as secondary areas for improvement because, while important, they are still subservient to commitment and continuous improvement. Each area is discussed in terms of the extent to which it is (or is not) covered in key examples of CP/PP/EM

literature. This is then compared with relevant developments in organisational change theory, particularly as they relate to change management models.

A model for improving the ability of such programmes to deliver commitment and continuous improvement towards sustainability is developed. The model draws on a range of change management models and focuses on the need for sustainability programmes to bring about an iterative, critically reflective cycle of learning.

The model is characterised by: a diagnostic phase (to enable the programme to be customised); initiation (to engage management and demonstrate leadership; visioning (to engage and involve all staff); iterative use of the vision (to motivate, inspire and drive continuous improvement); distinctive tasks (to clarify the basis for involvement and spread the load); participatory design of the programme (to enhance commitment), and inclusion of top level managers at key stages in the process (to maximise involvement, leadership, commitment, progress and support).

The model also includes six distinct types of activities, designed to bring about iterative and critically reflective learning processes within the organisation: 1) visioning; 2) assessment of the status of the business in relation to the vision; 3) short, focused audits using CP/PP tools; 4) actions based on the results of the audits; 5) evaluation of actions in relation to the vision, and 6) communication of results.

The last activity forms the basis for the next cycle during which the contributions of actions to the vision are acknowledged, the status of the organisation re-assessed and the next audit cycle begun.

Preface

Before embarking upon this doctoral programme, I worked for a number of years with businesses to help them to adopt sustainable practices. My background was not unlike the majority of others undertaking this type of work: most of us have natural and/or physical science backgrounds and we tend to have expertise in the more technical aspects of sustainability (e.g. waste and emissions auditing, and the techniques and technologies available for preventing or reducing wastes and emissions).

Hundreds of case studies demonstrate economic and environmental benefits of these approaches, and attest to our successes. However, over the past decade there has been an increasing realisation amongst practitioners that social issues within the businesses with which we work are as, if not more, important than technical ones. While this will come as no surprise to those who are schooled in the social sciences, social issues were too often only superficially addressed in the application of the natural and physical sciences. As a result, I felt myself ill-equipped to deal with the social issues within the businesses with which I was working.

When I first enrolled for a PhD, my intention was to undertake a rigorous research programme that would provide insight into how attitudes and behaviour contributed to the uptake of sustainability in business. My supervisory committee reflected this interest and included co-supervisors who were experienced in psychology and human geography.

However, while conducting literature searches and reading on the subject of human behaviour within organisations, an opportunity arose for me to evaluate the effectiveness of NZ's Target Zero (TZ) project. The project aimed, with the help of consultants, educators and students, to: 1) demonstrate that a particular kind of sustainability programme (known as a "cleaner production" or "pollution prevention" programme) would be economically and environmentally beneficial to NZ businesses, and 2) that a multi-company approach would enable the programme to endure. The demonstration organisations were to be taken through a two-year, systematic programme that would assist them to identify and implement options for preventing or reducing their wastes at source.

The opportunity to evaluate TZ was valuable because: it was the largest project of its kind in NZ and would be well resourced; it used a relatively standard type of programme that

was already in use elsewhere in the world and the results of the evaluation would therefore have the potential to be broadly applicable; it would provide a sample of 23 "demonstration" organisations (mostly businesses) for study, and the research would be funded.

However, there were also limitations of using the TZ project as a basis for my research. Firstly, the project would be using a standard type of approach and methodology and could not, therefore, be manipulated to test a particular theory or set of theories. Secondly, the sample was not selected using a scientific method, but made up of organisations that were voluntarily willing to participate. Thirdly, the project was soon to begin and there would not, therefore, be sufficient time to conduct a comprehensive literature review and use it as a basis for developing the methodology.

Despite these limitations, I believed that the opportunity was too good to miss. I decided to evaluate the project and the use the results of the evaluation to develop a model that could be used to improve the effectiveness of sustainability programmes for business. Instead of using a normative hypothetico-deductive approach, whereby I would have reviewed the literature on attitudes and behaviour, developed a theory and a methodology to test that theory, and used the results to draw conclusions, I used a combination of practitioners' experience and the limitations that had been identified in a small number of publications as the basis for the methodology used to evaluate the TZ project.

During the course of this evaluation and my continued reading on behaviour within organisations, it became apparent that organisation theory, particularly as it relates to organisation development and change, had the greatest potential to be of use for developing the model. I had little prior knowledge of these subjects and anticipated that this would be the case for the majority of practitioners who may read my thesis. I undertook, therefore, to develop an overview of the literature on relevant developments in organisation theory. I used this overview as the basis for the discussion of the results of the evaluation and the development of the model.

If the structure of the thesis had followed this chronological order, the overview of organisation theory would have followed the results of the evaluation and preceded the

discussion. However, I felt that its inclusion earlier on would add value for readers, who have little prior knowledge of organisation theory.

The structure of the thesis is therefore as follows:

```
┌─────────────────────────┐
│        Chapter 1         │
│ Sustainability programmes│        ┌─────────────────────────┐
│  for business: Context   │──────► │        Chapter 3         │
│  and background for      │        │ Using the Target Zero    │
│       research           │        │ project as a case study: │
└─────────────────────────┘        │ Background and research  │
                                     │      methodology         │
┌─────────────────────────┐        └─────────────────────────┘
│        Chapter 2         │                   │
│ Theoretical developments │                   ▼
│  of relevance to         │        ┌─────────────────────────┐
│  organisational change   │        │        Chapter 4         │
└─────────────────────────┘        │ Effectiveness of the     │
                                     │   Target Zero project    │
                                     └─────────────────────────┘
                                                │
                                                ▼
                                     ┌─────────────────────────┐
                                     │        Chapter 5         │
                            ────────►│ Improving sustainability │
                                     │ programmes for business  │
                                     └─────────────────────────┘
```

Ch. 1 provides an introduction to sustainability programmes for business. Ch. 2 provides an overview of theoretical developments of relevance to organisational change. Ch. 3 introduces the TZ project and covers the methodology used for the evaluation. Ch. 4 summarises the results of the evaluation. In Ch. 5 a meta-analytical approach is taken to discuss the conclusions drawn from the evaluation in light of the relevant developments in organisation theory. This discussion is then used as the basis for developing a model that could potentially be used to improve the effectiveness of sustainability programmes for business.

Ch. 2 is placed before Ch. 3 despite not having informed the methodology to any great extent. It is referred to again in Ch. 5 for the discussion.

"What is the true value of knowledge?
That it makes our ignorance more precise."

From Anne Michaels' "Fugitive Pieces" (A. A. Knopf, New York, 1997).

Contents

Contents *continued*

Contents *continued*

Addendum: Summary papers published after the thesis was concluded (provided in this electronic copy for the reader's information)	342

Abbreviations

BCSD	Business Council for Sustainable Development
CEO	Chief Executive Officer
CERES	Coalition for Environmentally Responsible Economies
CP	Cleaner production
DfE	Design for the Environment
ECU	European currency unit
EM	Environmental management
EMAS	Eco-Management Audit Scheme
EMS	Environmental Management System
EU	European Union
GATT	General Agreement on Tariffs and Trade
GRI	Global Reporting Initiative
ICC	International Chamber of Commerce
INEM	International Network for Environmental Management
ISO	International Organisation for Standardisation
IUCN	International Union for the Conservation of Nature
LCA	Life Cycle Analysis
Manfed	NZ Manufacturers Federation
MfE	Ministry for the Environment, NZ
MIT	Massachusetts Institute of Technology
NOTA	The Netherlands Office of Technology Assessment
NZ	New Zealand
PP	Pollution prevention
QM	Quality management
RCGD	Research Centre for Group Dynamics
SMF	Sustainable Management Fund, NZ
TNS	The Natural Step
TQM	Total quality management
TQEM	Total quality environmental management
TZ	Target Zero
UK	United Kingdom of Great Britain and Northern Ireland
UNCED	United Nations Conference on Environment and Development
UNEP	United Nations Environment Programme
UNIDO	UN Industrial Development Organisation
US	United States of America
USEPA	US Environmental Protection Agency
USNPPR	US National Pollution Prevention Roundtable
USOTA	US Office of Technology Assessment
WBCSD	World Business Council for Sustainable Development
WICE	World Industry Council for the Environment
WTO	World Trade Organisation

List of Figures

---

[2] Figure titles for Ch. 4 have been truncated to reduce length.

List of Figures *continued*

List of Tables

List of Boxes

1 Sustainability programmes for business: Context and background for research

1.1 Introduction

The primary concern of this thesis is the effectiveness of programmes that encourage and assist businesses to become more sustainable, particularly in environmental[1] terms. The specific scope and terms of reference of the research are presented in s1.7 below. It is, however, important to begin by emphasising that the thesis is concerned with programmes that focus on "preventative", rather than control-oriented environmental performance improvement. The former encourages businesses to identify and tackle the *sources* of their environmental impacts, in contrast to the latter, which focuses on controlling them at a later stage, usually immediately before they are about to enter the environment. The distinction is important because the sources of environmental impacts are frequently traced back to the organisational aspects of the business (e.g. its structure, management, staff and/or culture). This is in contrast to control-oriented approaches that tend to have a technological focus (e.g. the addition of a treatment plant for liquid wastes or gas scrubbing equipment for gaseous wastes), and hence narrower organisational implications.

Sustainability programmes[2] that are preventative in nature therefore provide more scope for studying organisational aspects. This represents a major extension of the traditional realm of environmental science. This discipline has developed out of the need to deal with environmental impacts. The principal focus of the people who work in it has been at the point at which these impacts occur. Their primary areas of interest and expertise have been in the natural and physical sciences.

Preventative approaches involve a shift in focus, what is commonly referred to by those

---

[1] The word *environment* tends to have a different meaning when used in reference to the natural and physical world, than it does when used in an organisational sense. For the former, it tends to refer to air, water and land, as well as plants and animals and the ecosystems that sustain them. For the latter, it tends to refer to the social context within which organisations operate. According to Pugh (1997: 97), the latter includes "suppliers, clients or customers, and competitors", as well as "legal, technological, cultural and ethical developments". To avoid confusion, the word will hereafter be used alone when in reference to the former meaning, and preceded by "organisational" when used in reference to the latter meaning.

[2] The term *sustainability programmes* will hereafter be used to encapsulate programmes that encourage and equip businesses (in a professional development sense) to improve their environmental performance by changing their products or services, the processes and resources they use, and the wastes they generate (see s1.4). The term *sustainability* is derived from the definition and discussion of the concept of *sustainable development* (see section 1.2).

who work in this area as "looking back up the pipe". The difficulty is that when you look far enough back up the pipe you end up with people. Essentially what we have, then, is natural and physical scientists (myself included) who have a predominantly technical background looking up and finding that the knowledge and skills that are necessary to deal with the ultimate source of the environmental impacts upon which they have focused are social.

I believe that it is important to raise this issue at the start of this thesis because it demonstrates the need to make the jump from an area of expertise that is predominantly technical to one that is predominantly social. It also provides the basis for the way in which I have structured the thesis.

Chapter 1 provides a basic introduction to the two areas of interest – the social and the technical – and how they interrelate. It focuses on the business/environment relationship because that is the point at which the interface between the natural and physical sciences and the social sciences occurs.

The chapter starts by exploring the social context for the business/environment relationship (s1.2). This is important because when we look back up the pipe, the people we find are not only part of organisations, but society as a whole. Social science tells us that the context within which they operate will influence their perceptions of and responses to the programmes we offer. It is important because it is believed to "impel particular changes to occur and also set constraints on what is possible" (Pugh, 1997: 433). It provides insight into the assumptions people may have about business and environment. These assumptions are important because of the influence that they have on the change/learning process (Schein, 1985: 21-26) (see s2.2.6 and s5.4 for further discussion).

By beginning with this broader social context, I also hope to demonstrate just how great a challenge we face in trying to encourage businesses to become sustainable. I also hope thereby to justify the need for myself and other natural and physical scientists who focus on preventative approaches to sustainability to extend our knowledge and skills (as theorists and practitioners) into the realm the social sciences.

The chapter continues by providing an overview of how the role that businesses play can be

extended in pursuit of sustainable development (s1.3). This helps to provide insight into the differences between existing and desired roles and provides an indication of the magnitude of the challenge involved in bringing about the necessary changes.

Sections 1.4-7 provide a basis for understanding the scope, limitations and goals of the thesis. Section 1.4 provides examples of some of the concepts that have been developed to encapsulate the changes required of business. Sustainability programmes for this sector tend to focus on specific concepts and tend to vary accordingly. It is beyond the scope of this thesis to evaluate all of these programmes. However, comparison of the concepts can provide a basis for understanding the limitations of the thesis, as well as the implications for extending its relevance. Section 1.5 provides an overview of the mechanisms used to promote relevant changes within business, specifically voluntary initiatives. This is because the thesis focuses on training programmes that are part of voluntary initiatives. Section 1.6 provides an overview of the limitations of business responses and the implications for sustainability programmes. This provides insight into the rationale behind the thesis, as well as its overall goal and objectives, which are presented in s1.7.

This chapter is intended to be constructive, rather than critical. It aims to provide insight into the challenges faced in sustainability programmes for business and begins to build the case for social theory, particularly organisational theory, to be included in their development, application and evaluation.

1.2 The business/environment relationship within the context of business' role within society

People are social beings: we live together with others and organise the way in which we interact, communicate and carry out activities (Harper, 1996: 29). To help us, we establish institutions that enable particular social functions to be systematically organised and performed. The term "business" is used to describe one of these institutions. The term tends to be applied to non-governmental activities to do with the production, distribution, buying and selling of goods and services, particularly within the context of "classical" or

free market economics[3] (Davis and Blomstrom, 1971: 11). Deeks (1993: 9) describes businesses as "profit seeking" organisations and includes within the term institutions that are funded by them, e.g. industry representative bodies, employer's federations.

However, the role of business extends beyond the specific activities mentioned above. Frederick, Davis and Post, in a later edition of the Davis and Blomstrom management text, recognise that businesses operate within a complex social context, with international, regulatory, political, technological, ethical and informational dimensions. In this context, business success is judged not simply by its technological and financial performance, but also the extent to which it carries out its "social, legal, political, governmental and broader human interests" (Frederick, Davis and Post, 1988: 5).

There is widespread recognition of the broader social function of business, although the extent to which this occurs varies from country to country. Results from a survey of business managers in a range of capitalist[4] countries put the United States of America (US) and Australia at the bottom of the list with only 60% and 65% (respectively) of managers recognising the broader social goals[5] of business, compared to 92% in Japan (Hampden-Turner and Trompenaars, 1993: 32).

Despite the underlying broader social function of business, its primary goal has traditionally been considered to be profit maximisation (Deeks, 1993: 9; Hutchinson and Hutchinson, 1996: 101). Profit is the standard measure of the efficiency with which outputs (e.g. goods, services, wages) are maximised as a function of inputs (e.g. capital, labour, physical or natural resources, technology). Where profit has been the main measure of success, businesses have tended to be driven almost solely by financial obligations to owners, shareholders or investors (Davis and Blomstrom, 1971: 40).

---

[3] *Classical or free-market economics* holds that the buying and selling of goods and services within a free or unregulated market will maximise the efficiency with which resources are used and therefore maximise the benefits to society (Harper, 1996:49). It also includes the presumption that efficiency will inherently result from the pursuit of self-interest (Hampden-Turner and Trompenaars, 1993: 53).

[4] According to Marx (quoted in Wolf, 1993: 77), *capitalism* is a mode of production whereby wealth is created by separating the means of production (i.e. tools,resources, land) from production itself. Those who control the means of production are therefore able to control the access of those who want to participate in and benefit from production. Two of the key characteristics of capitalism are the creation of a waged labour force and the accumulation of liquid capital (Marx quoted in Sweezy, 1972: 6).

[5] The *broader social goals* referred to in the study reported in Hampden-Turner and Trompenaars (1993: 32) are the "well-being of various stakeholders, such as employees, customers, etc."

The tendency towards profit as a driver, and its legitimisation through classical economics, appears to have undermined business' broader social purpose in favour of creating wealth for individuals. While neo-classical economics assumes that this maximises community interest, even the most direct manifestation of that – the provision of employment – appears to have become increasingly subservient to the profit incentive. The esteem bestowed on "Fortune 500"[6] companies, despite the loss of four million jobs in the twelve year period spanning the late '80's and early '90's, and continuing reductions in health and pension benefits, real wages and job security (Hawken (1993: 125), seems to provide evidence of widespread acceptance of this trend.

The contents lists of prominent "self-help"[7] management books published within the past decade indicate just how widespread this approach has been. Nolan and Croson's book entitled "Creative Destruction: A six stage process for transforming the organisation" and published by Harvard Business School Press, provides an extreme, but not unusual example of modes of thinking and operation that appear to ignore the broader social objectives of business. Notably, "downsizing" is advocated as the first stage in the "creative destruction" process (Nolan and Croson, 1995). In his critical appraisal of this trend, Hawken (1993: 124) cites the paradoxical example of the Chief Executive Officer (CEO) of a large US corporation who was believed to have the admiration of his peers despite having eliminated 170,000 jobs during his time in office. The trend appears to be sufficiently widespread to justify the publication of books that provide advice for survivors of these "slash and burn" types of approaches to management, e.g. Woodward and Bucholz's "Aftershock" (1987) and Hurst's "Crisis and Renewal" (1995).

Another development consistent with reductionist approaches to business function has been the emergence of large, trans-national[8] corporations. Because the growth in international trade has not been matched with internationally integrated policies and laws to regulate it, trans-national corporations appear to operate "above the law, above national boundaries and are able to set their own economic agenda" (Welford, 1995: 13). While they are

---

[6] *Fortune 500* refers to the companies that are considered by Fortune magazine to be top performers. The rankings are based primarily on revenue and a list of the 500 top revenue earners is produced annually.

[7] Popular publications designed to provide advice, in this case primarily to managers.

[8] The term *trans-national* refers to corporations that operate in a number of countries. It has superceded the term *multi-national,* drawing attention to the way in which these corporations transcend national boundaries and governance.

undoubtedly responsible for creating employment, they are also recognised as "wielding considerable power", particularly in developing[9] countries where they are accused of creating dependencies on their "patronage, employment and technology" (Welford, 1995: 13).

The wealth generated by these corporations tends to remain largely in the hands of a relatively small number of stakeholders. The resultant inequities in wealth creation have not gone unnoticed. Trans-national sportswear manufacturers, for example, have received much publicity over the past few years for the disparity between the profits they make and the wages paid to sub-contracted workers within developing countries (e.g. Runyan, 1998).

This uneven distribution of economic wealth and social well-being[10] is not limited to developing countries. Countries such as the US, Australia, Canada and the United Kingdom of Great Britain and Northern Ireland (UK) provide further evidence of this situation (Bruton, 1997: 2). The average annual income of CEOs in the US, for example, increased by 481% during the 1990s, in contrast to a 28% increase for general workers (IPS/UFE, 1999).

Objections to profit maximisation as a sole criterion for business success are not limited to incompatibility with the broader social goals of business. Drawbacks for organisations that pursue such a goal almost exclusively are presented by Hampden-Turner (1990: 205-220) and summarised below.

1. Profits made in the present are a function of decisions made some time in the past. They do not, therefore, provide an immediate or timely indicator of the effectiveness of management strategies used by an organisation.

2. Profit is most easily attained by focusing on the needs of customers. This tends to focus attention away from other aspects of the health and needs of

---

[9] A range of terms are used in reference to countries that are in the process of industrialisation. These include *Third World*, *The South*, *non-industrial*, *developing* or *under-developed*. There is considerable debate over the "correct' usage and most terms have been criticised as being inexplicit, patronising or derogatory in some way. Because the focus of this thesis is industry, the term *developing* will be used to refer to these countries, since they are *developing* in terms of industrialisation. No derogatory inference or inferiority is implied.

[10] *Well-being,* in its broadest sense, is defined by Bruton (1997: 19) as a life "rich in meaning and personal growth, ... that reflects one's humanness, ... membership of a community, and ... [is] built from ... conscious thought and reflection as to its content and purpose."

an organisation.

3. Investment occurs well before customers buy the products or services that result from that investment. Investors therefore express allegiance to the organisation well before the allegiance of customers or profit generators is secured.

4. Profit maximising strategies are predictable and easily defeated by competitors, e.g. through price cuts.

5. Profits created by a new market may quickly be eliminated or reduced by competitors who rush to exploit the opportunity.

6. Strategies that demand high returns may result in comparable demands by employees.

7. Competitors who have investors or suppliers with lower demands in terms of rates of return can gain cost advantages.

8. The integrity and coherence of an organisation's knowledge, expertise and skills can be damaged when it "hops" between markedly different products or services in pursuit of profits (Hampden-Turner and Trompenaars, 1993: 44, 45).

Despite criticism of profit maximisation as an exclusive measure of business success, its hold on businesses and the resulting effects remain significant. Welford (1995: 124) draws on the work of Schein (1985), when he points out that "human consciousness rests on the basic assumptions that people make about the world around them" and that the assumptions they make about business "form the foundation for an organization's culture".

The profit-centred approach provides the foundation upon which businesses have been built and it therefore contributes significantly to perceptions of the role and responsibilities of business. Hampden-Turner and Trompenaar (1993: 3) go so far as to suggest that wealth creation has achieved the status of a moral act. They attribute this to the non-conformist and puritanical religious beliefs of the first entrepreneurs and the links to the capitalist spirit that they purportedly engendered. Deeks (1993: 27) points out that the strong moral

code and responsibility to community that was adopted by the first entrepreneurs to justify their wealth and secure their spiritual well-being was, by the 1850's, replaced with "money-making" as a virtue in itself.

It is reasonable to assume that this perception affects business responses to issues that are believed to be external to the profit motive. Top business figures frequently invoke the "sanctity of the free market" to prove the sound and constructive nature of present business practices. The view that "nothing should be allowed to hinder commerce" (Hawken, 1993: 7) is demonstrated in the articles that tend to appear in the NZ media whenever the social implications of business activities are publicly questioned.

So, although business may have an inherent social role, the context within which it operates tends towards acceptance of goals that are predominantly exclusive, rather than inclusive of broader social aims (at least in a direct sense). This has implications for sustainability programmes. If businesses are reluctant to recognise their social responsibilities, how likely are they to take into consideration the natural environment, which could arguably appear to be even less "the business of business"? Like social responsibility, environmental responsibility has, until relatively recently, been considered by the majority of business managers to be outside the normal scope of business activities.

An obvious example is the continued production by industries of "millions of tons of potentially harmful substances, some seventy thousand compounds, ... at least several hundred [of which] can be seriously argued to present serious health or environmental risks" (Solomon, 1994: 300). Businesses have tended to ignore their responsibilities in this regard unless goaded by legislation (or the threat of it). The most notable example is the legislation that resulted in the US's Toxics Release Inventory (TRI). The inventory was established in response to the US's Emergency Planning and Community Right-To-Know Act (EPCRA) and the Pollution Prevention Act (PPA). It contains information on the waste management activities and toxic chemical discharges by facilities that "manufacture, process, or otherwise use" a particular set of toxic chemicals. Because of the public nature of the information, the TRI is credited with large-scale reductions in such discharges (see USEPA website).

The five-fold rise in the world economy since 1950 has occurred at the expense of physical

and natural resources (Flavin and Young, 1993: 180). This is despite the fact that the environment "provides the atmosphere, the very ground and climate, within which all business and all human activity takes place" (Solomon, 1994: 298).

The paradoxical nature of the relationship between business and the environment is most noticeable in the area of natural resource use. Business success tends to be measured in terms of the efficiency with which resources are used. However, the issue of long-term security of supply does not appear to translate into acceptance of the key role that businesses have to play in terms of resource stewardship. The largely unregulated use of non-renewable resources is a symptom of the abrogation of responsibility in this regard.

Human history appears to provide clues to the source of the paradoxical nature of the relationship between business and the environment. Humans have managed to circumvent, at least in the short-term, the natural constraints that are faced by all other species (Ponting, 1991: 393). As a result, our numbers have soared and our activities have become increasingly complex. The delayed, distant or indirect nature of many of the damaging effects of our activities has enhanced the perception that we operate apart from natural and physical systems. Harper, in his book on society and environment, provides the following quote from a mainstream sociology text as evidence of the pervasiveness of this perception:

> *"Humans are not governed by the natural processes that govern plants, animals and planets, but by their own creations."* (Rossides, 1993: 31 quoted in Harper, 1996: 53).

Some authors consider this approach to have developed as a result of the Christian idea of dominion over nature (e.g. White, 1966; Passmore, 1980). White (1966) caused a furore when he argued that medieval attitudes and perceptions towards the environment are responsible for the ecological crisis. He further suggested that science and technology have become "blessed words in our contemporary vocabulary", because they give realisation to the "Christian dogma of man's transcendence of, and mastery over, nature." While he recognised that the Franciscans viewed the relationship between Christianity and nature differently, he also noted that active suppression of this order by the mainstream church all but eliminated its influence.

These anthropocentric approaches have been discussed in great detail by other authors (e.g. Passmore, 1980, in contrast to Gore, 1992: 238-265). However, the concept of control over

nature and a concordant faith in the ability of science and technology to deliver us from all ecological evils, have become entrenched through the teachings and writings of people of influence throughout modern history.

The resultant perceptions form an important component of the dominant social paradigm[11] of industrial societies. Milbrath considers the following to be key assumptions of this paradigm.

1. The value of nature is primarily as a source of resources for the production of goods. Humans are in control and economic growth takes precedence over environmental protection.

2. The needs of the present generation take precedence over future ones. The value of other species depends on their ability to serve human needs.

3. Wealth maximisation is important and any risks in achieving it are acceptable. Markets (i.e. the buying and selling of goods and services), not regulations, allocate risks and these are generally born by individuals.

4. Humans are not causing serious damage to nature and there are no physical limits to growth. Science and technology will be used to overcome problems with resource shortages or human population.

5. Competition and democracy are important, but also efficiency, expert knowledge, hierarchies and control by large organisations (particularly of production). Lifestyles are complex and fast paced. (Milbrath, 1989: 119)

The environmental movement that began in Western countries in the late sixties and early seventies challenged previously held perceptions regarding business responsibility and the environment. Environmentalists drew attention to the effects of industrial activities and came into direct conflict with the businesses that were responsible for impacts at a local level. One of the first and amongst the most notorious cases was in response to the contamination caused by Hooker Chemical and Plastics Corporation's activities at Love Canal, Niagara Falls in the US (e.g. Piagen, 1982).

While the chemical industry fuelled and bore the brunt of much of this onslaught through the seventies and eighties, the focus of the environmental movement had by the nineties spread to include almost all major business activities (for a summary of this progression see Hutchinson and Hutchinson, 1997: 244). As a result, the moral high ground that businesses traditionally held as the saviours of humanity became tainted with suspicion and distrust.

While some businesses have taken the initiative and capitalised on environmental pressure (one of the most celebrated examples being The Body Shop International), more common initial responses have tended towards: denial and defence (Environmental Assessment Group, Kent County Council, quoted in Ledgerwood *et al.*, 1992: 161); "greenwash"[12] (Greenpeace, 1992), or an anti-environmental "strike-back"[13] (Beder, quoted in English, 1997).

Ironically, one of the more common anti-environmental claims is that environmental demands on businesses will result in job losses (Renner, 1992: 138). This type of argument suggests that its proponents still consider business to be the saviour of society and that environmental considerations carry even less weight than social ones (in this case, employment).

1.3 Business' role in achieving sustainable development

Despite the historical exclusion of environmental considerations in business practice, calls for businesses to accept responsibility for their share of environmental degradation are no longer only heard from environmentalists. International fora, governments and even business representative bodies have now drawn attention to the important role that business has to play in achieving sustainable development.

---

[11] According to Harper (1996: 36) a *dominant social paradigm* is the major, implicit mental model that people in a given society share about certain areas of their lives.

[12] *Greenwash* is a term that refers to business initiatives that appear to respond positively to environmental pressures, but which are actually superficial or are purely for the purpose of improving public relations (see Greenpeace, 1992).

[13] Sharon Beder, in her book "Global Spin", identifies two waves of what she calls "corporate strike back": the formation of "conservative think tanks and business councils", and the proposition of "free-market solutions to environmental problems" (English, 1997)

Much has been written on sustainable development since the inception of the term in the seventies. This section will not attempt to revisit this considerable body of work, but rather provide a summary of key developments that have led to international acceptance of the need for businesses to play a role, and the broad nature of that role.

The concept of "sustainable development" was defined by the World Commission on Environment and Development (WCED, 1987: 43) as development that *"meets the needs of the present without compromising the ability of future generations to meet their own needs"*.

While most human activities cause environmental damage, such damage only has the potential to be permanent if ecological integrity, either structural or functional, is compromised to the extent that life-supporting capacity is significantly undermined or destroyed (Jackson, 1993: 31). The definition of sustainable development therefore implies that all human activities must be carried out without causing permanent damage to the life-supporting capacity of the natural environment.

Human activities have already led to macro-effects such as the destruction of species and habitats, and damage to the assimilative and regenerative capacity of natural systems (e.g. Worldwatch Institute, 1998). In addition, evidence indicates that micro-effects, such as endocrine disruption, are subtly undermining the contributions that individuals make to ecosystem integrity (Colborn *et al.*, 1996).

Production that is carried out in support of the consumptive needs of humanity is recognised as a significant contributor to environmental degradation (e.g. Durning, 1995). Key characteristics of production and consumption that have the potential to cause permanent environmental damage include:

- depletion of non-renewable resources;
- use of renewable resources at a rate exceeding regenerative capacity, and
- release of toxic, persistent and bio-accumulative materials into the air, water and soil.

Figure 1.1 provides a stylised summary of the flow of resources within human production and consumption systems. The figure provides an indication of the significance of the

influence that businesses have on the environmental effects of the system as a whole. Not only do they operate at all stages in the cycle, they also affect other stages. They are responsible for the design and marketing of products, and decisions on what types and quantities of resources are used and how they are processed. Design influences the way in which products are used and disposed of. Marketing programmes, coupled with customer need, determine the quantities of products that are sold and their resource intensity.

While consumer demand is partly responsible for output, businesses sometimes use it as an excuse for environmental inaction or ineptitude. As an example, Richard Punter, a one-time CEO of the NZ Dairy Corporation, when questioned about the environmental merits of a proposed switch from returnable, re-usable glass milk bottles to plastic and cardboard cartons cited public demand as the main reason. (Punter, pers. com., 1990). Punter failed to acknowledge the impact the organisation had on demand by selectively and systematically withdrawing glass from the market.

Businesses exert considerable influence on the types and quantities of products that are bought. Paul Connett, Professor of Chemistry at St. Lawrence University in New York and a long time proponent of environmentally considerate waste management practices, draws attention to this in his own reference to the dairy industry. He expresses amazement at the way the industry has convinced consumers that fetching and carrying milk in disposable cartons from supermarkets is more convenient than having them delivered to their front doors (Connett, 1998, pers. com.).

Marketing has also influenced the demand for products, other than those for which there is a clearly demonstrated need (such as milk). One author goes so far as to suggest that most products are no longer bought for their need, but for the "existential satisfaction" they provide (Frank, reviewed by Runyan, 1998). The feelings of material inadequacy that marketing programmes are believed to induce in potential customers (Macdonald, pers. com., 1996) would presumably contribute to this situation.
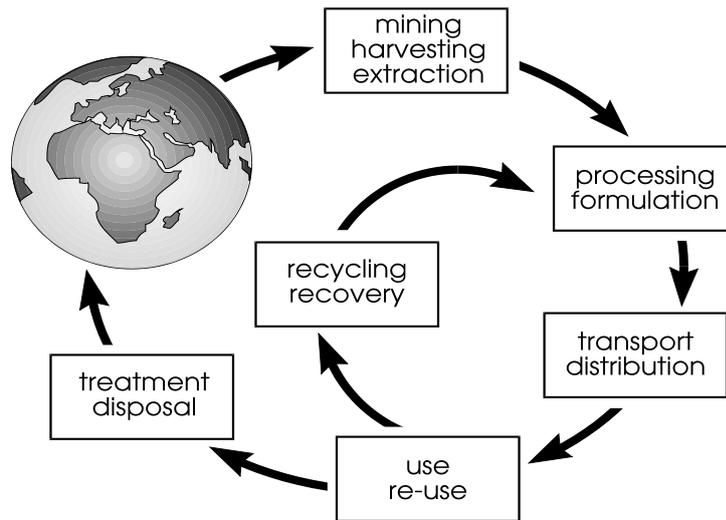
Figure 1.1. Summary of the flow of resources and key human activities.

Ayres (1998) suggests that most people don't adopt more sustainable practices such as buying organically grown food or using alternative means of transport because "they don't belong to small communities that share knowledge of how these things can work. They're citizens of a global village now, where the village elders are either the voices of Coca Cola, Shell Oil, and Disney, or the voices of the pundits and politicians for whom those companies provide the financing, and who set the rules for how this village will be managed."

In addition to the negative impacts that businesses have on the environment, there is also a positive side. According to Hawken (1993: 17) they are "the only institution in the modern world … powerful enough to foster the necessary changes" to achieve sustainability. It is important therefore, for businesses to recognise and respond to their role in doing so. The past three decades have shown an increasing activity in this area. Some of the key developments are summarised below.

The first globally significant and graphic demonstration of the links between business and sustainability was presented by Meadows *et al.* in their report to the Club of Rome in 1972. The authors modeled key components of the global economy. Their study led them to predict that trends in population, industrialisation, pollution, food production and resource

depletion would result in global economic collapse by the middle of the 21st century.

The release of the report caused a furore (Meadows *et al.*, 1992: xiii), but it was not until 1983, when the United Nations established the World Commission on Environment and Development (WCED) that the first real attempt was made to address, on a global scale, the issue of sustainability. The ensuing "Brundtland Report" (WCED, 1987) provided a "global agenda for change", calling for the coupling of environment and economy in the search for sustainable development pathways. In addition, the report called on all countries to develop policies that would:

- revive growth, while changing its quality;
- meet essential needs, while ensuring sustainable population levels, and
- conserve and enhance the resource base, while "re-orienting technology and managing risk" (WCED, 1987: 49).

The report drew attention to the significant role that businesses would have to play in the transition towards sustainable development. It also made it clear that the change would require a "continuing flow of wealth from industry" (WCED, 1987: 202), as well as increased efficiency in resource use, less pollution and waste, use of renewable instead of non-renewable resources and reduced environmental and human health impacts (WCED, 1987: 213).

While there have been criticisms of the report (e.g. Trainer, 1990) its value as a catalyst is clear. WCED's definition that sustainable development has strong social elements. Hampden-Turner's criticisms of profit maximisation as a sole criterion for business success (summarised in s1.1), become even more acute when considered within the context of inter-generational equity. If businesses are to contribute effectively to sustainable development, it is clear that they will not only need to accept a broader social role, but also recognise that responsibility extends well beyond the short time scale within which they normally operate. They will also need to begin to recognise the environment as a key stakeholder (albeit a silent one, as suggested by Solomon, 1994: 299).

Much has been done since the release of WCED's report to try to address the effects of business on the environment and to develop approaches that can help them to reduce their environmental impacts. A wide range of concepts encapsulate these approaches and form

the basis of sustainability programmes.

1.4 Concepts that encapsulate the changes required for business to become sustainable

Twenty years after the Meadows *et al.* (1972) report to the Club of Rome, three of the original authors revisited their previous study and came to the conclusion that although evidence indicated that human activities had already surpassed the limits to growth, economic collapse could still be prevented. They recommended two key changes for averting this crisis (Meadows *et al.*, 1992: xvi):

1. Revision of policies and practices that increase consumption and lead to population growth, and

2. Increased efficiency in the use of materials and energy.

The second recommendation has been taken up with vigour by non- and governmental organisations working to promote change within businesses. Their programmes have tended to focus on the provision of information and the development of tools that businesses can use.

One of the more prolific sources of information on business and environment has been the World Business Council for Sustainable Development (WBCSD) and its "parent" organisations, the World Industry Council for the Environment (WICE) and the Business Council for Sustainable Development (BCSD). During the run-up to the United Nations Conference on Environment and Development (UNCED), Stephan Schmidheiny, the conference's business advisor, established the BCSD. Schmidheiny's report for UNCED (BCSD, 1992) was the first of its kind, providing a "global business perspective " on sustainability.

The BCSD's declaration in the front of the report recognises the "vital role [that business will need to] play in the future health of this planet" (BCSD, 1992: xi). The declaration suggests use of the term "eco-efficiency" to encapsulate specific changes to business activities. The definition for the term is as follows:

> *"Eco-efficiency [is] reached by the delivery of competitively priced goods and*

services that satisfy human needs and bring quality of life, while progressively
reducing ecological impacts and resource intensity throughout the life cycle, to
a level at least in line with the Earth's estimated carrying capacity."
(WBCSD/UNEP, 1996.)

There are other terms that are also used to encapsulate the changes that businesses need to make to contribute to progress towards sustainability (see Higgins, 1995: 1). Some of these are presented below. The list is not intended to be exhaustive, but rather as examples of the range of concepts that are being applied for preventative purposes (see s1.1 above).

One of the earliest of these is "pollution prevention". It is defined by the National Pollution Prevention Roundtable in the US (USNPPR, 1997) as the reduction or elimination of pollution at the source instead of at the end-of-the-pipe or stack. It applies when:

–   raw materials, water energy and other resources are used more efficiently;

–   less harmful substances are substituted for hazardous ones, and

–   toxic substances are eliminated from the production process.

The emergence of the term can be traced almost directly to the "pollution prevention pays" programme established by the 3M Corporation in the mid-1970s (see 3M, 1998). This programme achieved international fame because 3M was able to demonstrate how economic benefits could be derived from a preventative approach to waste management (Hawken, 1993: 60-1). The organisation found that improvement in areas such as maintenance, inventory control, raw material choice and process control reduced or even eliminated certain waste streams. Economic benefits resulted from reductions in the costs of conventional treatment methods, as well as improved efficiency (Hirschhorn and Oldenburg, 1991: 78). The organisation claims to have prevented 750,000 tons of pollutants, saved US$790 million between 1975 and 1996, and planned to cut total releases to the environment by 50% by the year 2000, using 1990 as a starting point (3M, 1998).

Local, regional and international attempts to link business and environment have used the economically favourable results of 3M and others to encourage businesses to prevent or reduce their wastes at source. While the term pollution prevention has been used primarily in such programmes in the US, the term "cleaner production" has been used in international programmes promoting virtually the same types of methods.

The term "cleaner production" was coined by the United Nations Environment

Programme's Industry and Environment programme (UNEP/IE) to encapsulate key changes that businesses must undertake to become more sustainable. UNEP/IE's definition for cleaner production has changed since 1989 when it was first introduced. The changes reflect on-going debate on the application and marketing of the concept. The latest definition marks an attempt to integrate the programmes of UNEP/IE and the WBCSD, and is as follows:

> *"Cleaner production is the continuous application of an integrated preventative environmental strategy to processes, products and services to increase eco-efficiency and reduce risks for humans and the environment.*
>
> *[For] production processes, [cleaner production requires] conserving raw materials and energy, eliminating toxic raw materials, and reducing the quantity and toxicity of all emissions and wastes.*
>
> *[For] products, [cleaner production requires] reducing negative impacts along the life cycle of a product from raw materials extraction to its ultimate disposal.*
>
> *[For] services, [cleaner production requires] incorporating environmental concerns into designing and delivering services. (WBCSD/UNEP, 1996.)*

The specific changes that WBCSD and UNEP advocate include: reduced resource intensity and increased service intensity of goods and services; reduced dispersion of toxic materials; reduced material durability; enhanced recyclability, and sustainable use of renewable resources.

In summary, the approaches encapsulated by the terms pollution prevention and cleaner production require businesses to change the types of resources they use and the way in which they use them. Numerous case studies have been generated as a result of programmes that promote pollution prevention, cleaner production or similar concepts (for examples see: UNEP/IE, 1993, 1994, 1995, 2000; USEPA, 1992; MfE, 1994). Some of the benefits that have resulted from businesses participating in these programmes are presented in Table 1.1.

Another approach draws direct attention to the essentially linear nature of human production and consumption systems and attempts to bring them more into line with the cyclical systems of nature. It is encapsulated by the term "industrial ecology" (Socolow *et al.*, 1994: 3).

Frosch and Gallopoulos (1989) were the first to suggest that industrial systems would be more sustainable if they could mimic natural systems where wastes from one activity become resources for another and are thereby used more efficiently. They suggested that each industrial "process or network of processes … be viewed as a dependent and interrelated part of a larger whole". Products and processes would need to be redesigned to achieve the following:

1. Maximisation of the extent to which cyclical use would be possible, and
2. Minimisation of the quantity and harmful effects of final discharges.

In addition, organisations would need to cooperate with each other to ensure mutual benefit.

The "Industrial Symbiosis" example from Kalundborg, Denmark is often presented as a showcase for industrial ecology in action. The case study involves a group of organisations including a coal fired power station, an oil refinery, a wallboard manufacturer, an insulin and industrial enzyme manufacturer, a city council and local farmers. The diversion of wastes from certain activities for use as resources for others reduces consumption of oil, coal and water; reduces emissions of CO_2 and SO_2, and enables the re-use of fly ash, sulphur, gypsum and sludge. Co-operation and networking between organisations are key features of the programme (Christensen, 1994 quoted in McGalliard et al., 1997: 5). This synergistic interaction among the organisations has evolved over a number of years and is considered to be a significant contributor to the project's success (Kalundborg Centre for Industrial Symbiosis, 1996).

Another approach that incorporates an ecological or systemic way of thinking is known as "The Natural Step" (TNS). This programme was established in Sweden and aims to provide a common framework upon which to base action for sustainability. The framework takes the form of four "non-negotiable system conditions" (TNS Canada, 1997):

1. *"Substances from the earth's crust must not systematically increase in nature.*

2. *Substances produced by society must not systematically increase in nature.*

3. *The physical basis for the productivity and diversity of nature must not be systematically diminished.*

4. *We must be fair and efficient in meeting basic human needs"* (TNSEFANZ, 2000).

Table 1.1. Examples of "cleaner production" in various sectors. (Abbreviations: SS = suspended solids; BOD = bio-chemical oxygen demand; COD = chemical oxygen demand; OM = oxidisable material.)

INDUSTRY	WASTE TYPE	METHOD	% REDUCTION	PAYBACK
Poultry Processing (1)	wastewater, high SS, BOD, COD	replacement of water-based transport system with pneumatic and mechanical system	wastewater: 45% SS: 100% COD: 29% grease: 60%	< 6 months
Fruit Processing (1)	wastewater, high SS, BOD, COD, sorbic acid	recovery of fruit juice concentrate	wastewater, SS, BOD, COD: 100%	< 1 year
Confectionery (1)	wastewater, high sugar, COD	recycling system	sugar: 46% COD: 46%	1 year
Sugar Refining (1)	wastewater, high SS, chlorine ions	by-product recovery by crystallisation	wastewater, SS, chlorine ions: 100%	2 years
Brewing (1)	wastewater, high SS, BOD, COD	dry recovery of filtering material	wastewater: 25% SS, BOD, COD: <100%	5 years
Leather Tanning (2)	wastewater with high chromium	equipment redesign to enable recycling of chromium to process	chromium: 99%	11 months
Textile Dyeing (3)	wastewater, dyes, other chemicals and salt	high temperature ultrafiltration for direct recycling	wastewater: 90% dyes: 10% chemicals: 82% salt: 82%	costs off-set by energy savings
Electroplating (4)	wastewater with cyanide, copper, chromium-6, zinc and nickel	low concentration plating and pacifying, modified rinsing systems	wastewater: 93% chromic acid:80% copper: 95% cyanide: 80% nickel: 98% zinc: 96%	2 months
Paint, Coatings Manufacture (5)	organic solvents, paint	pneumatic cleaning	solvent: 100% paint: 100%	< 1 year
Equipment Manufacture (5)	organic solvents, oil, paint	ultrafiltration	solvent: 100% oil: 100% paint: 98%	2 years
Car Repair (4)	waste, wastewater containing halo-generated materials, oil, solvents	paint substitution, recycling equipment, modifications to mixing systems	halogenated materials: 100% oil-containing materials: 100% solvents: > 50% solid waste: 30%	3 months
Dry Cleaning (6)	cooling water, solvent emissions, energy	equipment upgrading	wastewater: 100% solvent: 85%	10-fold decrease in costs over 2 years
Photographic Processing (5)	organic solvent, developer, fixer, silver	ion-exchange, electrolytic recovery, reverse osmosis	solvent: 95% developer: 85% fixer, silver: 95%	< 1 month
Printing (4)	waste water, metal hydroxide sludge, reproduction chemicals, solvent emissions	mass-balance analysis, house-keeping improvements, bulk ink delivery, modified mixing procedures	waste water: 90% solvents: 90% chemicals: 70% sludge: 40% containers: 50%	from immediate

Sources:
1. Overcash, 1986.
2. Martin, 1989.
3. Campbell and Glenn, 1982.
4. UNEP/IE, 1993.
5. Huisingh, 1989.
6. CAE, 1992.

The aim is for organisations to adopt programmes that progressively reduce their impacts as related to the four system conditions. The conditions are said to be derived from the first two laws of thermodynamics (the conservation and degradation of energy), as well as the principles of ecology (Craig, pers. com., 2000). They were agreed to as part of a consensual process among scientists, industrialists and public officials in Sweden, and formed the basis of a community-wide educational programme in that country. While at least 50 Swedish companies and 50 municipalities are considered to have adopted TNS inspired practices, the programme is also spreading in developmental form to other countries, e.g. USA, Canada, Australia, NZ (TNS Canada, 1997).

The most celebrated example of the application of the TNS approach to business is described in "Mid-Course Correction", a book written by Ray Anderson, the Chairman and CEO of Interface Inc., a US-based carpet-tile manufacturer. The organisation has used the concept of "backcasting" to identify a route towards sustainability.

Backcasting is a key component of the TNS approach and involves:

1. developing a vision of what the organisation needs to become to avoid the difficulties that are likely to be faced by simultaneous increases in demand and decreases in resources;

2. considering the organisation as it presently exists, and

3. developing a set of steps to achieve the vision.

This approach has led Interface to develop a set of seven steps to achieve the vision of sustainability: elimination of waste; benign emissions; use of renewable energy sources; "closing-the-loop" or using resources in a cyclical way; resource efficient transportation; mechanisms for enhancing sensitivity to environmental and social needs, and re-design of commerce (Anderson, 1999). As an example of the latter, a key feature of the programme has been the development of a system whereby customers lease, rather than buy carpet tiles and the company is contracted to provide, maintain and replace them during the contract period.

Other examples of improvements or changes in organisations that attribute their successes to the TNS approach include:

– development of an ethanol-based fuel derived from organic material;

– clothing manufactured using materials derived from waste plastics;

– a solar driven lawn mower, a vegetable-based lubrication oil and a waterless dishwasher;

– edible packaging for a fast foods outlet, and

– elimination of bleach from the cleaning activities of a hotel (Schley & Laur, 1998).

The approach is difficult to evaluate because the details on how it is applied are not in the public domain. According to proponents it is superior to the previously mentioned concepts because it provides a "clear statement of sustainability" (Craig, pers. com., 2000). However, they also recognise that its implementation is "dependent on [the above-mentioned concepts] and others to provide specific methodologies for moving forward" (Craig, pers. com., 2000).

Product changes of a similar nature to those mentioned above have been identified as a result of programmes that promote the development of products with fewer environmental impacts, commonly called "design for the environment" (DfE). DfE currently described by the USEPA (2000) as "an approach companies use to make business decisions that consider environmental impacts". In the US the approach originally focused on product design, but now appears to have been expanded to include the design of not only products, but also processes, technologies and even management systems that are "more protective of human health and the environment" (USEPA, 2000). In other countries (e.g. Sweden and The Netherlands), the focus is still on product design (see NUTEK, 1999).

Product-oriented DfE programmes tend to include some form of life cycle analysis (LCA), a systematic approach to designing or re-designing products in order to reduce their environmental impacts across all stages of the life cycle (see Fig. 1.1). The quantitative approach can be extremely complex and relies on the quantification of impacts, but there are also qualitative approaches that apply environmental criteria to product design (see CSS, 2000). Examples of these criteria include:

– Use of renewable, natural resources;

– Use of fewer or no hazardous solvents;

– Use of water-based vs. solvent-based inks, dyes, etc;

– Reduced use of filler and packaging;

– Replaceable component parts;

– Enhanced durability;

– Enhanced re-usability;

– Enhanced recyclability;

– Use of recycled materials, and

– Enhanced re-use of scrap and excess materials

Systematic approaches have become common features of programmes that promote sustainability in businesses. An important manifestation is the series of environmental management standards developed by the International Organisation for Standardisation (ISO). Known as the ISO 14000 series, these standards provide a set of system components that can be used by organisations to improve environmental outcomes. The following standards have been or are in the process of being developed (Standards Australia, 1998):

ISO 14001 – Environmental Management System (EMS) Specification

ISO 14004 – EMS Guide

ISO 14010 – Environmental Auditing (EA) General Principles

ISO 14011 – EA Procedures, EMS Audits

ISO 14012 – EA Auditor Qualifications

ISO 14015 – EA Sites & Entities

ISO 14020 – Environmental Labels (EL) General Principles

ISO 14021 – EL Self-declared Claims

ISO 14024 – EL Type I Programmes

ISO 14025 – EL Type III Programmes

ISO 14031 – Environmental Performance Evaluation (EPE) Generic Methodology

ISO 14040 – Life Cycle Analysis (LCA) General Principles

ISO 14041 – LCA Goal, Scope & Inventory Analysis

ISO 14042 – LCA Impact Assessment

ISO 14043 – LCA Interpretation

ISO 14050 – Glossary of Terms

ISO 14061 – Forestry Report

The standards are non-prescriptive in terms of specific environmental improvements. Organisations that receive formal accreditation for ISO 14001, for example, can be considered to have a system in place to address the environmental considerations identified in their environmental policy. For organisations adopting this type of approach, the key objectives are therefore the systems themselves, rather than specific outcomes such as reduced resource use. An organisation that has an EMS is only likely to reduce their resource use if resource efficiency is identified as a goal in their environmental policy. Equally, an organisation that achieves the standard for Environmental Performance Evaluation (ISO 14031) will have a system in place for doing so. The standard does not prescribe what the focus of that system is, nor specifically what it achieves.

The European Union has its own environmental management standard, the Eco-Management Audit Scheme (EMAS). One notable difference between ISO14001 and EMAS is the latter's requirement for a publicly available report on the organisation's environmental performance. It has been suggested that the public nature of this report enhances the likelihood of environmental performance improvement amongst EMAS, as opposed to ISO accredited organisations (Huisingh, pers. com., 1997).

It is interesting to note that most of the concepts mentioned above include social, as well as environmental aspects. This inclusion is consistent with what is referred to as "triple bottom line" reporting, whereby businesses are encouraged to report on social and environmental, not just economic performance (e.g. The Body Shop International, 1998).

The reference to social goals is fairly tentative in most of the definitions mentioned above. The eco-efficiency definition includes a social element, namely the need to "satisfy human needs and bring quality of life". However, the context within which this is presented suggests that it was put there to act more as a restraint for "reducing ecological impacts and resource intensity", than for some greater social good. The incorporation of the term "efficiency" suggests that the concept is more synonymous with profit maximisation as a driver, than the philanthropic aspects of sustainable development.

The cleaner production definition includes a social component insofar as it refers to the need to "reduce risks for humans and the environment". This reference to risk management as a driver is consistent with what Hampden-Turner and Trompenaars (1993: 38) refer to as

a "Western culture of analysis". They suggest that this culture has led to a focus on specifics that can easily be subjected to analysis (e.g. price), rather than aspects significant for holism or social purpose (such as values). Risk management, as practiced currently, tends to be based on statistical analysis and probabilities regarding risks, and could therefore be considered consistent with such a culture.

The reference in the eco-efficiency definition to the need to bring the delivery of goods and services into line with the "Earth's estimated carrying capacity", suggests a similarly analytical approach. Meadows *et al.*'s model (1972 and 1992), suggests that carrying capacity may already have been over-reached, certainly in terms of human activities. The inclusion of such a nebulous concept within a definition, may have more to do with detraction than social conscience.

Neither pollution prevention nor design for the environment include social aspects in their definitions. While it could be argued that their environmental aims, particularly those to do with toxics use reduction and reduced resource intensity, make these aspects implicit, it is interesting to note that the changes identified in thousands of case studies seldom include social indicators. Neither the ISO14000 series of standards nor the EU's EMAS include social components, although the systems do require employees to be involved.

TNS's third "system condition" suggests a more holistic approach to environmental protection, recognising the need to protect from damage the "physical basis for the productivity and diversity of nature". The approach is also notably different from other concepts in that the fourth system condition is direct in its requirement for "meeting basic human needs" in ways that are "fair and efficient" (TNSEFANZ, 2000). While the efficiency component may limit its intent (as suggested above), the requirement for equity in resource use provides a more direct reference to the social elements of sustainable development.

However, it is not just the concepts, but the means whereby they are promoted that are of interest for sustainability programmes. The following section will provide insight into those mechanisms.

1.5 Mechanisms for promoting relevant changes in business

There are three main ways in which businesses are encouraged to adopt the types of practices encapsulated in the concepts discussed above, viz. through regulatory, economic and voluntary mechanisms (Stone, 1993). While regulatory mechanisms are being used increasingly throughout the world, they tend to focus more on "end-of-pipe" types of controls, such as emissions standards. These controls act to reduce discharges to the environment, but they do not necessarily result in preventative environmental performance improvement. In countries where preventative approaches are prioritised, programmes tend to include a suite of different mechanisms working together to maximise desired outcomes.

In the US, for example, the TRI legislation (see s1.2 above), was combined with the 33/50 Program[14], a voluntary initiative to assist businesses to identify methods whereby they could reduce their use of certain toxic substances (USEPA, 1999). Without the encouragement and support provided by the 33/50 Program, it is possible that the business response to TRI may have focused on treatment or disposal methods, rather than preventing or reducing the wastes in question at the source. Traditional methods, while improving short-term environmental outcomes, do not usually make businesses address the longer-term issues that are relevant to sustainability.

In NZ, the only regulatory mechanisms that are applied to any great extent are standards for trade wastes that are discharged to the sewers. The Auckland region's Trade Wastes By-Law (1991) includes a suite of mechanisms for encouraging preventative approaches. In addition to banning certain discharges to the sewers and mass-based[15] standards for others, the by-law requires permit holders to undertake a cleaner production assessment (see Ch. 3) and develop a programme for reducing discharges at source (ARC, 1991). Their permit periods and fees are able to be altered to reflect the extent to which they are complying with these requirements.

NZ's only national regulatory instrument, the Resource Management Act 1991 (RMA), has attempted to improve the environmental outcomes of businesses by requiring them (and all

---

[14] *33/50* Refers to the consecutive percentage reductions required of participating businesses.

[15] Discharge limits are based on mass, rather than concentration to avoid discharges from being diluted for compliance purposes.

other resource users) to "avoid, mitigate or remedy" their effects on the environment (RMA, 1991: s5). The Act operates through policies and plans that are developed at a regional and local level (RMA, 1991: Part V). These are then used as the basis for decision making on individual development projects. Organisations wanting to undertake a development project that involves resource use, as defined in the Act and associated instruments, must apply for "resource consents"[16]. To receive these consents, they must satisfy the consent authorities[17] that they have assessed their effects, will have methods in place to avoid, mitigate or remedy effects and that they have consulted stakeholders (RMA, 1991: Part VI).

The issues of resource use and flow, implicit in the WCED's definition of sustainable development, are not legally required to be taken into account for decision making. Neither are there economic incentives for doing so. Despite the "user pays"[18] context within which the RMA operates, individuals or businesses are not required to pay for the environmental effects they cause if these are considered "minor". There are no national standards that can be used to determine whether an effect is significant or not.

To promote sustainability within businesses, the NZ government favours voluntary, rather than regulatory or economic initiatives. This emphasis is consistent with NZ's active involvement in the de-regulation and globalisation of trade, and the export-driven nature of the economy. (MfE, 1997a: 15-6).

The trend away from regulating industry is an international one that may be partly as a result of the General Agreement on Tariffs and Trade (GATT) and the dominance of large, trans-national corporations in global trade. The GATT is an international trade agreement under which countries enter into bilateral negotiations to reduce the tariffs they place on each other's exports. The overall purpose of the GATT is to reduce barriers to international trade. Baseline conditions for these negotiations are set in a series of multi-national "Rounds", the last being the "Uruguay Round" (Kernot, 1993: 27).

---

[16] A *resource consent* is essentially a permit for conducting the activity in question.

[17] Local and territorial authorities (councils) responsible for administration of the RMA.

[18] The term "user pays" refers to the policy of ensuring that those who use a resource (or pollute it) pay for the privilege of doing so.

Exporting countries that believe that their exports are being disadvantaged by the regulations of importing countries and that cannot resolve these issues in bilateral negotiations, are able to seek a ruling by the World Trade Organisation (WTO)[19]. During the Uruguay Round, a number of cases resulted in the scrutiny of national environmental laws that were considered to breach GATT rules regarding trade barriers. Two high profile cases – the Mexican tuna case and the Danish deposit/refund case – indicated that the GATT would take precedence over national environmental legislation that disadvantaged foreign businesses (see Barrett, 1993: 43).

The rulings that resulted from these cases undermined national environmental legislation in these countries and caused a flurry of activity from environmental groups and resulted in a report by the GATT Secretariat outlining GATT's position. Despite this report and the establishment of a Committee on Trade and the Environment (WTO, 1997), the debate continues. Difficulties in settling these, as well as a wide range of other issues prevented a new round of trade talks from being initiated in Seattle in 2000. It is interesting to note that demonstrations outside the venue included environmental, as well as social activists. This is because the GATT is seen as supporting international, rather than local trade and thereby having the potential to undermine local employment opportunities. Until these difficulties are resolved, it is not known how the WTO will influence decisions regarding the regulation of business for environmental purposes.

Attempts to regulate business at an international level failed when the UNCED avoided placing environmental controls on trans-national corporations (Hawken, 1993: 167, 168). This process led instead to a voluntary code of practice, the International Chamber of Commerce's (ICC's) "Business Charter for Sustainable Development: Principles for Environmental Management" (ICC, 1991).

International agencies such as ICC and UNEP have focused on developing programmes, information and tools that can be used to promote sustainable business practices. Examples include the Environmental Self-Assessment Programme (ESAP) which was based on the ICC's business charter (GEMI, 1993) and, more recently, the Global Reporting Initiative (GRI). The latter was established in late 1997 by the Coalition for Environmentally

---

[19] The WTO was established after the Uruguay Round and acts as the secretariat for the GATT.

Responsible Economies (CERES) and UNEP. The primary focus of the GRI was the development of a set of "globally applicable guidelines for reporting on the economic, environmental, and social performance" of businesses. (GRI, 2000) The guidelines are designed to assist businesses to develop a "Sustainability Report" that contains the following components:

– Statement of support from the CEO;

– Profile of the organisation;

– Executive summary and key environmental, economic and social indicators;

– Vision and strategy;

– Policies, organisation and management systems, and

– Performance (as measured against specific indicators) (GRI, 2000).

These components provide insight into the topics that tend to be covered to a greater or lesser extent in sustainability programmes for business. Because of NZ's focus on voluntary initiatives, the Ministry for the Environment (MfE) has, over the past few years, been promoting cleaner production programmes. An important mechanism has been the allocation of funds (grants) via its Sustainable Management Fund (SMF). The SMF has funded projects in specific industries (e.g. construction and demolition, retail, dairy farming, fruit growing, food processing, fishing, metal products, hospitals and hotels), as well as multi-sector initiatives (MfE, 1997b). One of these multi-sector projects, the Target Zero project, was used as the case study for this thesis (see Ch. 3, 4).

These projects have tended to take the form of "demonstrations", whereby participating organisations are encouraged to adopt a particular approach, staff are trained in its application, and external facilitators assist them during a pre-determined implementation period. A manual is usually used (which may be developed during the process) and the results are written up for use as case studies.

Resources that have been developed to assist in these kinds of activities include:

– "Environmental Management Handbook for Small Industry" (ManFed/MfE, 1993);

– "Cleaner Production Guidelines" (MfE, 1994);

– "Environmental Integrity Programme" (Tradenz, 1995);

- "Basics in Environmental Management: A Handbook for NZ Business" (Worley, 1996), and

- "Waste Minimisation Handbook" (ECNZ, 1996).

In addition, relevant education/training programmes are offered by tertiary institutions, including: University of Auckland (e.g. School of Environmental and Marine Sciences and School of Engineering); UNITEC Institute of Technology (Dept. of Civil and Environmental Engineering), Open Polytechnic (Dept. of Applied Science). While some of these programmes are designed for professional or business people, they will not be included in the scope of the thesis. The thesis will focus on the informal programmes that form part of voluntary initiatives and take the form of demonstration projects.

The apparent success of voluntary initiatives has resulted in the development of many case studies over the past decade (see Ch. 3). Some provide insight into the systems that organisations have developed and implemented (e.g. INEM, 2000), while others demonstrate a broad range of technical changes that businesses can make and the environmental, as well as economic benefits that result (e.g. UNEP, 2000).

Technical changes tend to focus on production processes and result in improvements in water, energy and/or raw materials use. Some changes are made with little or no capital investment, particularly those to do with "housekeeping", e.g. inventory control, layout, scheduling or maintenance. Changes that do require capital investment, e.g. where equipment needs to be replaced, commonly have relatively short pay back periods (see Table 1.1 for examples). Case studies show that annual savings range from hundreds to millions of dollars.

Such actions by businesses show real progress towards reconciling their activities with environmental constraints, and the economic benefits that they demonstrate are useful motivators (Hawken, 1993: 61). However, it has been a decade or more since these types of initiatives were launched in many industrialised countries. At the end of what has been called the "decisive decade" for sustainability (Postel, 1992), it seems pertinent to step back and consider whether business responses are indeed resulting in significant progress towards sustainability.

1.6 Limitations of business responses and the difficulties they encounter

Despite numerous tools, demonstration programmes and case studies, business responses appear to be limited. Ulhøi and Madsen (1996: 289) point out that the "greening" of industry is still largely "wishful thinking". The UN's "Rio 5" meeting issued the greatest indictment. While recognising that some progress had been made in the five years after UNCED in 1992, participants agreed that the changes were totally inadequate.

The following excerpt from the United Nations General Assembly Resolution on the Programme for the Further Implementation of Agenda 21 (September, 1997, New York), sums up the situation:

> *"We acknowledge that a number of positive results have been achieved [since Rio], but we are deeply concerned that the overall trends with respect to sustainable development are worse today than they were in 1992. Five years after [Rio] the state of the global environment has continued to deteriorate... and significant problems remain deeply embedded in the socio-economic fabric of countries in all regions. Many polluting emissions ... are continuing to increase although in some industrialized countries they are decreasing. Marginal progress has been made in addressing sustainable production & consumption patterns. Many countries [that] are undergoing rapid economic growth and urbanization are also experiencing increasing levels of air and water pollution, with accumulating impacts on human health. Conditions in natural habitats and fragile ecosystems are still deteriorating in all regions of the world, resulting in diminishing biological diversity. At a global level, renewable resources, in particular fresh water, forests, topsoil and marine fish stocks continue to be used at rates beyond their viable rates of regeneration; without improved management, this situation is clearly unsustainable. While there has been progress in material and energy efficiency, particularly with reference to non-renewable resources, overall trends remain unsustainable."*

Similarly, in NZ there has been acknowledgement that some significant improvements have been made, whilst recognising that much still has to be done (MfE, 1997a). While businesses are not the only culprits in the continued degradation of the environment, they continue to play a significant role in production and consumption. A decade after the enactment of the RMA and the introduction of concepts such as cleaner production, it seems pertinent to critically examine the effectiveness of programmes that promote their uptake within businesses.

Many studies have been conducted on the difficulties faced by businesses embarking on sustainability programmes. In an early study on the "obstacles" to waste reduction, Palmer

(1982, quoted in Huisingh, 1989: 5) found that 60% were political, 30% were financial and only 10% were technical. Political obstacles were: "bureaucratic resistance" (20% of the total); "human conservatism"; "piecemeal legislation"; "media sensationalism", and "public ignorance and misinformation" (10% each). Financial obstacles were: "disposal subsidies"; "scarce money", and an "entrenched disposal industry" (also 10% each). Technical obstacles were "lack of centralized reliable information" and "lack of assistance with the application of waste reduction approaches to individual needs/uses" (5% each). Huisingh (1989: 5) suggested that this study, together with his own experiences, highlighted the "multi-dimensional nature" of the factors that inhibit "corporate adoption of new processes and technologies". He identified an "array of constraints" that businesses face, that are both internal (i.e. "product quality, expenditure of capital, reluctance to change" and "awareness … of technically sound alternatives"), and external (i.e. "customer demands, governmental mandates, regulatory approaches, environmentalist pressures" and "availability of technically sound alternatives") (Huisingh, 1989: 5).

A more detailed study by Chandak (1994) elaborated on these findings. The study was part of the "DESIRE" project that was funded by the UN Industrial Development Organisation (UNIDO) and conducted by the National Productivity Council in India. It involved 4 "units" in each of three sectors, the "agro-residue based pulp and paper industry", the textile dyeing and printing industry, and the pesticides formulation industry (Chandak, 1994: 2). Chandak found that businesses encountered a wide range of "barriers" during the course of the programme. He categorised these as "organisational", "systemic", "attitudinal", "technical", "governmental" and "economic", although there were also some that fell outside these categories (Chandak, 1994: 15-21). In addition, he identified a range of "enabling measures" that could be used to overcome them (Chandak, 1994: 21-24). The barriers and enabling measures are presented in Table 1.2.

Like Huisingh, Chandak distinguished between barriers and enabling measures that he believed to be internal and external to the businesses involved. He categorised organisational, systemic, and attitudinal barriers/measures as internal, while governmental barriers/measures were obviously external. The technical and economic categories included internal, as well as external barriers/measures. They may appear simplistic, but this was the first study (and is still one of the few) that even considered non-technical barriers to any great extent.

More recently, Hillary (1999) conducted a substantive review of 33 studies on the "barriers, opportunities and drivers for small and medium-sized[20] enterprises in the adoption of environmental management systems" (EMS). She also distinguished between internal and external barriers to adoption. Internal barriers to EMS adoption that were consistently identified in the studies she reviewed were: a "lack of human resources"; the "interrupted and interruptible" nature of the process; "practical" issues to do with assessment and implementation; a paucity of information about how EMS's work and what benefits can be gained; no "translation" of "positive personal attitudes towards the environment" into the workplace; poor perception of environmental impacts or issues faced, and scepticism about "benefits, cost savings and customer rewards associated with positive environmental action" (Hillary, 1999: 6). External barriers were: "inconsistencies" to do with certification and verification of EMS's, as well as: high costs; uncertainty regarding external drivers such as "market benefits"; lack of support, and lack of "sector specific guidance" and information.

A major finding of her analysis was that *"internal barriers to EMS adoption were more important than external barriers"* (Hillary, 1999: 6, emphasis added). Specific barriers to adoption and implementation are presented in Tables 1.3a and b.

---

[20] Note that the sizes of businesses classified as *small and medium-sized* varies from country to country. Hillary (1999: 11) uses the EU definition, i.e. independent enterprises with less than 250 employees and an annual turnover of less than 7 million ECU, or an annual balance sheet total of less than 27 million ECU.

Table 1.2. Barriers and enabling measures for cleaner production. Adapted and developed using Chandak (1994). The items in two columns are not intended to necessarily correspond.

BARRIERS	ENABLING MEASURES
Organisational Barriers Non-involvement of employees Vested decision-making powers Emphasis on production High staff turnover Lack of recognition	**Organisational Measures** Encouraging employee participation, input and autonomy Delegation of decision making powers Recognition of the social responsibility of business Reward systems Inclusion of CP in staff appraisals
Systemic Barriers Poor record keeping & reporting Inadequate & ineffective management systems Lack of systems for professional development *Ad hoc* production planning	**Systemic Measures** Re-design record keeping & reporting to include CP requirements Train & develop employees at all levels Integration of CP across all functions Production planning incorporating CP principles
Attitudinal Barriers Lack of good housekeeping culture Resistance to change Antagonism between work-force and management Lack of leadership Lack of effective supervision Job insecurity Fear of failure	**Attitudinal Measures** Change management Provision of effective supervision Trust building through provision of incentives, recognition, reward Job security
Technical Barriers Limited or non-existent training Limited access to technical information Technology limitations Technology gaps Limited in-house maintenance facilities	**Technical Measures** Develop training provide access to technical information and its applicability Technology development infra-structure
Governmental Barriers Lack of infra-structure Lack of incentives Emphasis on end-of-pipe approach Industrial policy Piecemeal legislation Lack of institutional support	**Governmental Measures** Assess and provide for provide infra-structural needs Special financial schemes Fiscal incentives Remove support for end-of-pipe approaches Stable, long-term industrial policies Integrated legislative framework incorporating economic, regulatory and voluntary initiatives Institutional support
Economic Barriers Resource pricing & availability Availability & cost of funds Exclusion of pollution control costs Inadequate investment planning *Ad hoc* investment criteria Prevalence of production-related fiscal incentives	**Economic Measures** Inclusion of environmental costs in economic analysis Total cost accounting Integration of CP into policy and strategic planning High level accountability for CP Incorporation of CP into financial/ accounting functions

The importance of internal barriers is consistent with the findings of a still more recent study on corporate participation in a voluntary cleaner production initiative involving 12 meat and animal processors in NZ (Morris, 2000). While Morris (2000: 15) recognises that the distinction between external and internal factors becomes blurred when an open system approach is taken (see Ch. 2), his study identifies some key internal factors that appear to contribute to success. These include: environmental responsibility allocated at a relatively high level in the organisation; the use of "work" and environmental teams, and "flattening" of the organisational structure to improve staff participation. The least success appears to have occurred in businesses that had the most "authoritarian leadership styles", "hierarchical and individualist structures", and "uni-directional, top-down communication styles" (Morris, 2000, 105). Factors that contributed to success that could be considered to have both internal and external dimensions were relatively low "political motivation", together with relatively high "financial motivation"[21] (Morris, 2000: 105).

While the small sample size and complexity within each organisation makes it unwise to generalise, Morris (2000: 105) notes that all of the "successes" in the programme involved "technical, post-production modifications to existing processes, with little or no input from staff other than managers". He believes that the reasons for participation in the programme were mainly political, with "environmental and social concerns" not extending significantly beyond "what is necessary to ensure … continued usage of the environment as a repository for effluent" (Morris, 2000: 105). He also suggests that "there is little reason to expect" that internal factors such as organisational leadership, structure and culture will change as a result of participation in the programme. He believes that there is also "little to suggest that the changes go beyond a short-term desire to cut costs and appear [to regulatory authorities to be] environmentally concerned" (Morris, 2000, 150-1).

---

[21] Morris (2000) uses the term *political motivation* in reference to external drivers such as compliance requirements, pressure from regulatory authorities, environmental or community organisations, etc., while *financial motivation* is used in reference to economic costs or benefits that could accrue as a result of the programme.

Table 1.3a. Internal barriers to adoption of environmental management systems. Source: Hillary, 2000: 18, 21.

1. Resources	2. Attitudes and company culture	3. Awareness
➤ Lack of time to investigate issues or locate support or tools ➤ Severe time pressures in micro companies ➤ Costs low and therefore savings are low and don't warrant time to investigate (micro companies in particular) ➤ Lack of resource allocation to bottom-up projects and budget not allocated to address environmental issues ➤ Lack of investment in training ➤ Cost constraints on investment ➤ No employee allocated responsibility for environmental issues	➤ Belief that SME has low environmental impact and no environmental issues to consider ➤ Mismatch between belief and actions, i.e., positive attitudes towards the environment do not translate into actions ➤ Environment given no status as a business issue ➤ Perception that ISO 14001 has no relevance to the business ➤ Inertia of top management and the desire to maintain status quo ➤ Short-termism ➤ Scepticism about the potential cost savings and market benefits ➤ Unconvinced or unsure the EMS will help meet customer needs ➤ Belief that benefits of EMS implementation accrue slowly but cost quickly ➤ Belief that no improvements in efficiency could be derived from improved environmental performance	➤ Low awareness of EMSs ➤ Low awareness of environmental legislation ➤ Low awareness of support organisations and information sources

Table 1.3b. Internal barriers to implementation of environmental management systems. Source: Hillary, 2000: 18, 21.

1. Resources	2. Understanding and Perception	3. Implementation	4. Attitudes and Company Culture
➢ Lack of management and/or staff time for implementation and maintenance ➢ Inadequate technical knowledge and skills ➢ Lack of training ➢ Multifunctional staff easily distracted by other work ➢ Loss of environmental champion ➢ Transient workforce ➢ Requirement for capital expenditure	➢ Lack of awareness and benefits ➢ Lack of understanding of EMAS environmental statement or value of reporting ➢ Lack of knowledge of formalised systems ➢ Uncertainty and concern over possible de-registration (from EMAS) for minor breaches of legislation ➢ Perception of bureaucracy ➢ Perception of high cost for implementation and maintenance ➢ Confusion between ISO 14001 and EMAS and how they relate	➢ Implementation is an interrupted and interruptible process ➢ Inability to see relevance of all stages ➢ Internal auditor independence difficult to achieve in a small firm ➢ Doubts about ongoing effectiveness of EMSs to deliver objectives ➢ Difficulties with environmental aspects/effects evaluation and the determination of significance ➢ Uncertainty about how to maintain continual improvement	➢ Inconsistent top management support for EMS implementation ➢ Management instability ➢ Low management status of person spearheading EMS implementation ➢ Resistance to change ➢ Lack of internal marketing of EMS ➢ Negative view or experience with ISO 9000 standards rubs off on ISO 14001's acceptance

The above-mentioned research results (and others, e.g. Allen and Alvington, 2000) confirm that organisational factors contribute significantly to the difficulties faced by some types of sustainability programmes for business. If such factors are significant in these sustainability programmes (i.e. environmental management systems or cleaner production programmes), it seems reasonable to assume that they may also be significant in programmes that attempt to bring about the full extent of the changes required of business.

In a review of the extent to which the changes in a group of NZ businesses identified as cleaner production case studies meet the requirements of sustainable development, Stone (1994) found the following limitations:

1. The types of changes that were made were seldom far-reaching enough to make a significant contribution to sustainable development. They tended to focus on simple changes that result in immediate or short-term economic benefits and did not tend to extend to the impacts that occur up- or downstream of the production process.

2. The issue of renewability of raw materials and energy did not appear to be a major consideration. Improved efficiency of resource use did occur, but for non-renewable resources this could be considered to be merely a delaying tactic. Businesses did not seem to be making strategic decisions to switch to renewable resources.

3. Changes still appeared to be "one-off", often occurring in response to a crisis of some sort. There appeared to be little emphasis on creating durable, strategic change within businesses.

4. Resources or processes that were changed were sometimes relatively insignificant contributors in terms of the business as a whole. In some cases they appeared to have more to do with public relations than with long-term sustainability.

5. Changes did not appear to be considered holistically. While they eliminated a particular type of waste (e.g. solid waste), they frequently transferred the problem to another medium.

6. The social implications of changes, e.g. job losses due to automation, did not appear to be taken into consideration.

To some extent, these limitations can be expected, because of the heavy reliance that the programmes place on maximising benefits vs. costs (as suggested in Table 1.1).

The last point (6, above) is important in terms of the triple bottom line appears to be sorely lacking in those businesses considered worthy of mention as cleaner production case studies. Hawken (1993: 127) sheds light on the need for such elements to be included in sustainability programmes by questioning the long-term sustainability of the "persistent state of anxiety [that] enlarges the power and control exerted over worker's lives by management". He points to the powerlessness that many employees feel despite the employee involvement and enhancement principles of quality management and its derivatives (Hawken, 1993: 128).

Another, potentially more significant limitation is the apparent absence of business action on the prevalent economic system that has unlimited growth and the free-market as its

basic tenets. While the Bruntland Report (WCSD, 1987) and Schimdheiny's book on "changing course" (BCSD, 1992: *xi*) both assert that growth is essential for achieving sustainable development, others disagree. Hawken (1993: 33), for example, points out that infinite growth cannot be possible on a resource finite planet, and Welford (1995: 127-8) suggests a change to "smart growth", or growth that is consistent with the finite nature of resources.

It is clear that the majority of businesses (including those participating in demonstration projects) do not appear to be contributing to the fundamental changes that are necessary to achieve sustainability, i.e.:

– Changes to the current economic system, particularly in terms of allocation of the costs of environmental damage and resource depletion (Jackson, 1993:145), and

– Restoration of the regenerative capacity and ecological integrity of already damaged ecosystems (Hawken, 1993:209).

1.7   The rationale for and purpose of this thesis

Previous sections suggest that businesses will have to make significant changes in order to do their share of what is needed for sustainable development to become a reality. Studies on sustainability programmes that are relatively narrow in their scope (e.g. environmental management systems or cleaner production) suggest that outcomes are limited and short-term. It is possible that the difficulties would be even greater in programmes where businesses are expected to undertake the *full* extent of changes necessary for sustainable development to occur. The difficulties encountered are likely to be even further exacerbated within the context of the predominant social paradigm within which most businesses now operate, i.e. the view that the "business of business" is to make a profit, and that environmental and social goals are beyond their remit.

In light of the enormous changes that businesses have to undertake in order to contribute effectively to sustainable development, and the difficulties encountered to date, it seems timely to look critically at the effectiveness of sustainability programmes.

A wealth of knowledge has accumulated on the social and psychological factors that

influence change within organisations. However, this knowledge and experience is not usually harnessed for the purpose of sustainability programmes for business. Morris (2000: 106) puts it bluntly when he suggests that literature on such programmes is "overly optimistic about the ability of organisations to manage the … change processes" required for successful implementation. While he limits this remark to programmes that focus on cleaner production, Hillary's (2000) study suggests that its relevance could be broader.

This optimism may stem, in part, from the lack of training that most sustainability trainers who work with business have in organisational theory. Most cleaner production education programmes in NZ (and elsewhere), for example, appear to be developed and run by people who have specialist training in one or more of the natural or physical sciences. This does not necessarily mean that their programmes are deficient – they are usually based on considerable practical experience and technical knowledge – but it may make them less likely to identify, recognise and be able to respond to organisational factors. It is for these people that this thesis has been written.

My thesis is that sustainability programmes could benefit from critical examination of their place and practice within the context of developments in organisation theory.

In order to test this thesis, I will:

1. Identify developments in organisation theory that are of relevance to organisational change (Ch. 2);

2. Evaluate the effectiveness of a particular sustainability programme for business, and (Chs. 3 and 4)

3. Consider the results of the evaluation within the context of relevant theoretical developments and change management models (Ch. 5).

Finally, I will use the discussion as a basis for developing a model that I hope can be used to improve the effectiveness of sustainability programmes for business.

It is important to note that there are two levels at which the effectiveness of sustainability programmes for business can be considered. The first level is best described in terms of the *receptivity* of businesses to sustainability, while the second level is best described in terms

of the *activity* undertaken. Receptivity depends on the organisational environment, the way in which businesses respond to it and the extent to which sustainability programmes are able to reach them. Activity, on the other hand, depends on the specific programmes that are undertaken. While activity may, to some degree be dependent on business responses to the organisational environment, there are many other organisational characteristics that also have the potential to be important. This thesis will focus on the second level, specifically the effectiveness of sustainability programmes programmes that are undertaken by businesses as part of voluntary initiatives. It is presumed that the businesses involved are *already* receptive, i.e. to the extent that they are prepared to participate in the programme.

A vast body of literature covers the subject of change within organisations. This thesis will not, therefore, attempt to identify and present the details in the field. The theoretical context will be limited to the major, theoretical developments that have contributed to the evolution of organisational change theory and their manifestations in models for managing change.

Although the body of literature on sustainability programmes for business is much smaller, it is still beyond the scope of this thesis to evaluate and make recommendations for improving the effectiveness of all the different approaches. The evaluation will therefore focus on a case study wherein a particular type of sustainability programme is applied. This type of programme has been developed specifically for the purpose of assisting businesses to develop and implement, on an on-going basis, what is commonly referred to as a cleaner production or pollution prevention programme[22].

This focus has been chosen for a number of reasons. Firstly, the concepts are well known within the field of sustainability programmes for business and are internationally applied[23]. Secondly, the specific nature of the changes included in the definitions of both concepts (see s1.3), makes it easier to measure effectiveness. Thirdly, although they have continued

---

[22] The terms *cleaner production* and *pollution prevention* are increasingly being used interchangeably (e.g. US National Pollution Prevention Roundtable, 1999). The acronym CP/PP is used for the remainder of this report to encapsulate the changes that organisations can make to undertake a wide range of *preventative* environmental performance improvements.

[23] Cleaner production forms the basis of UNEP's international Industry and Environment Programme (IEP), while pollution prevention forms the basis of preventative programmes in the US. Their international application tends to reflect the different spheres of influence of UNEP's IEP or the US's National Pollution Prevention Roundtable (NPPR).

to evolve, both concepts have now been applied for a number of years[24] and practitioners have developed a relatively standard programme that they use when working with businesses. This programme is virtually identical for the two concepts and also contains elements that are similar in essence to those found in programmes associated with other concepts (see s3.3). It is hoped that the results of this thesis, despite the particular focus, will be of use to practitioners who are involved in a much wider range of programmes that promote sustainability in business.

---

[24] Cleaner production has been applied internationally since its inception in 1988, while pollution prevention has been applied in the US since the mid-1970s and elsewhere since the early 1990s (Hirchhorn and Oldenburg, 1991: 3).

2 Theoretical developments of relevance to organisational change

2.1 Introduction

Achieving change is a complex task and an imperative for sustainability. Organisational change is essentially about the way in which organisations respond to, adopt and implement change. It has only relatively recently developed as a discipline in its own right, and it has as its roots the developments that have occurred during the evolution of organisation theory.

According to Tolbert and Zucker (1996: 176), organisations have not always been considered to be worthy of study in their own right. They suggest that organisations were initially studied within the context of general social phenomena and, apart from a few earlier developments, it was only in the 1940s that organisation theory began to be considered as a mainstream discipline in its own right.

The body of knowledge that contributes to our understanding of organisations spans many disciplines. Terms that encapsulate relevant aspects of organisation theory and practice include: organisational psychology; industrial psychology; organisational sociology, and industrial sociology. Organisational and industrial psychology tend to focus on the behaviour of individuals. The former covers the cognitive aspects of human behaviour as well as motivation, attitudes, commitment, values, personality processes, decision making, leadership and their implications for organisational development. The latter tends to cover these aspects from an occupational perspective, i.e. in terms of selecting people for positions, analysis and evaluation of jobs, performance appraisal, training and development and occupational health and safety (Miner, 1992).

In contrast, organisational sociology tends to cover the social nature of organisations, including their place within society as a whole (Deeks, 1993) and internal aspects such as power, authority, communications and decision-making. Industrial sociology tends to cover industrial relations, sources of conflict such as race and gender and the theories of technological uptake (Joseph, 1989; Grint, 1991).

Robbins and Barnwell (1998: 6, 7) distinguish between organisation behaviour and organisation theory, suggesting that the former takes a "micro-perspective" that focuses on the behaviour of individuals and small groups within organisations, while the latter takes a "macro-perspective" that focuses on the behaviour of the organisation as a whole, specifically in terms of structure and design. They do, however, point out that there are many areas of overlap between the "macro-" and "micro-perspectives".

Pugh (1997: xii) provides a more general definition for organisation theory, i.e. "the study of the structure, functioning and performance of organisations and the behaviour of groups and individuals within them". This definition suggests that the term is not necessarily limited to the macro-perspective, but rather that it may be used to encompass all of the previously mentioned branches. Another term of relevance is "institutional theory", which focuses on the processes whereby institutions[1] develop, including the role of institutional and individual "actors"[2] (Tolbert and Zucker (1996: 175).

Because of this broad range of disciplines, it would be a huge task to analyse and summarise the contribution that each has made to knowledge of change within organisations. Moreover, change management came after the incorporation of these disciplines into organisation theory. It is not within the scope of this thesis to conduct such an in-depth analysis, but rather to present a broad overview that can be used as a theoretical context for the case study that follows. The overview relies on the work of authors who have already undertaken their own analyses (or presented those of a range of others) and have identified frameworks for organising and presenting a wide range of perspectives that contribute to orgnisational theory (e.g. Argyris and Schön, 1996; Burgoyne and Reynolds, 1997; Clegg, Hardy and Nord, 1996; French, Bell and Zawacki, 1994; Inkson and Kolb, 1998; Pugh, 1997; Robbins and Barnwell, 1998). Two examples are: Reed's (1996) "meta-narrative interpretative" framework and Robbins and Barnwell's (1998) "central themes" framework.

Reed (1996: 31-56) provides a synthesis that can be used as a basis for placing the different approaches to organisation theory into context. He emphasises that discourse about

---

[1] Tolbert and Zucker's work on institutionalisation (1995: 177) suggests that the term *institution* is used when the "symbolic, as well as action-generating properties" of organisations are recognised.

organisation theory is a function of a "precarious combination of individual vision and technical production located within a dynamic socio-historical context" (Reed, 1996: 33). A key feature of this is that every "interpretative framework" has to be considered within the broader social context within which it evolved. He identifies six "meta-narrative" interpretative frameworks that he believes describe "shared ... methodological procedures through which reasoned judgements of competing interpretative frames and explanatory theories are negotiated and debated" (Reed, 1996: 33). The six frameworks are characterised by: rationality and order; integration and consensus; market and liberty; power and domination; knowledge and control, and justice and participation.

Other authors provide different frameworks for *organising* organisation theory. Robbins and Barnwell (1998: 24) use Scott's model (1978: 22) as a basis for differentiating between important theoretical approaches that they believe have contributed to contemporary organisation theory. The model has two "underlying dimensions": the first deals with the "ends" of (or basis for) organisational structure[3], while the second deals with the systemic nature of organisations. These two dimensions reflect the basic dichotomy in the evolution of organisation theory, i.e. structural vs. systemic approaches. For each of these dimensions, two opposing perspectives are identified, namely rational vs. social ends for organisational structure, and closed vs. open systems. Table 2.1 shows the four perspectives and the "central themes" that are attributed to each "type" of combination (Scott, quoted in Robbins and Barnwell, 1998: 25).

The approaches identified by Robbins and Barnwell as types 1 and 4 appear consistent with two of Reed's interpretive frameworks, namely those categorised by "rationality" and "power", respectively. Types 2 and 3 both appear to fit within the framework categorised by "integration". Reed's remaining three frameworks, namely those categorised by "market", "knowledge" and "justice", do not appear to be distinguished using Scott's model.

The framework provided by Inkson and Kolb (1998: 59) echo's aspects of Scott's model.

---

[2] The term *actor* is used in social science reference to individuals, as well as small or large groups.

[3] Pugh (1997: 1) defines *structure* as the mechanisms whereby an organisation facilitates the regular, continuing activities that are required for the achievement of a specific goal or set of goals. It includes the different functions within an organisation, the way in which they are assigned and maintained, and the relationships between the different functional units and the individuals within them (Inkson and Kolb, 1998: 239-245).

They distinguish between three types of approaches that have historically been applied to management, i.e. administrative, socio-political and cultural approaches. While a wide range of contemporary theories are believed to fall outside these categories (e.g. see Reid, 1987), they are reasonably recurrent in the literature and are therefore used as the basis for the following overview.

Table 2.1. Central themes believed attributable to combinations of opposing perspectives of the systems and structural dimensions of organisation theory. Based on Scott, quoted in Robbins and Barnwell, 1998: 25-26.

	SYSTEMIC DIMENSION ⟶	
STRUCTURAL DIMENSION	**Closed system**	**Open system**
Rational basis	*Mechanical efficiency ("type 1")*	*Contingency designs ("type 3")*
Social basis	*People, human relations ("type 2")*	*Power, politics ("type 4")*

In order to consider its value for improving sustainability programmes for business, it is necessary to develop an understanding of the theoretical developments that have occurred in organisation theory. Section 2.2 describes five approaches that are illustrative of key elements of this development: mechanistic/rational approaches (s2.2.1), humanist/social approaches (s2.2.2), environmental/contextual approaches (s2.2.3); political/power approaches (s2.2.4) and cultural approaches (s2.2.5). Section 2.3 provides an overview of developments of direct relevance to organisational change. It begins by distinguishing between stochastic and planned or managed change (s2.3.1) and then provides an overview of the development of change management (s2.3.2). Section 2.3.3 identifies models that have been developed for managing change.

This chapter does not attempt to link the above-mentioned developments to sustainability programmes for business. This is done in Ch. 5, in light of the results of the evaluation covered in Ch.'s 3 and 4.

2.2 Major developments in the evolution of organisation theory

2.2.1 Rational or mechanistic approaches

Approaches with mechanical efficiency[4] as a central theme tend to be consistent with the normative/rational model for human behaviour (e.g. Simon, 1947). Miller *et al* (1996: 294) suggest that neo-classical economics "lie at the heart of the rational choice model", the main thrust being to maximize rewards and minimize costs for those involved".

Despite the difficulties and uncertainties inherent in the application of the rational/normative model to human behaviour, rationality still forms the basis of mechanistic approaches to organisation theory. It also continues to dominate businesses and government in the western world, where market economics assumes that little or no regulation is required if individuals base their decision-making on a rational choice model (Miller *et al.,* 1996: 294).

Rational or mechanistic approaches assume that individuals in organisations base their behavioural decisions on analyses of the costs and benefits of actions (Hechter, 1990). Such analyses are expected to be used as a basis for developing the most efficient and effective mechanisms for achieving the organisation's goals (Tolbert and Zucker (1996: 177).

This "rational actor" model forms the basis of what Clegg and Hardy (1996: 2) refer to as "functionalist", Inkson and Kolb (1998: 64) refer to as "administrative", and Robbins and Barnwell (1998: 27) refer to as "classical" approaches to organisation theory. Under such approaches, an organisation is believed to be an orderly system of units, the purpose of which is the achievement of rational, formally defined goals (Clegg and Hardy, 1996: 2).

Robbins and Barnwell (1998: 27) consider Max Weber (1924, translated in 1947), Frederick Taylor (1911) and Henri Fayol (1916, translated in 1949), to be classical (or "type 1") theorists. Reed (1996: 36) includes Simon (1945 and 1957b) as a key contributor to such approaches. This is because he believes that while Simon's concept of bounded rationality provides a critical response to rationalism, it is still "framed within an approach

---

4 *Mechanical efficiency* refers to the achievement of a specific set of organisational goals.

which sees rational choice between clearly delineated options as the basis of all social action" (Reed, 1996: 36).

Interestingly, Reed (1996: 34) considers Weber's work to contribute more to interpretative frameworks regarding power and domination within organisations, rather than rationality and order. Weber (1978, quoted in Reed, 1996: 40) appears to have believed that bureaucracy flows from the sociology of domination. Reed therefore places him with Marx, and suggests that his work had more to do with power and domination than rationality and order (Reed, 1996: 34-36, 40-41).

Nevertheless, the organisational models of Weber, Fayol and Taylor tend to be used as a basis for discussion of rational approaches. This is because they appear to be based on rational decision making within a closed system, with the purpose of maximizing mechanical efficiency. Like other early theorists, they focused on organisational "structure" because it was believed to reflect "rational efforts" to coordinate and control work activities for the purpose of maximizing efficiency (Tolbert and Zucker (1996: 177).

Key elements of organisational structure are "formalisation" and the structure of authority (Inkson and Kolb, 1998: 242, 244-245). Formalisation refers to the way in which rules are made, recorded and applied (e.g. in writing), while authority structure refers to the way in which authority is allocated and exercised (e.g. hierarchical).

Weber (1924, translated in 1947) suggested rational or legal authority as an alternative to "traditional" and "charismatic" authority (Weber, 1947: 328). Rational or legal authority is based on "normative rules" and a rational or legal right to that authority (Weber, 1947: 328). In contrast, traditional authority is based on "established belief in the sanctity of ... traditions" and status gained as a result of those traditions, while charismatic authority is based on "devotion to a specific and exceptional" individual and his/her expectations (Weber, 1947: 328).

Weber considered that rational or legal authority would enable progression away from the irrational conduct upon which organisations had previously been based (Inkson and Kolb, 1998: 69). He identified the following elements of rational or legal authority (Weber, 1947: 329-333):

1. A set of rules or norms that are applied continuously to ensure that the functions necessary for achieving goals are carried out. Any rules can be agreed or imposed as long as they are expedient and/or rational. They tend to be driven by "technical" requirements, ie. in the pursuit of efficiency. They normally form part of an intentionally established, consistent system and are administered by a particular process and approved principles.

2. Division of labour into specific "spheres of competence". These spheres correspond to specific, clearly defined functions that are required to be carried out.

3. Personnel are assigned to functions according to their "technical' competency and are compelled to perform according to clear requirements. Positions cannot be appropriated by incumbents.

4. Hierarchies of authority. Authority is allocated for the purpose of carrying out specific functions. S/he is superior to and/or subordinate to others.

5. A person with authority holds an 'office' or position from which s/he takes action or issues commands. Such actions/commands are required to be consistent with her/his status and impersonal, i.e. based on membership of and status within the group and in response to the "order" or system of rules, not an individual. Obedience is also considered to be impersonal.

6. Administration and ownership of the means of production and/or administration are separate. Administrative staff may use resources that belong to the organisation only for the purpose of carrying out their specific functions and they are required to account for the use of such resources.

7. Rules, procedures, actions and decisions are formalized by being clearly and precisely recorded in writing.

While Weber recognised that the three forms of authority were unlikely to be found in "pure" form, he considered "bureaucracy" to be the "purest" form of rational or legal authority (1947: 328, 333). The characteristics of his hypothetical, bureaucratic model are: rationality, division of labour, a hierarchy of authority, formalisation, impersonality, merit,

and a "career track"[5] (Robbins and Barnwell, 1998: 269; Inkson and Kolb, 1998: 69).

The organisational models of Taylor (1911) and Fayol (1916, translated in 1949) appear to be similar in principle to Weber's, although all three are different in focus (Inkson and Kolb, 1998: 64-65, 72; Robbins and Barnwell, 1998: 28, 29).

Taylor's model focused on scientific research as the basis for improving worker productivity (Inkson and Kolb, 1998: 64). He identifies four principles of what he calls "scientific management" (Taylor, 1947: 40-45):

1. Development, through systematic analysis, of a "science"[6] or set of rules for improving productivity;

2. "Scientific selection and progressive development" of employees;

3. Mechanisms to ensure that the "science" is applied throughout the organisation;

4. Equitable division of labour, particularly between management and other employees.

Fayol's model focused on improving the functions of managers at all levels in an organisation (Robbins and Barnwell, 1998: 29). Most of his principles (see Fayol, 1949, in Pugh, 1997: 253-274) are consistent with those of Weber, but some differ in that they include the need for flexibility, communication up and across the organisation, equity, consideration for employees, and recognition of the value of their initiatives[7] (Inkson and

---

[5] The bureaucratic model includes a system whereby employees can expect to be promoted on the basis of merit and, in return for their commitment, are able to pursue a career within the organisation (Robbins and Barnwell, 1998: 269).

[6] Taylor quotes Professor Maclaurin, then President of the Institute of Technology, Boston when defining science as "classified or organized knowledge of any kind" (Taylor, 1947: 41). The use of the term "scientific" in this context can be considered to be consistent with a normative or rational approach whereby decisions are based on such knowledge.

[7] Fayol (1949) defines *initiative* as the "power of thinking out a plan and ensuring its success".

Kolb, 1998: 72). They therefore incorporate social and environmental[8], rather than purely rational principles.

While Warren Bennis (1966) heralded the "coming death of bureaucracy" and suggested that it would be replaced by "adhocracies"[9] (Robbins and Barnwell, 1998: 35), rational or mechanistic approaches are still believed to be "driving forces" in organisational studies (Clegg and Hardy, 1996: 2). They have, however, been supplemented by others that recognise the significance of social and environmental factors (Inkson and Kolb, 1998: 74).

The work of Follett (1916) and Barnard (1938), for example, began to "question the wisdom of leaving the personal, human element" out of organisation theory (Inkson and Kolb, 1998: 74). Follett identified the need for group effort rather than individual specialisation, while Barnard recognised the need for cooperation and conscious coordination within organisations (Inkson and Kolb, 1998: 73), and is also credited with introducing the concept of "an organisation as a cooperative system" (Robbins and Barnwell, 1998: 34). These authors appear to have been moving in the direction of what Inkson and Kolb (1998: 77-95) call "socio-political" approaches, what Reed (1996: 36-38) calls the "re-discovery of community", and what Robbins and Barnwell (1998: 31) and Pugh (1997: 353) call the "human relations school" or "movement". These types of approaches are discussed in the following section.

2.2.2 Humanist or social approaches

Approaches to organisation theory that have people and their relationships as central themes are consistent with theories such as social learning theory, because they recognise the influences that social factors have on behaviour. They recognise that organisations are social groupings and that the way in which individuals (or groups) behave or respond within them is influenced by social interaction.

---

[8] In terms of organisation theory, *environment* can be considered to be the context within which an organisation operates. Robbins and Barnwell (1998: 189) distinguish between "specific" and "general" environments. They define the former as "that part of the environment that is directly relevant to the organisation achieving its goals", while the latter are defined as "conditions that may have an impact on the organisation, but their relevance is not particularly clear" (Robbins and Barnwell, 1998: 190), Suppliers, customers and competitiors are examples of specific environmental components, while general legal, technological, cultural and ethical developments are examples of general environmental components (Pugh, 1997: 97).

[9] According to Robbins and Barnwell (1998: 35), the term *adhocracy* applies to "decentralised and democratic structures organised around flexible groups", with influence based on expertise, rather than authority.

Many authors identify the work of three theorists, Elton Mayo (1933), Chester Barnard (1938) and Douglas McGregor (1960), as central in the development of this type of approach (e.g. Robbins and Barnwell, 1998: 31-35; Inkson and Kolb, 1998: 74, 81, 84).

Research conducted by Mayo (1933) drew attention to the role that social factors such as group cohesion, common values and co-operation play in improving productivity (Inkson and Kolb, 1998: 81, 82). This research, known as the "Hawthorne experiments" or "studies", showed that group pressure, acceptance and security played a more important role in determining employee behaviour than did physical working conditions (e.g. lighting), or incentives (e.g. increased wages) (Robbins and Barnwell, 1998: 32). Productivity was found to increase, not because of physical variables, but rather as a result of:

1. the opportunities that participation in the research gave workers to exercise more control over their workplace and pace of work, and

2. the "personal interest" that each worker received as a participant in the research (Inkson and Kolb, 1998: 82).

This personal interest mainly took the form of interviews during which workers were given the opportunity to "talk freely" and in confidence to "a competent[10] listener" (Mayo, 1949, in Pugh, 1997: 361, 362).

However, Mayo goes to great length to emphasise that while the interviews certainly had a "therapeutic" value for the individual, their value for the organisation lay in providing individuals with an opportunity to develop strategies for improving their contributions to group efforts (Mayo, 1949, in Pugh, 1997: 362-64).

The two factors identified above are believed to have resulted in the development of a social group with "high cohesion and group values and high standards of co-operation and productivity", as well as the development of a sense of "pride in group performance" (Inkson and Kolb, 1998: 82). They were found to be particularly valuable in the face of

---

[10] Mayo (1949, in Pugh, 1997: 359) identifies a range of competencies for interviewers. Key requirements were that they were eager to listen and able to "help to give expression to ideas and feelings but dimly understood" (Mayo, 1949, in Pugh, 1997: 359, 360).

changes in routine, which appeared to result in "loss of security for many people" (Mayo, 1949, in Pugh, 1997: 363).

Although the "scientific validity" of the Hawthorne experiments has been challenged (e.g. Carey, 1967; Sonnenfeld, 1985), they are believed to have exerted considerable influence on management (Inkson and Kolb, 1998: 83) and resulted in the "human relations movement" (Pugh, 1997: 353). This movement is believed to have come about not only as a counter to the mechanistic approaches of Weber, Taylor and Fayol (Robbins and Barnwell, 1998: 31), but also because it expressed the "gradual liberalisation of political and social attitudes" (Inkson and Kolb, 19998: 81). Reed (1996: 34) identifies a more specific social context that is characterised by integration and consensus.

A key premise of the movement is recognition of what Mayo (1949, in Pugh, 1997: 362) calls the "feeling of security and certainty" that results from "assured membership of a group". His work led to recognition of the importance of the social processes that occur outside formal structures, and as a result of informal social interaction within organisations (Pugh, 1997: 353).

So, humanist approaches to organisation theory tend to focus on social interactions within the organisation, while rationalist approaches tend to focus on structure. The application of "systems theory" to organisations stems from the recognition that structural and social aspects of organisations are inter-linked and cannot be considered in isolation (Inkson and Kolb, 1998: 89). Systems theory as it is applied to organisations is loosely based on the physical and natural sciences (Reed, 1996: 37; Robbins and Barnwell, 1998: 8, 9; Inkson and Kolb, 1998: 90). Organisations are therefore considered to be whole systems and the focus is not on the individual components, but the relationships between them.

Barnard (1938) combined the results of Mayo's work with those of Weber, Taylor and Fayol and concluded that organisations are cooperative systems (Robbins and Barnwell, 1998: 32), and that their activities need to be "consciously coordinated" (Inkson and Kolb, 1998: 74). He also suggested that authority only works if it is accepted by subordinates and that the main roles of managers were to "facilitate communication" and "stimulate subordinates to high levels of effort" (Robbins and Barnwell, 1998: 34).

McGregor (1960) provided insight into some of the barriers to such an approach. He identified contrasting sets of assumptions about human nature ("Theories X and Y") that he believed were held by managers (Inkson and Kolb, 1998: 84). The assumptions relate to employee's attitudes towards work, achievement of objectives, responsibility and decision-making. McGregor advocated the use of the more positive set of assumptions ("Theory Y"), as the basis for managerial responses to employees, i.e.:

– employees can consider work to be "natural";

– commitment to objectives will result in "self-direction" and "self-control";

– responsibility is acceptable to and even sought by most people, and

– managers are not the only people capable of being creative in decision-making (Robbins and Barnwell, 1998: 34).

Robbins and Barnwell (1998: 35) suggest that these assumptions on the part of managers are more likely to result in enthusiasm for "participative decision-making", the provision of "responsible and challenging jobs", and "good group relations".

Inkson and Kolb (1998: 85) include Abraham Maslow (1954) in what they call "behavioural science approaches". Maslow (1954) developed what he called a "needs hierarchy", believing that higher order needs (such as esteem and self-actualisation) can only come to the fore if basic, lower order needs (such as physiological and safety needs) are met. His hierarchy is shown in Fig. 2.1. Schein (1992: 125) explains the application to organisation theory: economic needs will dominate if the individual is in "survival mode"; if these needs are met, social needs will become important, and if the latter are met, they will be superceded by self-actualisation needs.

Figure 2.1. Maslow's hierarchy of needs, under which lower order needs have greater priority than higher order needs. Adapted from Rouse, 1993.
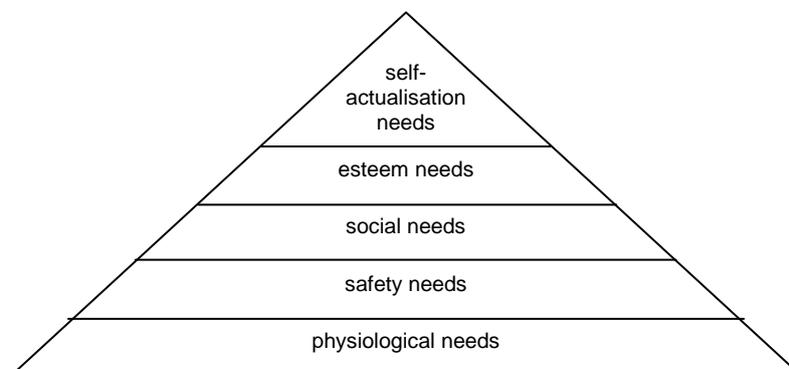
From one perspective, the needs hierarchy appears to be consistent with humanist approaches, where meeting the social needs of employees were seen as a precursor to self-actualisation. However, this is only the case if the self-actualising needs of the individual are consistent with the organisation's objectives. This is not necessarily the case, although employees could be manipulated into believing it to be so. Manipulation and insincerity form the basis of some of the main criticisms of humanist approaches (Inkson and Kolb (1998: 84, 85). They are also accused of naiveté, because they tend to ignore the extent to which political forces influence organisation dynamics (Inkson and Kolb, 1998: 85).

Further criticisms stem from the internal focus (e.g. Mayo's early work from the 1920s to the early 1930s) and what Robbins and Barnwell (1998: 25-32) call a "closed system" approach. In contrast, Mayo's later work very clearly draws attention to influences outside the organisation (Mayo, 1949, in Pugh, 1997: 360, 361). He suggests that a new range of difficulties for management and employees was brought about by "scientific, engineering and industrial development" and the "passage from an *established* to an *adaptive* social order" (Mayo, 1949, in Pugh, 1997: 360, 361).

Reed (1996: 37) concurs, suggesting that the human relations movement and the systems approach to organisations were themselves driven by the need to maintain social order in the "unstable and uncertain world" created by hitherto unprecedented rates of "socio-

technical" change. He further suggests that these approaches were driven by the image of the organisation as an "intermediate social unit" where "benevolent and socially skilled" managers guided individuals to integrate into "modern industrial civilization" (Reed, 1996: 37).

The recognition that organisations are influenced by these external types of forces and that they operate within an open- rather than closed system, led to the development of what have been called contingency approaches.

2.2.3 Contingency approaches

The underlying assumption of contingency approaches is that "organisational variables are in a complex interrelationship with one another and with conditions in the environment" (Lawrence and Lorsch, 1967: 157). Contingency theory developed out of a synthesis of rational and humanist approaches (Donaldson, 1996: 58) and uses a "finite but flexible set of variables [or contingency factors] ... to account for variations in organisational design and effectiveness" (Clegg and Hardy, 1996: 12).

Donaldson (1996: 59, 60) credits Burns and Stalker (1961) with having "pioneered" the approach, although he identifies Lawrence and Lorsch (1967) as having coined the term "contingency theory". However, Robbins and Barnwell (1998: 35) trace its roots back to Simon's work in the 1940s. Simon (1947) argued against strict adherence to competing rational or humanist principles, believing that it was necessary to first consider the conditions under which organisations operated and then to determine which principles (or combinations) would be most appropriate (Robbins and Barnwell, 1998: 35). Despite this, it was another twenty years before contingency theory gained momentum in mainstream organisation theory (Robbins and Barnwell, 1998: 35).

Burns and Stalker (1961) distinguished between two "ideal types" of organisations, namely mechanistic and "organismic", suggesting that mechanistic forms were appropriate for stable environments, while organismic forms were appropriate for changing conditions (Burns, 1963: 18). Table 2.2 summarises the characteristics of the two types of organisations. Mechanistic organisations were characterized by rigid controls over structure, roles and the availability of knowledge, while organismic organisations were characterized by flexible structure, loosely defined roles and dispersion of knowledge

(Donaldson, 1996: 59). Another feature of Burns and Stalker's work was that it recognised that the uncertainty associated with tasks, particularly as a result of innovation, was likely to influence organisation structure (Donaldson, 1996: 59).

Lawrence and Lorsch (1967) studied the structural differentiation and integration within three "high-performing" organisations (Donaldson, 1996: 60). The aim of the study was to gain insight into "what types of organisations are effective under different environmental conditions" (Lawrence and Lorsch, 1967: 133, 134). The results suggested a relationship between four factors:

1. the certainty and diversity of the strategic external environment;

2. the degree of structural differentiation within the organisation;

3. the complexity of its "integrative devices"[11], and

4. the processes used for conflict resolution (Lawrence and Lorsch, 1967: 133, 134).

They found that the organisation with the highest degree of differentiation appeared to also have the most "elaborate" set of integrative devices (Lawrence and Lorsch, 1967: 133, 134).

The study was similar to those of other contingency theorists (e.g. Woodward, 1965; Katz and Kahn, 1966) in that it focused on organisation structure and the way in which it "fits"[12] with various contingency factor/s (Donaldson, 1996: 57). However, the main focus of Woodward (1965), along with Perrow (1967) and Thompson (1967) was the importance of technology[13] as a determinant for organisation structure (Robbins and Barnwell, 1998: 36).

---

[11] *Integrative devices* are mechanisms that help to achieve integration amongst the different structural units of an organisation, e.g. direct contact between unit managers, cross-functional teams or "paperwork systems" (Lawrence and Lorsch, 1967: 136, 138).

[12] According to Miles and Snow (1984: 11), "*fit* is a process as well as a state - a dynamic search that seeks to align the organisation with its environment and to arrange resources internally in support of that alignment".

[13] Robbins and Barnwell (1998:156) define *technology* as the "information, equipment, techniques and processes required to transform inputs into outputs in an organisation". They emphasise that it is not limited to the mechanical aspects of manufacturing, but is applicable to the transformation process that occurs in all types of organisations.

Table 2.2. Characteristics of mechanistic and organismic systems of management. Adapted from Burns, 1963 (in Pugh, 1997: 105).

CHARACTERISTIC	MECHANISTIC SYSTEMS	"ORGANISMIC" SYSTEMS
1. Differentiation of tasks	*Specialised, functional*	*Contributive (to common concern)*
2. Nature of tasks	*Abstract, distinct from common concern*	*Realistic, set by common concern*
3. Reconciliation of tasks	*By immediate superiors*	*Continually re-defined by interaction with others*
4. Definition of rights, obligations, methods	*Precise, specific to function*	*Within a field*
5. Translation of rights, obligations, methods	*Commitment to functional position*	*Commitment to common concern*
6. Structure of control, authority, communication	*Hierarchic*	*Network*
7. Reinforcement	*Knowledge located at top of hierarchy*	*Knowledge located anywhere, becomes centre of authority*
8. Direction of interaction	*Vertical*	*Lateral*
9. Content of communication	*Instructions and decisions*	*Information and advice*
10. Required commitment	*Loyalty to concern, obedience to superiors*	*To tasks and "technological ethos"*
11. Basis for importance, prestige	*Internal knowledge, experience, skill*	*External affiliations and expertise*

Woodward (1961) compared over eighty manufacturers, dividing them into three categories, namely those with:

1. single units or small batches (e.g. crafts, musical instruments);

2. many units (mass manufacturing) or large batches (e.g. automobile assembly), and

3. flow processes (e.g. oil refining) (Pugh, 1973, quoted in Pugh, 1997: 31).

The variables that she studied included: the length of the "line of command" from the CEO; the ratio of managers to other employees; the "span of control" of line supervisors; the clarity of role definition, and the amount of paperwork (Pugh, 1973, quoted in Pugh, 1997: 3). She found that while organisations in categories 1) and 3) both appeared to have

organic structures, the former tended to be informal, while the latter tended to have work teams and be run on more of a human relations type of approach. In contrast, organisations in category 2) appeared to have more formal or mechanistic structures (Donaldson, 1996: 59).

These results led Woodward to suggest that there was a cause-and-effect relationship between an organisation's production system and its structure, and that this made it possible to use an organisation's production system to determine its structural requirements (Pugh, 1973, quoted in Pugh, 1997: 31). However, a group of researchers from the University of Ashton in the UK replicated Woodward's work and expanded it by taking into consideration a greater range of contingency factors (Pugh, 1973, quoted in Pugh, 1997: 31). The factors included:

- origin and history of the organisation;
- kind of ownership (e.g. private or public) and control (e.g. concentrated or dispersed);
- size (including employees, assets, market position);
- number and range of goods and services;
- degree to which the workflow was integrated[14]
- location, interdependence, of the organisation (Pugh, 1973, quoted in Pugh, 1997: 27).

They argued against Woodward's findings, suggesting that size had a greater influence on structure than technology, and that patterns in contingency factors emerged as the size of an organisation increased (Robbins and Barnwell, 1998: 36).

Perrow (1967) expanded the concept of technology to include what he called "knowledge-technology" as a contingency factor in his studies (Donaldson, 1996: 60). He identified two dimensions of what he called "knowledge technology", or the variability of tasks and the extent to which problems can be analysed. The former refers to the number of "exceptions" or deviations from normal tasks, while the latter refers to ease with which responses to the exceptions can be identified (Robbins and Barnwell, 1998: 160, 161). Perrow (1967) found

---

[14] *Workflow-integration* was a technological measurement that took into account the characteristics of the technological processes and equipment, e.g. automation of repeat cycles, self-adjustment, effects of breakdown on process, waiting times during process (Pugh, 1973, quoted in Pugh, 1997: 27).

that low task variability tended to be associated with well-defined, analysable problems (i.e. "routine technologies" such as car manufacturing, petrol refining or banking), while high task variability appeared to be associated with poor problem definition and analysability (i.e. "non-routine" technologies such as strategic planning and research). There were, however, exceptions where low variability combined with low problem analysability (e.g crafts) and high variability combined with high problem analysability (e.g. engineering) (Robbins and Barnwell, 1998: 160, 161).

Perrow suggested that centralised decision-making would best suit organisations with a low level of variability and a high level of problem analysability (or "codified knowledge technology"), while de-centralised decision-making would best suit organisations with a high level of variability and a low level of problem analysability (Donaldson, 1996: 60).

Centralisation was only one of the structural characteristics that Perrow that selected. The others included formalization, "span of control" and "coordination and control" (Robbins and Barnwell, 1998: 162, 163). Table 2.3 shows Perrow's predictions for the relationship between types of knowledge technology and a range of structural characteristics. The Table shows knowledge technology categorised according to the variability of tasks and the ability of problems to be analysed. Combinations of these categories correspond with varying degrees of centralisation, formalisation, the span across which control is exercised and the way coordination and control are achieved.

Thompson (1967) also contributed to the structure-technology narrative, but he added to it by recognising the different ways in which the technological characteristics of "open-" and "closed system organisations" can be used as a basis for designing structure in a way that reduces uncertainty (Donaldson, 1996: 60; Robbins and Barnwell, 1998: 164). He distinguished between three types of technology, namely:

– "long-linked" technology that involves a sequence of linked steps (e.g. mass production assembly lines);
– "mediating" technology that links clients on both input and output sides of the process (e.g. banks, retail stores), and
– "intensive" technology that involves two or more separate units that contribute to the organisation as a whole (e.g. hospitals, universities) (Thompson, 1967: 15-17).

Table 2.3. Perrow's predictions for the interaction between combinations of task variability and problem analysability (or "knowledge technology") and a range of structural characteristics. Adapted from Robbins and Barnwell, 1998: 163 (Table 7.3), quoting Perrow (1967).

KNOWLEDGE TECHNOLOGY		STRUCTURAL CHARACTERISTIC			
TASK VARIABILITY	PROBLEM ANALYSABILITY	CENTRALIS-ATION	FORMALIS-ATION	SPAN OF CONTROL	COORDINATION AND CONTROL
LOW	HIGH	High	High	Wide	Standardised, using planning and rigid rules
HIGH	HIGH	High	Low	Moderate	Flexible, using reports and meetings
LOW	LOW	Low	Moderate	Moderate/wide	According to knowledge and experience, using training and meetings
HIGH	LOW	Low	Low	Moderate/ narrow	Interactive, using group norms and group meetings

Thompson also found that each type of technology was associated with a different type of interdependence (Thompson, 1967: 15-17). Organisations with long-linked technology tended to be characterized by "sequential" interdependence, while those with mediating technology tended to be characterized by "pooled" interdependence, and those with intensive technology tended to be characterized by "reciprocal" interdependence (Donaldson, 1996: 60, Robbins and Barnwell, 1998: 164-166). Thompson argued that these interdependencies determine the way in which organisations insulate themselves from uncertainty[15], e.g. through the establishment of "sub-units to deal with homogenous sub-segments of the environment" (Pfeffer and Salancik (1978: 273) or the containment of "core production technologies within a closed system (Donaldson, 1996: 60). He found that decision-making and communication became more demanding as technology changed from mediating to long-linked to intensive (Robbins and Barnwell, 1998: 166). Consequentially, Thompson's work suggested that structural complexity increases from mediating through long-linked to intensive technology (Robbins and Barnwell, 1998: 167).

---

[15] Galbraith (1973) defines *uncertainty* as "… the difference between the amount of information required to perform a task and the amount of information required to perform a task and the amount of information already possessed by the organisation".

Unlike Perrow (1967) and Thompson (1967), whose research drew to attention the importance of routine and interdependence, respectively, as determinants for organisation structure, Galbraith (1973) argued that structure was influenced by the extent to which an organisation was required to process information (Robbins and Barnwell, 1998: 182). He argued that "task uncertainty" influences the amount of information that has to be processed by decision-makers. He went on to develop "design strategies" for organisations with varying degrees of uncertainty and information processing (Robbins and Barnwell, 1998: 167). His design strategies include:

1. Rules and programmes for routine tasks that reflect existing knowledge;

2. Referral to superiors when exceptions are encountered in tasks that are normally routine;

3. Goal setting to ensure that complex tasks are broken down into components that can be carried out independently;

4. Creation of "slack resources", i.e. ensuring that resources are available beyond the minimum necessary to complete a task;

5. Creation of self-contained tasks, i.e. designing work to ensure that each group has the autonomy and resources necessary to complete a task with minimal management control;

6. Investment in "vertical information systems" (e.g. computer systems or other mechanisms for processing/conveying information), and/or

7. Creation of "lateral relations", i.e. providing for and enhancing communication across the organisation (Galbraith, 1973: 14-18).

Strategies 1 to 3 were believed to be sufficient in organisations with relatively low levels of task uncertainty. In organisations where uncertainty was greater, strategies 4 and 5 were recommended for reducing the *need* for information processing, and strategies 6 and 7 were recommended for increasing the *capacity* for information processing (Robbins and Barnwell, 1998: 168).

Much of the above-mentioned contingency research was carried out to identify ways to

avoid the inefficiencies that were believed to result when organisational structure failed to adapt to change (Donaldson, 1996: 60). While most of it recognised that organisations operate within open-systems, as advocated by Katz and Kahn (1966), the contingency approaches that resulted appear quite mechanistic. They assume a rational basis for decision-making and are therefore in marked contrast to approaches that recognise the limitations of rationality and the effects that conflicting goals and competition have on organisations. These types of approaches tend to be characterized in terms of power and politics (Robbins and Barnwell, 1998: 26, Inkson and Kolb, 1998: 300).

2.2.4 Political approaches

Simon (1945, 1947) is believed to have presented one of the earliest and most comprehensive critiques of the rationalist approach to organisation theory. However, his resultant concept of "bounded rationality" still only provides a limited basis for such theory, because it focuses on the cognitive limitations of decision-making and, consequently, underplays the role of power and politics during the implementation of decisions (Miller *et al.,* 1996: 294).

An important criticism of the rationalist approach is that it "aggregates the behaviour of individuals and groups", i.e. it assumes that rational decision-making by managers will be followed by equally rational decision-making by groups (Miller *et al.,* 1996: 294). A central tenet is therefore that managers and groups have the same goals, and that they rationalise their decisions in order to achieve those goals (Robbins and Barnwell, 1998: 219). Political approaches appear to have developed in response to the recognition that this is not always the case.

Robbins and Barnwell (1998: 36) believe that such approaches can be traced back to March and Simon (1958), who argued for organisation theory to recognise not only the cognitive limitations of decision-makers, but also the presence of conflicting goals. They maintained that decision-makers seldom concerned themselves with making perfect (rational) decisions, but that they nevertheless frequently made satisfactory decisions (March and Simon, 1958). It follows, therefore, that decision-making is not influenced purely by cognition, but also by political considerations.

These political considerations form the basis of political approaches to organisation theory.

They are concerned with the dynamics of power within organisations, i.e. the nature of power, its source/s and the way in which it is exercised. Power is defined by Inkson and Kolb (1998: 304, 308) as "the capacity to influence others", and by Kanter (1979: 65) as "the ability to mobilise resources (human and material) to get things done". Inkson and Kolb's definition appears to be broader, in that it extends beyond the achievement of organisational goals as inferred in Kanter's definition.

Inkson and Kolb (1998: 308) note that the concept of power in organisations has been discussed for decades. As an illustration, they draw attention to Follett's (1925) recognition of the significance within organisations of political activities such as "bargaining and negotiation". Follett recognised that the "scientific [management] methods" advocated by Taylor (1911) "merely set the limits ... within which bargaining still goes on" (Follett, 1925 quoted in Inkson and Kolb, 1998: 308). She also distinguished between coercive and co-active power, where the former is defined as power that is exercised *over* others, while the latter is defined as power that is exercised *together with* others (Inkson and Kolb, 1998: 304, 308). Her emphasis on the exercise of power was consistent with the emergence of the humanist approach, and its focus on integration and consensus within the workplace (see Reed, 1996: 34).

Similar distinctions are echoed in later works (e.g. McClelland, 1970; Kanter, 1979). McClelland (1970) was more judgmental, distinguishing between what he believed to be the "negative" and "positive" faces of power. The negative face was associated with exploitation, while the positive face was associated with concern for group goals, and the provision of assistance and support in formulating and achieving those goals (Robbins and Barnwell, 1998: 230). Kanter (1979: 65) distinguished between "oppressive" power that is used to dominate and control, and "productive" power that is used to enhance effectiveness and capacity.

The categories identified by Follett and McClelland allude to the sources of some of the difficulties associated with the discourse on power in organisations. Kanter (1979: 65) put it bluntly: "Power is America's last dirty word. It is easier to talk about money – and much easier to talk about sex – than it is to talk about power. People who have it deny it; people who want it do not want to appear to hunger for it; and people who engage in its machinations do so secretly." She argued for power to be de-stigmatized and recognised as

a "critical element in effective managerial behavior" that can be used in a positive way to enable an organisation to meet its goals (Kanter, 1979: 65).

Pfeffer (1978, 1981) built on the theories of March and Simon, recognising the influence that coalitions, conflicts over goals, and decisions made in favour of the "self-interest of those in power", have on organisations (Robbins and Barnwell, 1998: 36). He asserted that organisation design reflects the outcomes of power struggles, where control is in itself the end, rather than the means for achieving efficiency (Pfeffer, 1981, quoted in Robbins and Barnwell, 1998: 36, 37). He concluded that an analysis of the preferences and interests of those who influence decision-making is likely to provide considerable insight into the design of organisations (Robbins and Barnwell, 1998: 37).

A common consideration in political approaches to organisation theory appears to be the *source* of power. French and Raven (1959) distinguished between five sources of power (Inkson and Kolb, 1998: 304-5). The first four are based on an actor's ability to punish ("coercive power"), reward, provide expertise ("expert power") and be admired ("referent power"), while the fifth is based on the allocation of power to an actor as part of a formal role or title ("legitimate power") (French and Raven, 1959: 158-161). Coercive power as defined by French and Raven, appears to be different to the coercive power defined by Follett. The former focuses on the source of coercive power (i.e. fear of punishment), while the latter focuses on its exercise (i.e. over others) irrespective of its source.

Bacharach and Lawler (1980) distinguish between four sources of power, i.e. power that is based on: position, personal attributes, expertise and opportunity. The first three have elements that are similar to French and Raven's categories, but the fourth is different in that it recognises that power may be derived from opportunities that arise as a result of "being in the right place at the right time" (Inkson and Kolb, 1998: 305).

In contrast, Astley and Sachdeva (1984) identify three sources of power, i.e. hierarchical authority, control of resources and "network centrality" (Robbins and Barnwell, 1998: 225). The first has elements that are consistent with French and Raven's "legitimate power" and Bacharach and Lawler's "position power". The second is based on the assumption that control of resources brings power, particularly if those resources are scarce, as well as important (or in demand) (Robbins and Barnwell, 1998: 226, 227). This

power source is echoed in Kanter's (1979: 66) three "uniquely organisational" sources of power, defined in terms of a manager's ability to influence lines of supply, information and support.

The third of Astley and Sachdeva's sources (1984, quoted in Robbins and Barnwell, 1998: 227), i.e. network centrality, is based on the contributions that individuals or groups are able to make to an organisation's strategic requirements. This type of power source appears to be consistent with Robbins and Barnwell's (1998: 223, 224) concept of a "power cone", which they use to explain the difference between power and authority. They believe that the concept of power equates to "an individual's capacity to influence decisions" (Robbins and Barnwell (1998: 223). The *power cone* consists of an apex and a sphere of influence at its base. The "power core" runs from the apex of the cone to the centre of the sphere. The closer an actor is to the power core, the more influence that actor will have on decision-making within the organisation. Robbins and Barnwell (1998: 224) point out that, while upward movement in an organisation is generally associated with an increase in power, horizontal movement – if it is closer to the power core – can also increase power. An actor may have a relatively high level of power, because of proximity to the power core, even though s/he has a relatively low level of authority (e.g. the personal assistant of a senior manager).

Kanter (1979: 67, 68) takes a more practical approach. She lists a range of organisational factors and the characteristics that result in power or powerlessness. She suggests that powerlessness is generated when inherent rules, predecessors, established routines, rewards for predictability and approvals needed for non-routine decisions, are *many.* Also, when task variety, flexibility around the use of people, publicity about job activities, interpersonal contact on the job and with senior officials, participation in programmes, conferences, meetings and problem solving task forces, and advancement prospects are *low* (Kanter, 1979: 67, 68).

Reed (1996: 40) suggests that the dialogue between Weber's (1978) "analysis of bureaucracy and bureaucratization" (i.e. the *institutionalisation* of power) and Foucault's (1980) expression of Machiavelli's (1513) writings on the way in which power is generated and used (i.e. the *process* of power), provide the basis for a broader analytical framework. He illustrates this by referring to Lukes' (1974) analysis of the dynamics and outcomes of

power in organisations (Reed, 1996: 41). Lukes (1974, quoted in Reed, 1996: 41) differentiates between three "faces of power", "episodic", "manipulative" and "hegemonic" (Clegg, 1989, quoted in Reed, 1996: 41).

Reed (1996: 41) describes an *episodic* conception of power as focusing on "observable conflicts of interest in particular decision-making situations". In contrast, a *manipulative* conception of power focuses on the surreptitious activities that powerful groups undertake in order to protect their own interests, while a *hegemonic* one focuses on the strategic role that existing "ideological and social structures" play in selectively limiting participation in decision-making (Reed, 1996: 41).

Clegg (1989), believes that this progression from episodic through manipulative to hegemonic conceptions of power coincides with a movement away from human "agents" as determinants of power relations, towards ideological or material mechanisms for institutionalising power and control. Reed (1996: 41) believes that there is also a corresponding *increase* in the levels at which power struggles are mediated (from micro-through to macro-level), and a decrease in the organisational specificity of practices that "produce and reproduce institutional forms". The characteristics of these three conceptions of power, as defined by Lukes, Clegg and Reed, also suggest an increasingly open system approach.

The use of power as a means to exercise control over or within organisations has received much attention from theorists. Child (1972) believed that managers have significant autonomy and that they can use their power to limit or control the effect of external forces on their organisations (Robbins and Barnwell 1998: 216). Areas where these "strategic choices" can be made include: the domain or field within which an organisation operates; the technology it uses; its structure and personnel; the way in which it creates demand for its products and/or services, and the relationships it has with suppliers, customers and competitors (Robbins and Barnwell, 1998: 216, 217).

Robbins and Barnwell (1998: 218) believe that Child's work formed a significant basis for challenges to the contingency approach, although Reed (1996: 38) refers to it as a "theoretical sleight of hand". This is because Reed believes that this type of approach "converts conflicts … into technical issues that can be 'solved' through effective system

design and management", and therefore has a "limited capacity to deal with the material, cultural and political complexities of organisational change" (Reed, 1996: 38, 41).

Reed (1996: 41) criticises the "faces of power" approach, because he believes it to be biased towards structural determinism. He also points out that "tactical interactions and alliances" or "networks of power" within organisations tend to be unstable, because they are "prone to internal decay and dissolution". He suggests that another framework, characterised by knowledge and its control, recognises the transience that is inherent in all forms of "institutionalised or structured social action" (Reed, 1996: 41). Within this context, knowledge is the source of power and the "production, codification, storage and usage" of knowledge are strategic considerations in the regulation of social behaviour (Cooper, 1992, cf. Reed, 1998: 42).

These links are echoed by Saul (1992: 16), who describes knowledge as the "currency of power". However, Saul (1992: 14, 22) believes that knowledge is part of a ruling triumvirate of the "Age of Reason" that has characterised Western civilisation for 500 years. Reed (1996: 41), however, attributes the knowledge-based interpretative framework to a relatively recent societal transition, from modernism to post-modernism[16].

Saul's (1992: 22) triumvirate consists of "organisation [characterised by structure], technology and information [characterised by knowledge]". He explains how these elements contribute to power by describing the "new priest" as an amoral technocrat[17] who "understands the organisation, makes use of the technology and controls access to information" (Saul, 1992: 22). Consistently, Reed (1996: 42) identifies health, education, crime and business as examples of fields that have become "colonized as preserves of certain specialist or expert groups". Within this context, he describes organisations as

---

[16] *Modernism* is described by Alvesson and Deetz (1996: 194) as the "instrumentalization of people and nature through the use of scientific-technical knowledge" in order to achieve "predictable results [as] measured by productivity and technical problem solving", and leading to "economic and social well-being". Such well-being is defined as the "accumulation of wealth by production investors and consumption by consumers". In contrast, *post-modernism* can be described as a discourse that "challenges ideas that are the foundation of modern science", namely "rationality, order, clarity, realism, truth, and intellectual progress" (Martin and Frost (1996: 611). It is characterised by ambiguity and contradiction, rather than certainty (Martin and Frost, 1996: 612).

[17] Saul's (1992: 23) *technocrat* is described as one who is "equipped [with] understanding of a system for reasoning" and who possesses "the equipment which fulfils that system", and is therefore able to provide "concrete manifestations of its logic". Saul (1992: 22) identifies "absolution from personal responsibility" as a key feature of such technocracy. He uses Robert McNamara (former US Secretary of Defense and World Bank president) as an example, referring to his role in shaping the Vietnam War, launching the nuclear arms race, commercialising the arms industry and creating the "financial structure" that led to the "Third World debt crisis" (Saul, 1992: 23).

"portable carrier[s] of the socio-technical knowledge and skills" through which social interactions develop and are reproduced (Reed, 1996: 42).

Saul (1992: 22) suggests that these elements [the triumvirate] form a "theology of pure power": *pure*, because those who wield it are "divorced from the questions of morality which were the original justification for reason's strength". This reference to morality is echoed by Reed (1996: 43): He identifies another body of literature on organisation theory that asks "fundamental questions about the types of corporate governance and control prevailing in contemporary organisations and their grounding in moral and political judgements concerning justice and fairness".

He suggests that this discourse developed in response to the way in which those concerned with the interplay between power and knowledge in organisations tend to focus on "micro-level processes and practices", and are therefore detached from "wider issues of justice, equality, democracy and rationality" (Reed (1996: 42). This comment draws attention to the significance of values and the way in which they contribute, from internal as well as external perspectives, to the exercise of power and control within organisations. Values form part of the social context within which organisations operate, and which influences the extent to which people with (or without) power are able to exercise it (see Inkson and Kolb, 1998: 305-6). The totality of this social context is referred to as "culture". It includes the values, practices, rituals, understandings and technologies that distinguish one group from another (Inkson and Kolb, 1998: 101, 411). While the term is more commonly associated with the distinctions between national or ethic groups, it has, over the past twenty years, come into use in organisation theory.

2.2.5 Cultural approaches

Homans (1951) studied the results of the research that Mayo had conducted in Western Electric's Hawthorne plant (see s2.2.1) and used them as a basis for his work. He was particularly interested in the recorded behaviour of the group in the "Bank Wiring Observation Room", because the group had been studied under conditions that were believed to be "as nearly … normal" as possible, rather than experimental (Homans, 1951: 49, 50). He used the observations from the Bank Wiring Room to develop a set of theories on "activity, interaction and sentiment" within groups, and then used studies of an urban

street gang and a Polynesian family group, to test the universality of his theories (Homans, 1951: 43, 156). He identified a set of behavioural "norms"[18] that had evolved within the working group in the Bank Wiring Room (Homans, 1951: 122). He believed that norms form only part of the "culture" of a group, because they describe only *expected* behaviour, not the way in which such behaviour is actually *practised* (or avoided) (Homans, 1951: 125).

Goffman's (1967) work between the early 1950s and the late 1960s focused on the rituals[19] associated with the interactions between people. He explained that people, when interacting, continually feed "glances, gestures, positionings and verbal statements" into the situation and that these may be intentional or unintentional (Goffman, 1967: 1). His purpose was to systematically examine and categorise these "small behaviours", and to identify a "normative order" within and between them (Goffman, 1967: 2). Like Homans (1951: 1-6), he was interested in the application of his theories to social interaction as a whole, rather than confining them to organisations.

While other authors had earlier began to consider culture specifically within an organisational context (e.g. Bower, 1966), it was not until the late 1970s and early 1980s that the subject began to receive significant attention. It was then that the role of organisational culture in explaining differences in performance between organisations, began to be seriously considered (Inkson and Kolb, 1998: 411).

Inkson and Kolb (1998: 101) identify three management texts that they believe played an important role in this discourse: "Corporate Cultures: The rites and rituals of corporate life" (Deal and Kennedy, 1982); "Theory Z: How American business can meet the Japanese challenge" (Ouchi, 1981), and "In Search of Excellence: Lessons from America's Best-Run Companies" (Peters and Waterman, 1982).

Deal and Kennedy (1982) believed that "organisational philosophy was as important as

---

[18] Homans (1951: 122) defines *norms* as expected behaviour. Schein's (1992) : 8, 9) definition is similar although it refers more to the source of expectations regarding behaviour. He describes norms as "implicit standards and values" (Schein, 1992 : 8, 9). Both authors point out the evolutionary nature of norms of behaviour.

[19] Goffman (1967: 1) uses the term *interaction ritual* to apply to "the class of events which occurs during co-presence and by virtue of co-presence". He describes them as the "external signs of orientation and involvement [or] states of body and mind not normally examined with respect to … social organization", and are therefore informal, rather than formal.

formal … and informal"[20] influences in determining organisational behaviour (Inkson and Kolb, 1998: 101). They believed that an organisation is influenced not only by the nature of its activities and the environment within which it operates, but also its "basic concepts and beliefs", or values (Deal and Kennedy, 1982: 13, 14). They considered all of these characteristics to be part of organisational culture, defining a "strong"[21] culture as:

1. "a system of informal rules that spells out how people are to behave most of the time", and which

2. "enables people to feel better about what they do, so they are more likely to work harder" (Deal and Kennedy, 1982: 15, 16).

They also identified key mechanisms whereby beliefs and values are transmitted, including myths, heroes, rituals and "cultural networks" (Deal and Kennedy, 1982: 14, 21). They describe *cultural networks* as the "primary (but informal) means of communication within an organization", with the suggestion that they form a "hidden hierarchy of power" and may be the "only way to get things done or to understand what's going on" (Deal and Kennedy, 1982: 15).

Ouchi (1981) was specifically concerned with whether Japanese management practices could be applied in the US (Inkson and Kolb, 1998: 102). This interest grew out of the perceived success of large Japanese corporations, particularly in terms of quality and productivity, in contrast to "sluggish" productivity in Western nations, particularly the US (Ouchi, 1981: 3, 4). Ouchi (1981: 48, 49) identified key differences between Japanese and US businesses:

- period of employment (long-term in Japan vs. short-term in the US);
- evaluation and promotion (slow in Japan vs. rapid in the US);
- career paths (non-specialised in Japan vs. specialised in the US);
- control mechanisms (implicit in Japan vs. explicit in the US);
- decision-making and responsibility (collective in Japan vs. individual in the

---

[20] Inkson and Kolb (1998: 101) consider *formal* influences to be those that have come about as a result of what they call *administrative* approaches (referred to in s2.2.1) and *informal* influences to those that can be attributed to "socio-political" approaches (referred to in s2.2.2 and 2.2.4).

[21] The context within which the word *strong* is used suggests that it refers to a culture that "helps employees to do their jobs a little better", i.e. improves productivity (Deal and Kennedy, 1982: 15).

US), and

– concern for the welfare of the organisation (holistic in Japan vs. segmented in the US).

While recognising that Japanese culture is significantly different to US culture, Ouchi (1981: viii) believed that there is sufficient similarity in the tasks of all organisations for some characteristics of Japanese organisations to be transferable. He identified a set of features that encapsulated the way in which the Japanese approach to management could be adapted to US businesses (Ouchi, 1981: 60). He referred to this set of features as "Theory Z" and referred to organisations that had incorporated them, as "Z" organisations (Ouchi, 1981: 60).

Ouchi (1981: 4) believed that the essence of Theory Z was that "involved workers are motivated workers". He referred to organisations as "social beings" that need "trust, subtlety and intimacy" in order to be successful (Ouchi, 1981: ix). He identified organisational culture as the "way in which the theory [or philosophy] is communicated", and believed that it includes "symbols, ceremonies and myths … that put flesh on to what would otherwise be sparse and abstract ideas" (Ouchi, 1981: 35).

Peters and Waterman (1982) studied the management practices of a sample of large American businesses that were believed to have been financially successful over a period of 20 years (Inkson and Kolb, 1998: 103). They drew on Mayo's (1949) observation that simply paying attention to employees appeared to contribute more to productivity than physical work conditions, and Barnard's (1968) belief that the role of leadership is to "harness … social forces" and to "shape and guide values" (Peters and Waterman, 1982: 5, 6). They had previously developed a framework of seven interdependent variables for diagnosing and remedying management problems within organisations and used them as the basis for their study. This "7-S" framework included structure, strategy[22], staff, skills,

---

[22] Inkson and Kolb (1998: 104) quote Stoner and Freeman (1989: 193) when they define *strategy* as "the pattern of an organisation's responses to its environment". However, they attribute use of the term in a business sense to Chandler (1962). In essence, Chandler believed that "structure follows strategy": a strategy of diversification, for example, would be considered to necessitate a decentralised structure (Peters and Waterman, 1982: 4). His work is credited with having formed the basis of "strategic management", whereby strategy drives an organisation's structure, decision making, leadership and control, as well as the way in which change is managed (Inkson and Kolb, 1998: 163, 164).

systems, style[23] and shared values (Peters and Waterman, 1982: 9). They used the framework as a diagnostic tool for management, but found that diagnosis could be "enriched" if management excellence was studied, in itself. They found that "excellent" or innovative organisations were not only good at "developing marketable new products and services", they were also adept at continually responding to all sorts of environmental changes (Peters and Waterman, 1982: 12).

They identified eight "basic" characteristics of excellence:

1. action on new ideas;

2. close association with and responsiveness to the needs of customers;

3. encouragement of autonomy and entrepreneurial activity;

4. recognition of the significance of the individual in enhancing productivity;

5. a hands-on approach to ensuring that values are reflected at all levels;

6. focusing on known, successful areas of activity;

7. simple structural forms, and

8. a mixture of centralisation (around core values) and decentralisation (autonomy at the work face) (Peters and Waterman, 1982: 13-16).

In essence, they believed that a cultural model was more useful than a structural one (Inkson and Kolb, 1998: 103), suggesting that "fascination with the tools of management … [had obscured] ignorance of the art" (Peters and Waterman, 1982: xxii). They suggested that tools which "are biased toward measurement and analysis" provide no insight into important factors such as the value of a motivated staff member (Peters and Waterman, 1982: xxii). They therefore advocated "leadership by cultural means", suggesting that productivity improvements will result if leaders develop a corporate vision, lead by example and thereby inspire employees to adopt the core values of that vision (Inkson and Kolb, 1998: 103).

---

[23] Schein (1992: 17) suggests that *style* refers to the superficially evident way in which people present themselves and their relationships. In Peters and Waterman's (1982: 9) "7-S" framework it refers to the way in which management present

Since the early theorists, many different definitions of organisational culture have been developed (Robbins and Barnwell, 1998: 355). While Bower (1966) had earlier simply referred to it as "the way we do things around here", Pascal and Athos (1981) reflected the move towards an employee/customer focus by defining it as "the philosophy that guides an organisation's policy toward employees and customers". On a broader level, Normann (1985: 230) defined it as "the institutionalized language and values of an organisation, together with their symbolic and structural manifestations".

Edgar Schein (1992: 8), renowned for his work on the subject, identified 10 major categories of "overt phenomena" that are included in the definitions of organisation culture that are presented by various authors. He listed them as follows:

1. "Observed regularities", i.e. the "language, customs and tradition, and rituals" that evolve in the group;

2. "Group norms", i.e. the "standards and values" that evolve during interaction of group members;

3. "Espoused values", i.e. the "principles and values" that the group articulates or publicly announces;

4. "Formal philosophy", i.e. the principles and philosophies that guide interaction with stakeholders;

5. "Rules of the game", i.e. the way group members are expected to behave in order to "get along in the organisation;

6. "Climate", i.e. the "feeling" conveyed by layout and interaction;

7. "Embedded skills", i.e. the "special competencies" of group members;

8. "Habits of thinking, mental models, and/or linguistic paradigms", i.e. the "shared cognitive frames that guide the [group's] perceptions, thought and language", and are

---

and conduct themselves.

taught to newcomers;

9. "Shared meanings", i.e. the "emergent understandings" that are shared by members the group during interaction, and

10. "Root metaphors", i.e. the "ideas, feelings and images groups develop to characterize themselves", and which are emotive or aesthetic, rather than cognitive (Schein, 1992: 8-10).

Schein (1984: 7) himself defines organisational culture as "the pattern of basic assumptions that a given group has invented, discovered or developed to cope with its problems of external adaptation and internal integration, and that have worked well enough to be considered valid, and therefore to be taught to new members as the new way to perceive, think and feel in relation to those problems". This definition is probably the most comprehensive. It introduces three new elements: the socialisation process; the contribution made by underlying perceptions, thoughts and feelings (as opposed to overt behavioural patterns), and recognition that more than one culture may exist in each organisation (Schein, 1985: 12-14).

Schein (1992: 16-26) identified three levels at which culture is manifested: artefacts, espoused values and basic underlying assumptions. Artefacts are described as the tangible or visible features that occur at the surface level of an organisation's culture, e.g. architecture, language, technology, products and style (Schein, 1992: 17, 18). They may be easy to identify, but their significance in terms of the organisation's culture may be hard to decipher. Espoused values are described as the "strategies, goals and philosophies" that are presented as the values of the organisation (Schein, 1992: 17). They differ from "basic assumptions" because they are not considered to have been validated by shared experiences of success (Schein, 1992: 19-21). An example of an espoused value is the expression in a particular organisation that "customers come first". While this may be relayed as the organisation's philosophy, it does not become a basic assumption until members of the group have experienced its value and accept, as a group, its validity. Values or beliefs that begin as basic hypotheses, but are repeatedly shown to be effective in response to a particular situation, gradually move through what Schein (1992: 19) refers to as a "cognitive transformation". They progress to become shared values or beliefs and finally,

basic assumptions that are "so taken for granted that [there is] little variation within a cultural unit" (Schein, 1992: 21, 22).

Schein's concept of basic assumptions is similar to Argyris and Schön's (1974) concept of "theories-of-use". Argyris and Schön (1974: xxviii) developed the concept when considering that the difficulties faced by people learning new theories may have been more a function of their old theories than the difficulties associated with the new ones. They used the term "theories-of-use" in reference to the actions that people know to do in a particular situation in order to achieve a certain outcome (Argyris and Schön, 1974: 7). This concept is discussed further in s2.3.2 below.

Robbins and Barnwell (1998: 360) identify three important phases in the evolution of organisational culture: its creation, maintenance and transmission. They believe that culture is created as a function of: an organisation's history; the biases and assumptions of its founders; their interaction with original employees; overall experience, and the lessons learnt (Robbins and Barnwell, 1998: 360-361). They believe that maintenance is a function of: the way in which personnel are selected, hired and fired; the actions and attitudes of top management; the way in which socialisation occurs, particularly orientation and reinforcement, and the way in which approval or admonishment is expressed (Robbins and Barnwell, 1998: 361, 364).

Mechanisms for transmitting culture include stories, myths, rites[24], rituals, material symbols, observation and experience, as well as language (Inkson and Kolb, 1998: 416; Robbins and Barnwell, 1998: 364, 365). Inkson and Kolb (1998: 417) draw attention to the role that heroes and villains[25] play in expressing and maintaining culture. Other characters that Deal and Kennedy (1982: 87-94) identified as having a role in the communication of culture, include "storytellers, priests, whisperers, gossips, secretaries and spies". They also noted the role of "cabals" or groups of people who join together in secret to advance a particular cause (Deal and Kennedy, 1982: 94).

---

[24] A *rite* is defined by Inkson and Kolb (1998: 416) as "an activity which participants must endure or complete, in order to progress within a culture".

[25] A *hero* is defined by Inkson and Kolb (1998: 417, 418) as " a well-known person who exemplifies positive values of the organisation", while a *villain* is defined as "a … person who represents a threat to the organisation … or … who exemplifies negative values".

Many authors (e.g. Homas, 1951; Peters and Waterman, 1982; Schein, 1992) draw attention to the links between leaders and culture (Bryman, 1996: 284). Schein (1992: 5) suggests that leaders play a significant role, not only in creating and maintaining organisational culture, but also in destroying or changing it. Alvesson (1992) attests to the importance of leaders as transmittors of culture. While Schein (1992: 5) believes that these are some of the most "decisive functions" of leadership, Bryman (1996: 284) draws attention to the way in which this relationship has caused the study of organisational culture to "drift" towards "normative, managerial approaches". He suggests that the focus on "leadership as culture management" has the potential to marginalise the "wider political and ethical ramifications of cultural manipulation" (Bryman, 1996: 284).

This criticism is consistent with Reed's (1996: 44) assertion that "organization analysis seems … to have come full circle". He suggests that current mechanisms for "socio-cultural control", as suggested by cultural management, result in debates about "participation and democracy" in much the same way that early bureaucratic organisations resulted in debates about "freedom and liberty" (Reed, 1996: 44).

Another criticism (although only marginally related to the above) stems from Hofstede's (1980) study of the values of employees of a large US organisation operating in fifty different countries. He found that national cultures influence organisational behaviour (Hofstede, 1980: 48, 49), implying that standardised management approaches may not be effective when applied directly in cultures other than those in which they originated.

Quality[26] management, identified by Inkson and Kolb (1998: 108-110) as a practical example that "incorporates and integrates" features of cultural approaches, provides insight into the sources of criticism. The quality movement arose out of concerns that western businesses would not be able to successfully compete in international markets without improving the quality of products and services. Quality management systems developed as a set of management tools that can be used to assist businesses to satisfy quality objectives. Many authors trace them back to Taylor's (1911) concept of "scientific management" (e.g.

---

[26] Juran and Gryna (1988) identify two "meanings that dominate the use of the word" *quality*, namely "product features" that meet and satisfy the needs of customers, and "freedom from deficiencies". Deming on the other hand, never defined quality precisely. The closest he came was to state, in his last book, that "a product or a service possesses quality if it helps somebody and enjoys a good and sustainable market" (Deming, 1993, quoted in Voehl and Lindsay, 1997: 77). Welford (1995: 140, 141) extends the concept of quality beyond "quality of products and services" to include "quality work" and "quality of life". He suggests that, within this extended context, the pursuit of quality can support sustainability.

Lindsay and Petrick, 1997: 67). However, their present form owes more to the work of a series of "quality guru's", the most renowned of whom were W. Edwards Deming and Joseph Juran (Lindsay and Petrick, 1997: 70-77).

Both Deming and Juran had been involved in the work conducted by Mayo (1933) at the Hawthorne plant. They saw in the plant examples of the "abuses" of scientific management and were particularly concerned by what they perceived as the degrading effect that authoritarianism had on the "human spirit" (Voehl and Lindsay, 1997: 71). Deming (1951) responded by developing a management system that aimed to improve quality by fostering cooperation and learning within the workplace (Anderson *et al.,* 1994: 472). He developed and refined a set of "14 points" which provide insight into the values he aimed to instil in organisations (see Box 2.1). They demonstrate the significance that Deming placed on social systems in the pursuit of quality (Voehl and Lindsay, 1997: 73).

Juran's (1951) work is characterised by a strong focus on standards, their quantification and validation through statistical means (Voehl and Lindsay, 1997: 74). He incorporated the "cost of quality" principle into quality management, drew attention to the effects that quality has on costs as well as income, and advocated use of the Pareto Principle (Voehl and Lindsay, 1997: 74). The principle holds that only a few of the contributors will be responsible for the bulk of costs (Juran and Gryna, 1988: 22.19). In addition, Juran described a "spiral of progress" that linked core organisational activities in the pursuit of quality (See Fig. 2.2). The spiral begins with market research, progressing to product development, then product design, specification, purchasing, manufacturing, production/process control, inspection/testing, marketing and customer service, at which point feedback from customers occurs and the cycle repeats (Juran and Gryna, 1988: 2.5).

Box 2.1. The "14 points" that Deming developed as essential pre-requisites of quality management. The points have been adapted from the form in which they were presented by Deming at a seminar on 10 January, 1990 and quoted in Lindsay and Petrick (1997: 33).

> 1. *Create and publish a statement of the aims of the organisation.*
>
> 2. *Learn the new philosophy.*
>
> 3. *Understand that inspection is designed to improve processes and reduce costs.*
>
> 4. *Stop awarding business on the basis of price alone.*
>
> 5. *Constantly and continuously improve the system of production and service.*
>
> 6. *Institute training.*
>
> 7. *Teach and institute leadership.*
>
> 8. *Drive out fear; create trust and a climate for innovation.*
>
> 9. *Optimise the efforts of teams, groups and areas to achieve the organisation's aims.*
>
> 10. *Eliminate exhortations for the workforce (e.g. "Zero defects!").*
>
> 11. *Eliminate numerical goals in favour of leadership and learning for improvement.*
>
> 12. *Remove barriers to pride in workmanship.*
>
> 13. *Encourage education and self-improvement.*
>
> 14. *Take action to accomplish the transformation.*

While earlier responses to the quality issue were strongly focused on scientific analysis, Deming and Juran's work, when combined, lead to a more holistic approach that formed the basis for the development of the concept of "total quality management" (TQM). Anderson *et al* (1994: 472) provide an example of a model for total quality management that is underpinned by Deming's management system. The key components of the model are: visionary leadership; internal and external co-operation; learning; process management; continuous improvement; employee fulfilment, and customer satisfaction. The relationships between them are presented in Fig. 2.3. While these components clearly demonstrate the socio-cultural nature of TQM, the complexity of the tools and texts that support it (e.g. Juran and Gryna's "Quality Control Handbook" with well over 2,000 pages), rings of some of the more mechanistic approaches mentioned in s2.2.1 above. Thus, organisation theory may have come full circle in more ways than one.

Figure 2.2. Juran's "spiral of progress" linking "the entire collection of activities" that contribute to quality improvement. Source: Juran and Gryna, 1988: 2.5).
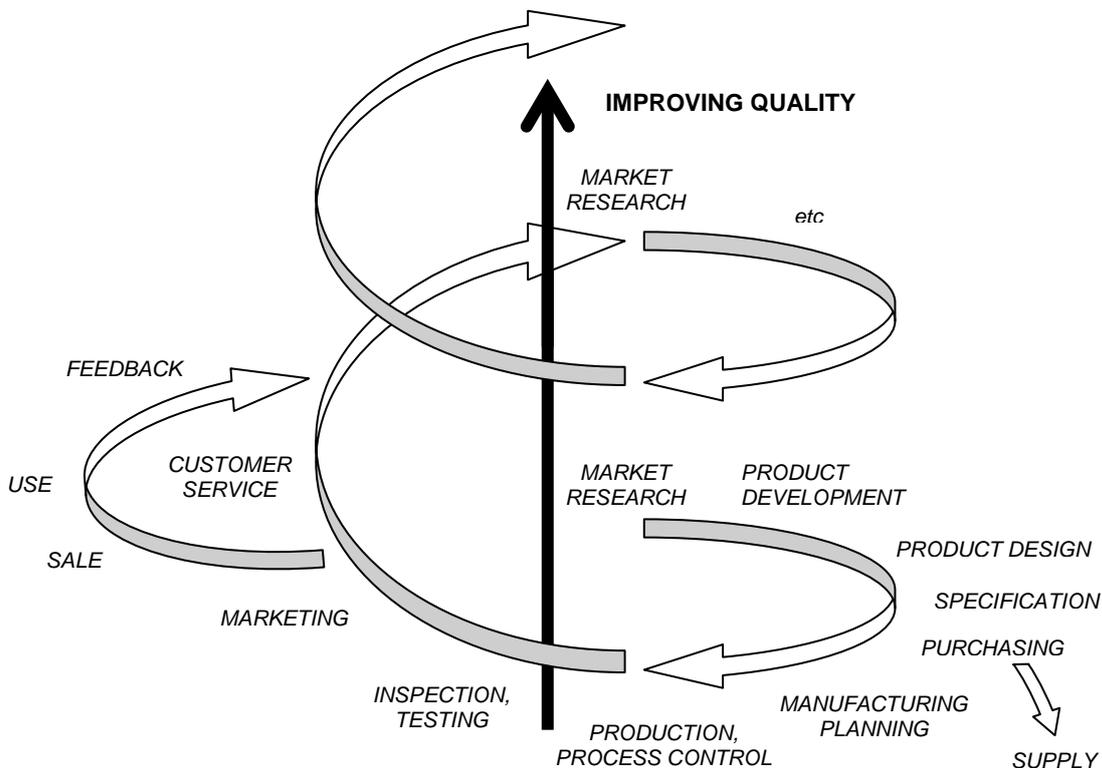
The standardisation of the approach (through the ISO 9000 series of standards) raises questions about the validity of its application on a global scale. The results of Hampden-Turner and Trompenaars' (1993) study of seven different "cultures of capitalism", provides evidence in support of this type of criticism. They believe that "although the words *total quality* have now been borrowed from Japan and are widely used in America, they may not have the same meaning" (Hampden-Turner and Trompenaars, 1993: 121). They draw attention to the prevalence in the US of an inspection-based approach, which frequently results in "impossibly high, theoretical standards being foisted by engineers on workers" (Hampden-Turner and Trompenaars, 1993: 121). This is seen to be in contrast to the Japanese approach, where a "seamless whole" ensures that quality becomes "integral to the whole process" and "is pushed higher and higher by the initiatives and learning of the workers themselves" (Hampden-Turner and Trompenaars, 1993: 120, 121). Japanese industrialist Konosuke Matsushita put it bluntly when he asserted US companies would "lose" in the quality fight with Japan, because of an "internal disease" that places executives and workers on opposite sides of a divide, where management's sole focus is the transference of "executives' ideas to … workers hands" (quoted in Lindsay and Petrick,

1997: 6).

Figure 2.3. Key concepts and links that Anderson *et al.* (1994: 472) believe underly Deming's management system and total quality management.
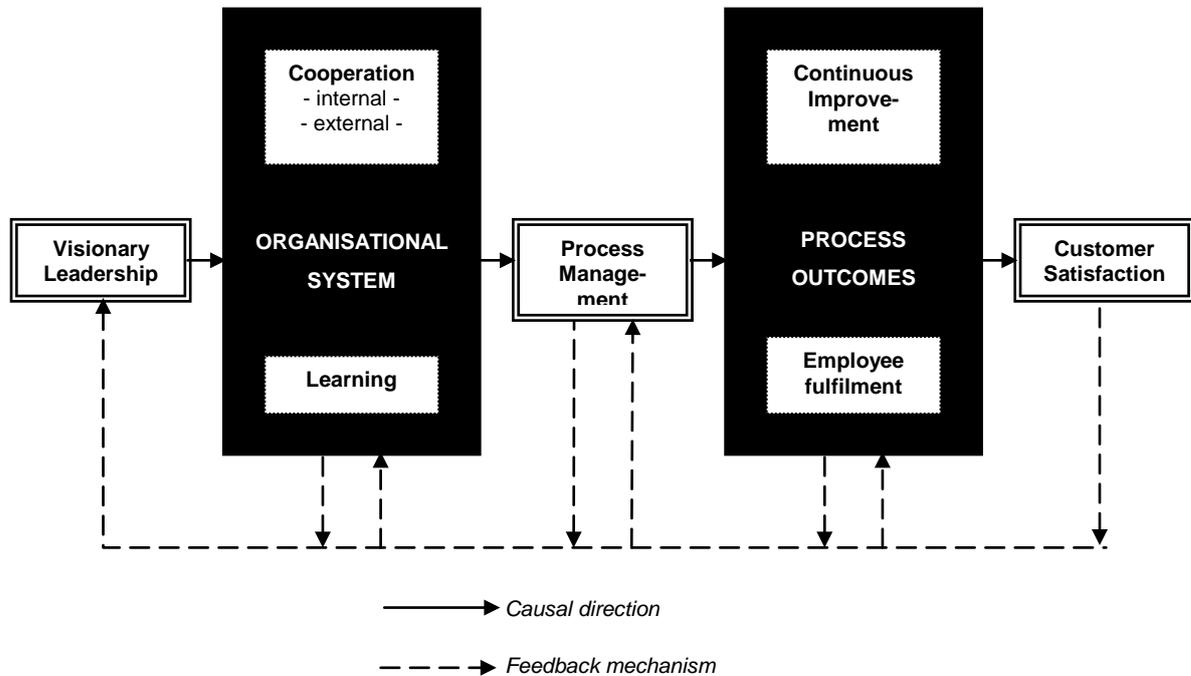
In their synthesis of the discourse on organisational culture, Martin and Frost (1996: 599-609) distinguish between two main conflicting perspectives, namely "integration" and "differentiation". The first focuses on the unitary nature of organisational culture, while the second focuses on the complexities *within* organisational culture (Martin and Frost, 1996: 602-604). They cite Peters and Waterman (1982), Deal and Kennedy (1982), Ouchi (1981), Pascale and Athos (1981) and Schein (1985), as key examples of the integration perspective (Martin and Frost, 1996: 602). A much broader, "rag-tag" collection of authors is believed to have contributed to the differentiation perspective and, unlike the previous group, they are characterised by an eclectic set of research interests (Martin and Frost, 1996: 603). These include the effects that factors such as age, gender, marital status, tasks, seniority, occupation, race and ethnicity, have on sub-cultures, and how they are developed, perceived, interpreted and dealt with (Martin and Frost, 1996: 604).

Martin and Frost (1996: 609) put forward a third perspective, which they refer to as the "fragmentation perspective" and which focuses on "ambiguity" as the essence of culture. Much of the writing that is representative of this perspective appears to have stemmed from a 1987 presentation by Joanne Martin, wherein she suggested that gaps in the popular definitions of culture have been caused by the exclusion of ambiguity from the discourse (cf. Alvesson, 1993: 110). Martin and Frost (1996: 611, 612) also suggest that post-modernism (see s2.3.4) contributes yet another perspective to the discourse on organisational culture, and they bemoan the damaging effect that the "struggle for intellectual dominance" between proponents of the four perspectives has had on the field.

However, they identify seven "lessons" that change agents can learn from this struggle, i.e.: 1) avoiding oversimplification of organisational culture and analysing failed attempts to change it; 2) adoption of a multi-perspective approach which recognises that unity, complexity, ambiguity and fluidity are likely to occur within any organisational setting; 3) application of the post-modern approach to "reality" so that its fictional and illusionary characteristics are recognised; 4) application of post-modern techniques such as "deconstruction"[27] to enhance cultural theories; 5) developing bridging mechanisms that are likely to be credible within a particular culture, rather than imposing a new one; 6) sensitivity to new developments within the organisation and fluidity of response, and 7) recognition of the multi-dimensional intentions of group members, and the potentially "tentative and experimental" nature of their actions (Martin and Frost, 1996: 614-615).

Martin and Frost's critique provides a useful point upon which to close this overview of approaches to organisation theory. It may, through the course of the section, have become obvious that the various approaches together provide a rich palette of knowledge from which to draw for the purpose of effecting change within organisations. Since this thesis is primarily concerned with change within an organisational context, the following sections present an overview of theories of relevance to organisational change and learning.

---

[27] *Deconstruction* is a method whereby language is critically analysed (Calás and Smircich, 1991).

2.3   Developments of direct relevance to organisational change

2.3.1   Introduction

The previous section summarised key developments in the evolution of organisation theory. These developments provide insight into the broad range of issues that contribute to the way in which organisations function. As mentioned in Ch. 1, sustainable development requires fundamental changes within businesses. It is therefore useful at this point to consider the theoretical aspects of organisational change[28].

Robbins and Barnwell (1998: 330) identify two broad categories of change that are relevant to organisations, namely stochastic and managed change. Stochastic changes are those that happen randomly. They may be caused by factors that are not directly under the control of the organisation, e.g. introduction of new products/services by competitors, sudden obsolescence of products/services, new governmental policies or legislation, or loss of supply (Robbins and Barnwell, 1998: 330).

Studies of the broad (societal) effects of stochastic change on organisations can be found within the realm of organisational ecology. This branch of organisation theory is concerned with the "population dynamics" of organisations, i.e. the variables that contribute to their founding and/or failure (Baum, 1996: 79). Baum (1996: 79-97) distinguishes between three categories of processes that contribute to founding and failure, namely demographic processes (e.g. age and size dependence); ecological processes (e.g. niche width dynamics, population dynamics, density dependence, competitive processes), and environmental processes (e.g. institutional and technological processes).

Managed change, on the other hand, is defined by Robbins and Barnwell (1998: 330) as change that occurs in a pro-active, purposeful and planned way, and which is generally used to keep an organisation up-to-date and viable. It may also be used to improve the potential for an organisation to be able to respond to or prepare for stochastic changes. This is consistent with Cummings and Worley's (1997: 26) description of what they refer to as "planned change".

---

[28] Whiteley (1995: 34) defines *organisational change* as the "renewal of parts or [all] of organisational culture, structure, processes and relationships with the outside environment".

Managers and management are considered to be less influential in stochastic change, which is more fatalistic about the range of choice organisations have in order to survive (Kolb, pers. com., 2001). The types of programmes that assist businesses to improve their environmental performance (as defined in s1.1) fit into the category of managed or planned, rather than stochastic change. The following sections will therefore focus on the theoretical aspects of managed or planned change, beginning with an overview of the historical developments and followed by key models for managing change.

2.3.2 Development of change management

While Cummings and Worley (1997: 2, 3) believe that organisational change is "a broad phenomenon involving a diversity of applications and approaches, including economic, political, technical and social perspectives", they discuss planned (or managed) change within the context of a body of theory known as "organisation development".

French *et al* (1994: 5) describe "organisational development" as a "particular kind of planned change effort" that aims to help members of organisations to improve the way they do the "things they want to do". They use a number of earlier definitions to develop a set of characteristics that they believe distinguish organisational development from other change processes. These characteristics can be summarised as follows:

1. A programme that is strategic, long-range, planned and sustained;

2. A consultant (or consultants) working, in a collaborative relationship with the organisation;

3. Interventions that are a) "reflexive, self-analytical [and] self-skill-building", and b) focus on "work-related groups of individuals", the relationships between them, organisational culture and relevant processes;

4. A behavioural science base, and

5. The goals to not only improve organisational effectiveness, but to also change organisational culture and processes so that reflexivity and self-examination are enhanced (French, Bell and Zawacki, 1994: 15, 16).

When Cummings and Worley (1997: 2, 3) undertook a similar exercise, they identified

similar characteristics, but also some noteworthy additions. These include the suggestion that organisational development applies to the entire organisational system, not just parts of it, and that it includes not only strategic, but also structural and process changes. The importance of process is also emphasised by their recognition of the need to include mechanisms whereby changes are sustained, specifically through stabilisation, reinforcement and institutionalisation.

While Cummings and Worley (1997: 2, 3) agree that organisational development has a behavioural science basis, they are more specific about relevant aspects. They believe that organisational development includes both "micro-" and "macro-concepts" in behavioural science. They identify "leadership, group dynamics and work design" as micro-concepts and "strategy, organization design, and international relations" as macro-concepts (Cummings and Worley (1997: 2). They also identify two dimensions of organisational effectiveness: the organisation's performance in terms of quality products and/or services, productivity, continuous improvement, and "quality of work life"[29], and its ability to solve its own problems, focus attention and apply resources in pursuit of particular goals (Cummings and Worley, 1997: 3).

Organisational development has been criticised for the "blind faith" that early theorists appear to have had in the ability of enhanced interpersonal skills and awareness to insulate organisations against influences such as environmental uncertainty (e.g. Miles, 1974: 170-71; Pfeffer and Salancik, 1980: 281, 282). The distinctions between French *et al* and Cummings and Worley's characteristics demonstrate some of the differences between earlier and more recent definitions.

Despite criticisms of organisational development, historical developments in this field are believed to have contributed significantly to the way in which change is currently managed within organisations (Cummings and Worley, 1997: 6, 7). It is therefore useful to gain some insight into the more significant of these developments, before considering the theories to which they have contributed.

French and Bell (1984, 1994: 25) identify three sets of activities as the main contributors in

---

[29] The term "quality of work life" is used to describe approaches that improve the personal satisfaction derived from work (Cummings and Worley, 1997: 301-303).

the evolution of the concept of organisational development, namely: "laboratory training", "survey research and feedback" and "action research". Cummings and Worley (1997: 6, 7) concur, although they add to the list "participative management", "quality of work life" and "strategic change". Each will be discussed briefly below.

Kurt Lewin, an applied social scientist who founded Massachusetts Institute of Technology's Research Center for Group Dynamics (RCGD) in 1945 and the National Training Laboratory (NTL) in 1947, is believed to have been instrumental in the development of the concepts of laboratory training, survey research and feedback and action research (Lindsay and Petrick, 1997: 10).

The term "laboratory training" is used in reference to work that began in the RCGD in 1946 in response to a request for assistance with research into the training of community leaders (Cummings and Worley, 1997: 7). It was found that trainees benefited from being involved in the previously private discussions that researchers had on the behaviour and groups dynamics that they had witnessed during the training sessions. Researchers found that this process of "group building" not only provided a "rich learning experience" for trainees, but could also be transported by them for use in their own environments (Cummings and Worley, 1997: 7). This evolved into what was known as "basic skill" or "T-group" training, wherein a trainer and an observer were included in the group (French and Bell, 1984, 1994: 25).

Despite the promise of early results, difficulties were encountered in the transference of results from small groups into much more complex organisational situations (French and Bell, 1995: 39). Douglas McGregor (1967) is credited with having helped to overcome these during his work as a consultant to industry (Beckhard, Burke and Steele, 1967, quoted in French and Bell, 1984, 1994: 27). A major feature of the work of McGregor and others (namely Herbert Shepherd, Robert Blake and Richard Beckhard) was the use of behavioural science to improve the functioning and dynamics of groups (French and Bell, 1984, 1994: 27).

McGregor (1967: 162-68) identified a number of what he believed were "unique features of an effective managerial team". They can be summarised as: "understanding, mutual agreement and identification of [the team's] primary task; open communication; mutual

trust; mutual support; management of human differences; selective use of the team; appropriate member skills, and leadership." The application of these and other T-group methods lead to what is now referred to as "team building", a term that is described by Cummings and Worley (1997: 8) as "a process for helping work groups to become more effective in accomplishing tasks and satisfying member needs".

In addition to providing the basis for some of the above-mentioned developments, Lewin is widely believed to have been one of the first researchers to demonstrate the application of "action research" to organisational development (Lindsay and Petrick, 1997: 12; French and Bell, 1984, 1994: 32). According to Eden and Huxham (1996: 526, 527), this type of research "involves the researcher in working with members of an organization over a matter which is of genuine concern to them and in which there is an intent by the organization members to take action based on the intervention". Cummings and Worley (1997: 27) describe it as an "iterative cycle of research and action [that] involves considerable collaboration between organization members and … practitioners".

Eden and Huxham (1996: 526) caution that this type of research has been criticised because it is normally "once-off", not repeatable and sometimes used to cover for "sloppy" or "poor social science". However, they and others (e.g. Rowan and Reason, 1981; Whyte, 1991) believe that these criticisms are outweighed by a "richness of insight" that would not otherwise be gained, and can be overcome by applying rigorous research principles within the particular research setting.

The RCGD's work in the US was complemented by the staff of the Tavistock Clinic in the UK, who had previously applied action research to psychotherapy (French *et al.,* 1984, 94: 32, 33). They further developed the approach by using it to provide practical help for families, organisations and communities. Eric Trist's use of semi-autonomous work groups in the restructuring of coal mining companies, gets particular mention as a basis for the development of a "socio-technical systems" approach to organisational interventions (French *et al.,* 1984, 1994: 32, 33; Lindsay and Petrick, 1997: 12; Eden and Buxham, 1996: 527). This approach involved research and theory development during the course of attempts to make significant changes within an organisation (Eden and Huxham, 1996: 527). It is sometimes distinguished from other strands by being referred to as a "quality of life" approach (see below).

Eden and Huxham identify a range of terms that they believe are related to action research. They include "action learning", "action science", "collaborative research", "participatory research" and "action inquiry" (Eden and Huxham, 1996: 528). One of the key distinctions they make between related concepts is that some focus on the development of individuals, while others focus on the development of groups (Eden and Huxham, 1996: 528). Lindsay and Petrick (1997: 13) identify a third category of research, i.e. one that focuses on systems development.

While Eden and Huxham (1996: 529) are critical of attempts to downplay distinctions, they recognise that there are "areas of congruence" between "action-oriented approaches", and draw from them in an attempt to characterise action research. They identify a set of characteristics that they believe are indicative of action research, namely:

1. A focus on action as an outcome;

2. Applicability to a wider audience;

3. Use of research for theory development;

4. Recommendations (e.g. regarding tools, methods) linked to theory;

5. Application of data and theory to emergent theory development;

6. An incremental and cyclical approach to theory development, and

7. Practical applicability (Eden and Huxham, 1996: 529-33).

They also identify characteristics of particular relevance to the processes used, including: systematic method and "orderliness" during the cyclical process of data gathering and theory development; replicable processes for "exploring" data; triangulation[30], and inclusion of history and context for interpretative purposes (Eden and Huxham, 1996: 534-37). Further insight into the processes can be gained from their graphic representation of the stages in an action research project and their cyclical nature (Eden and Huxham, 1996: 532, 534) (see Fig. 2.4). From the graphic it can be seen that pre-understanding is used in

---

[30] *Triangulation* is described by Denzin (1989: 234) as a research method whereby the validity of data is cross-checked by using different methodologies in response to a particular research question. It is believed to be particularly useful in sociological research as a means for reducing the impact of a researcher's bias.

the early stages of the project to develop an emergent theory that is then applied in terms of an action-oriented intervention. This largely informal process is followed by formal consideration of the methodology, and further exploration and development of the theory as well as its implications. The results of the process are then written up and the cycle continues.

The term "survey research and feedback" refers to a particular kind of action research (Lindsay and Petrick, 1997: 11; Cummings and Worley, 1997: 8). Its origin is attributed to the work of Rensis Likert, who is renown for the development of the five-point "Likert scale" for use in surveying attitudes (French et al., 1984, 1994: 31).

Likert and other researchers at the Institute for Social Research in Michigan, pioneered an approach whereby the following sequence of events was used to assist in the change process:

1. Surveys were conducted to provide insight into the attitudes of management and employees;

2. Results were reported to management and transmitted to other staff;

3. Feedback sessions were held wherein the results of the surveys were discussed in groups consisting of supervisors and their subordinates (Cummings and Worley, 1997: 8).

Figure 2.4. The stages of an action research project. Source: Eden and Huxham (1996: 534).

EARLY STAGES **Implication of pre-** _ _ _ _ _ → **Application of**
understanding **emergent theory**

Theory exploration **Action focused**
and development **intervention**

– – → Informal process
——→ Formal process

Methodological
reflection

LATER STAGES **Implication of pre-** _ _ _ _ _ → Application of
understanding emergent theory

Explication of pre- **Theory exploration** Action focused
understanding **and development** intervention

Writing about **Methodological**
research outcomes **reflection**

The research suggested that positive changes (e.g. increased job satisfaction) occurred in departments where there had been discussion (as opposed to those where results were reported to managers, but there was no follow-up discussion with staff) (Mann, 1962: 605-615). Likert (1967: 14-24) identified four types of management systems, namely: 1) "exploitative authoritative systems", 2) "benevolent authoritative systems", 3) "consultative systems" and 4) "participative group systems". As implied by the titles, staff participation in decision making is lowest (non-existent) in system 1) and increases to full participation in system 4). Likert (1967: 14-24) suggested that system 4) results in the greatest achievement in terms of productivity, quality and job satisfaction.

Likert (1967) used the survey feedback approach as the basis for an organisational development intervention. Participants would first be surveyed on their opinions regarding

features of their organisation, particularly "leadership, motivation, communication, decisions, goals and control" (Likert, 1967, quoted in Cummings and Worley, 1997: 13). The results of the surveys would then be "fed back" to work groups and discussed in terms of the differences between the existing situation and the ideal in terms of System 4. The discussions would then be used as the basis for developing a plan to achieve the ideal (Likert, 1967, quoted in Cummings and Worley, 1997: 13).

The concepts that arose as a result of this work, i.e. "participative management", "quality of work life" and "strategic change" are believed to have helped to overcome criticisms that arose from a traditional focus on group function without consideration of the effects on organisational performance (Cummings and Worley, 1997: xvii).

Hofstede (1980: 57, 58) is critical of the universality of the theories put forward by McGregor, Likert and Blake (the latter together with Mouton). He suggests that they all advocate participation of subordinates in decision-making, and that acceptance of this is likely to be influenced by power distances (see s2.2.4). He believes that participative management may be acceptable in countries like the US, where it was developed and which have "middle" scores for power distances, but that this may not be the case in countries with larger power distance scores (Hofstede, 1980: 57, 58).

Hofstede (1980: 57, 58) also draws attention to the effects that "uncertainty avoidance"[31] has on subordinates. He believes that low uncertainty avoidance in countries like Sweden and Denmark resulted in participative management being used before any legislation on the subject, while the opposite was the case in countries like Germany and Austria, which are characterised by strong uncertainty avoidance. Hofstede (1980: 57, 58) believes that the "crucial fact" about leadership is that it is "a complement to subordinateship", i.e. only feasible in a particular style if it is consistent with the cultural conditioning of subordinates.

This reference to cultural conditioning draws attention to the contribution that organisational environment is believed to play on the way in which workers perceive themselves, their relationship with superiors and their responses to particular management

---

[31] *Uncertainty avoidance* is described by Hofstede (1980: 44, 45) as "the extent to which a society feels threatened by uncertain and ambiguous situations and tries to avoid these situations by providing greater career stability, establishing more formal rules, not tolerating deviant ideas and behaviors, and believing in absolute truths and the attainment of expertise".

styles. Hofstede's concerns are echoed by Pfeffer and Salancik (1978: 280), who are strongly critical of the way in which organisational development responds to the context within which organisations operate. They provide as an example the paradox of attempts to create "stable and more predictable environments" in the face of increasing uncertainty.

The discourse on participative management draws attention to some of the difficulities associated with change management as a whole. Not least amongst these are the pitfalls faced by managers in their role as leaders[32] or change agents[33]. Pettigrew (1987: 649) identifies a significant "gap" between expectations of the "potency" of leaders and what individuals are really likely to be able to deliver in the face of changing circumstances. Inkson and Kolb (1998: 432, 494) identify cultural diversity and emotional response as just two of the sources of the pitfalls that managers face in this regard. They emphasise that, while the role of senior managers is critical for successful change to occur, it still requires "support and leadership from members throughout the organisation" (Inkson and Kolb, 1998: 491).

When considering the role of leadership in the change process, it is important to note that management and leadership are not necessarily synonymous. Inkson and Kolb (1998: 367) draw attention to Kotter's (1990) distinctions between the two. These distinctions occur in four key areas: creation of an agenda; development of the "human network" for achieving it; its execution, and outcomes (Kotter, 1990, quoted in Inkson and Kolb, 1998: 367). The role of management in terms of these four areas can be described as administrative, while that of leadership is more visionary. According to these distinctions, management can be expected to plan, budget, organise, staff, control and problem solve, while providing "a degree of predicability and order" in terms of the process. Leadership, on the other hand, can be expected to establish direction, align people, motivate and inspire, while bringing about change that may be both dramatic and beneficial. (Kotter, 1990, quoted by Inkson and Kolb, 1998: 367.)

---

[32] A *leader* is defined by Conger (1992: 18, quoted in Inkson and Kolb, 1998: 366) as an individual who establishes "direction for a working group of individuals", gains their commitment and motivates them to achieve relevant outcomes. This definition is consistent with the concept of participative management, requiring leadership "*with* rather than *over* others" (Inkson and Kolb, 1998: 366, emphasis provided).

[33] Inkson and Kolb (1998: 499) distinguish between internal and external *change agents*. While both facilitate change, the former does so from within the organisation, while the latter is contracted from outside.

These issues are relevant to the application of another concept, "quality of work life". As mentioned earlier, this concept arose out of the work of Eric Trist and others at the Tavistock Institute in the UK. This work took into consideration both social and technical aspects of organisations, as well as the relationships between them (Cummings and Worley, 1997: 14). It lead to the development of "socio-technical systems" that focused on improving productivity by enhancing the satisfaction that "non-executive ranks" derived from their work (French and Bell, 1984, 1994: 33). A key feature was the establishment of semi-autonomous groups for the purpose of re-designing and managing the work of their members (Cummings and Worley, 1997: 14).

While the initial focus was "enrichment" of individual jobs, it evolved to include group work, as well as the systems within which work is carried out (Cummings and Worley, 1997: 14). The US "zeal for Japanese management methods" including quality circles[34] is attributed by some to the interaction between quality-of-work-life researchers in the UK and their counterparts in the US (Cummings and Worley, 1997: 14).

Cummings and Worley (1997: 16) describe "strategic change" as improving the relationship between an organisation's environment and its "technical, political and cultural systems". They trace development of the concept back to Beckhard's use of "open systems planning" (Cummings and Worley, 1997: 16). This approach was developed in order to assist executives to:

– identify and analyse the strengths and demands of the present and potential environmental forces of relevance to their organisations;
– identify, describe and compare existing and desired responses;
– develop a programme of activities that reflect desired responses, and
– evaluate effects over time (Beckhard and Harris, 1977: 59).

Vital to the process is the organisation's "core mission"[35], because of the significant role that it is believed to play in terms of the prioritisation of actions (Beckhard and Harris, 1977: 60, 61). Beckhard and Harris (1977: 62) stressed the need for an organisation's core

---

[34] *Quality circles* are described by Juran and Gryna (1988: 10.9) as "quality and self-improvement study groups". Cummings and Worley (1997: 14) describe them as groups of workers who are trained in and meet to resolve problems related to the "work-environment", productivity and quality-control".

[35] Beckhard and Harris (1977: 60) describe an organisation's *core mission* as its *primary* reason for being.

mission to be agreed to, believed in and used by "top management" to "guide priorities in goal setting, resource allocation, etc."

Despite criticisms, the previously mentioned concepts have contributed to the development of a range of models for managing change within organisations. An overview of these is provided in the next section.

2.3.3 Models for managing change

Many authors have developed their own models for managing change. It would be impossible within the confines of this thesis to mention them all. There are, however, a few models that appear to be identified consistently within the literature as having made significant contributions to the development of change management theory. They include: Lewin's (1952) "force field" model; Lippett *et al.* 's (1958) "planning model" and Kolb and Frohman's (1970) adaptation thereof, and Worley *et al.*'s (1996) "strategic change model" (e.g. Cummings and Worley, 1997: 26, 27; Inkson and Kolb, 1998: 494-499). The key features of these models are summarised below, together with other contemporary models that appear relevant.

Lewin's (1952) change model is based on the theory that there are forces acting for and against changing the status quo in an organisation (Cummings and Worley, 1997: 27; Inkson and Kolb, 1998: 494, 495). He believed that these forces act within a "total social field"[36], including "groups and sub-groups, their relations, their value systems, etc." (Lewin, 1952: 224). He believed that the "whole social field" needed to be studied and re-organised for change to occur (Lewin, 195: 224).

According to Lewin's model, change requires an increase in the forces *for* change and a reduction in the forces *against* change (Lewin, 1952: 224-25). Examples of forces for change include competition, "leaders' enthusiasm", "desire to learn" and technological advances, while forces against change include fear, uncertainty, lack of skills and "old work habits" (Inkson and Kolb, 1998: 495). Kotter and Schlesinger (1979, quoted in Inkson and Kolb, 1998: 496) identify six categories of methods that can be used for

---

[36] Cartwright identifies the concept of a "social field" as Lewin's "most fundamental construct". He defines the field of a group as its " life space" or "the group and the environment as it exists for the group" (Lewin, 1952: xi).

reducing forces against change: "education and communication"; "participation and involvement"; facilitation and support", "negotiation and agreement"; "manipulation and co-optation", and "explicit and implicit coercion". They identify situations within which the methods are commonly used, as well as their advantages and disadvantages. While the first three are believed to be time consuming, they appear to have the greatest promise because they can achieve "buy-in", commitment and adjustment to change, respectively. The last three appear to have increasing potential for causing difficulties at a later stage, suggesting that changes may not necessarily be permanent.

Lewin believed that it was preferable to tackle and reduce forces acting *against* change than it was to increase forces for change (Cummings and Worley, 1997: 27). He suggested that this be done in three steps, which he referred to as "unfreezing", "moving" and "refreezing" (Lewin, 1952: 228-29). *Unfreezing* involves reducing the forces that are acting against change[37]; *moving* involves developing new behaviours, and *refreezing* involves putting in place mechanisms for supporting and reinforcing the new state (Cummings and Worley, 1997: 27).

Lewin's change model was adapted by Lippett, Watson and Westley in 1958, and "advanced" by Kolb and Frohman in 1970 (Inkson and Kolb, 1998: 497). These adaptations are referred to by Inkson and Kolb (1998: 497) as a "planning model". Lippett *et al.* expanded Lewin's three steps into five:

1. "development of the need for change";

2. "establishment of a change relationship";

3. "working toward change";

4. "generalization and stabilization of change", and

5. "achieving a terminal relationship". (quoted in Kolb and Frohman, 1970: 52).

---

[37] An example of "unfreezing" can be found in what Schein (1999: 154) refers to as "disconfirmation". This is a process whereby observation of unexpected and undesirable outcomes of behaviour encourages actors to change (Cummings and Worley, 1997: 27).

Kolb and Frohman (1970: 52) drew on this five-step change management model, as well as those of Beckhard (1969), Lawrence and Lorsch (1969) and Schein (1969), when developing their seven-phase "process of planned change". The seven phases are graphically presented in Fig. 2.5. They are summarised as: "scouting", "entry", "diagnosis", "planning", "action", "evaluation", and "termination" (Kolb and Frohman, 1970: 52, 53).

Scouting, entry and diagnosis are consistent with Lewin's unfreezing phase, while planning and action are consistent with his moving phase, and evaluation and termination are consistent with his re-freezing phase (Cummings and Worley, 1997: 27, 28). However, a distinguishing feature of this model is the existence of two feedback loops (see Fig. 2.5). The first defines the need for continuing dialogue with the client on diagnosis and planning issues, while the second defines the need to incorporate the results of previous evaluations into planning (Kolb and Frohman, 1970: 54).

The steps bear further scrutiny because they provide insight into the extent to which historical developments in organisation theory have contributed to change management. They also demonstrate the significance that many authors assign to the consultant or external change agent in the change management process. Key features of the seven phases are summarised below.

1. "Scouting" involves "preliminary data gathering" by both parties prior to contracting. This can be used by the client to determine whether the consultant is suitable, by the consultant to identify resource availability, limitations, social & cultural norms/values, sub-systems, key relationships (internal and external), attitudes (toward change, authority, outsiders) and motivation. Important for choosing and understanding a formal point of entry. (Kolb and Frohman, 1970: 54-5)

2. "Entry" involves establishing a collaborative relationship based on agreement regarding goals, initial problem, relationship to overall system, resources and abilities (internal and external), approach, nature of client/consultant relationship, expected benefits for each and potential for influence/ power. This may need to be renegotiated if the need arises as project proceeds. (Kolb and Frohman, 1970: 55-6)

3. "Diagnosis" involves focusing on and developing an empathy with the client in terms of their "felt" problem, goals and resources (internal and external). The problem is defined by identifying "sub-parts" wherein the problem is located and relationships between them and other parts of the system. The goals are defined in terms of the organisation's "desired state", and are used to provide direction and place the change process within the context of the development of the organisation as a whole. The client's resources for improving the situation are assessed in terms of availability, "readiness" for and receptivity to change, motivation, commitment, responsibility and potential for development. The consultant's resources are assessed in terms of ability to meet the client's needs, empathise and reduce dependency. (Kolb and Frohman, 1970: 56-7)

4. "Planning" is a collaborative effort that ensures that the change process will be appropriate to the client's needs, and that the client understands and is committed to them. It involves clear definition of specific objectives, generating alternative change strategies, simulating consequences, and choosing the most appropriate course of action. Alternatives can be classified in terms of four sources of power and six "organizational subsystem[s] to which the intervention is addressed". The four types of power are formal, expert, coercive and "trust-based"[38] power, while the six organisational subsystems are defined in terms of people, authority, information, tasks, policy and culture, and organisational environment. Interventions within the six subsystems involve: personnel flow and education[39]; formal and informal authority[40] and information[41]; the technological bases for jobs, the satisfaction they provide and the

---

[38] Kolb and Frohman, (1970: 56) describe *trust-based power* as the "informal influence that flows from collaborative problem definition and solution".

[39] *Personnel flow interventions* involve "selection, placement, rotation, and retention" of staff, while *educational interventions* can be "designed to change motives, skills and values" (Kolb and Frohman, 1970: 58).

[40] Interventions that change *formal authority* can involve: "job titles and responsibilities, … span of control, … number of organizational levels, [and] … the location of decision points" (Kolb and Frohman, 1970: 58).

[41] The *formal information sub-system* can be changed by re-design to ensure that important information is prioritised, visible and has mechanisms for delivery. The *informal information sub-system* can be changed by improving the quality of communication, as well as identifying and improving the information flow from "gatekeepers". (Kolb and Frohman, 1970: 58). Inkson and Kolb (1998: 497) define *gatekeepers* as people who control essential services within organisations, irrespective of their status.

relationships between them; explicit policy and implicit culture[42]; and external, as well as internal organisational environments. It is suggested that these components be used to develop a checklist to assist during the planning, as well as implementation phases. (Kolb and Frohmam, 1970: (58-9)

5. "Action" involves implementing the change strategy that was chosen during the previous stage. Difficulties encountered may be as a result of failure to identify consequences of change and/or the change process. Resistance to change may not be rational, but rather in response to a consequence that has not been anticipated. The potential for such "unanticipated consequences" may decrease if "subordinates are included in the planning process (Kolb and Frohman, 1970: 60-1).

6. "Evaluation" involves assessing the effectiveness of the change process in achieving its goals (or interim goals). In order for evaluation to contribute effectively to improvement of the change process, it should be seen as part of the process and not separate from it. (Kolb and Frohman, 1970: 61)

---

[42] Interventions that change *explicit policy* can involve formal rules, while *implicit culture* involves informal rules.

Figure 2.5. Examples of change management models with feedback loops numbered. Sources: a) Lewin, 1952; b) Kolb and Frohman, 1970; c) Lippett *et al.,* 1958; d) Schein, 1969, e) Cummings and Worley, 1997.
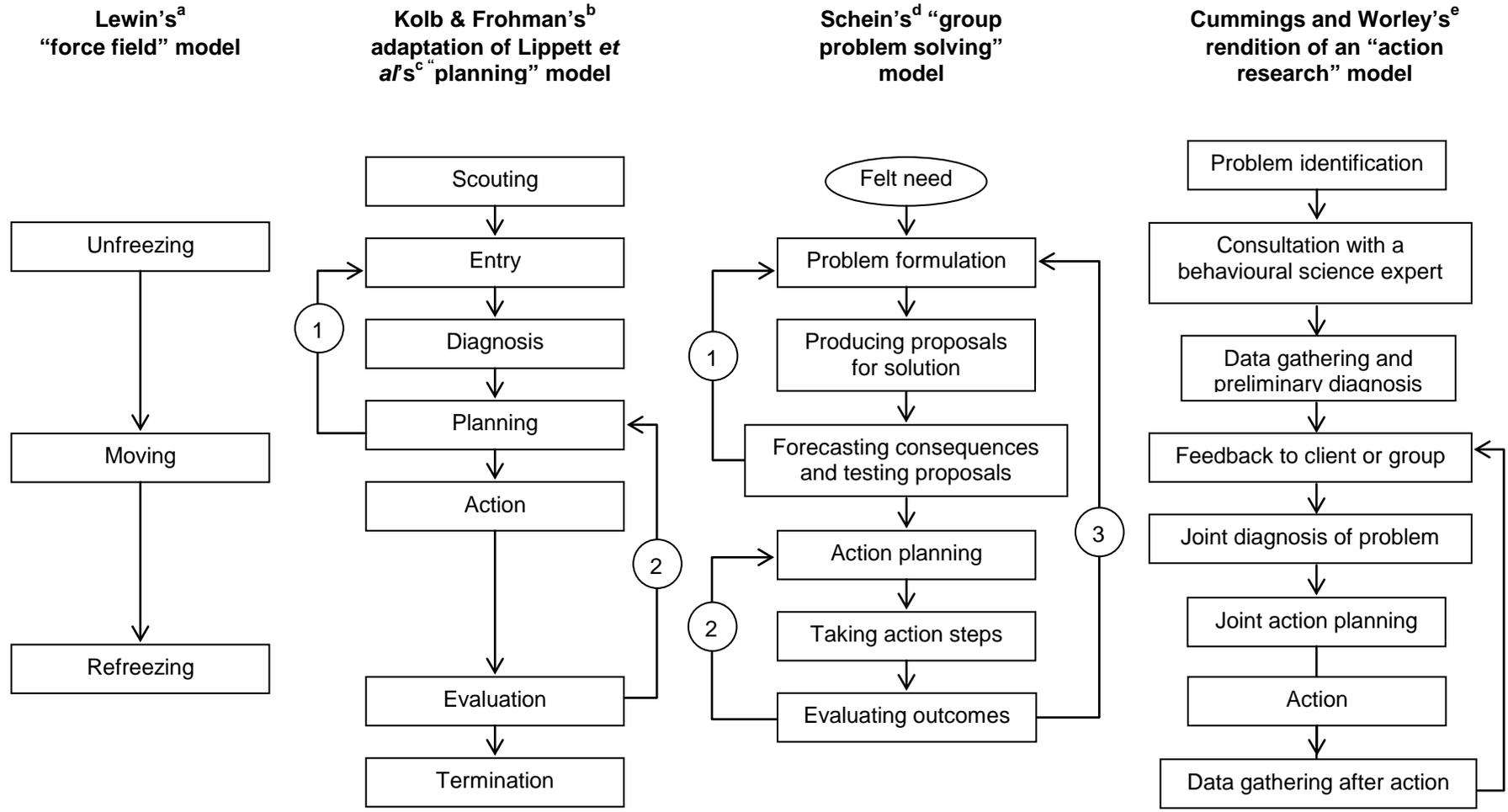
7. "Termination" involves bringing to a close the formal relationship between the client and the consultant. This should be based on pre-determined criteria which may or may not have changed by negotiation during the process. It needs careful consideration throughout the process so that it contributes to agreed goals and objectives. (Kolb and Frohman, 1970: 61-2)

The final step was later referred to as "institutionalisation", whereby the relevant changes were incorporated into the "day-to-day" activities of the organisation. Inkson and Kolb (1998: 498) believe that institutionalisation is achieved by repetition, reinforcement and the establishment of systems in support of change.

Schein (1969; 1999: 152-3) presents a "group problem solving" model within the context of what he refers to as "process consultation"[43]. The model has six steps:

1. "problem formulation";

2. "producing proposals for [a] solution";

3. "forecasting consequences [and] testing proposals";

4. "action planning";

5. "taking action steps", and

6. "evaluating outcomes" (see Fig. 2.5).

Schein (1999: 152) distinguishes between two "basic cycles of activity" in the model: the first (steps 1-3) occurs prior to a decision being made on what action will be implemented, and the second (steps 4-6) occurs afterwards. The steps in the first cycle appear consistent with Kolb and Frohman's diagnostic phase, while those in the second cycle appear consistent with their planning, action and evaluation phases.

However, the important distinguishing feature between the two models is the emphasis that

---

[43] Schein (1999) defines *process consultation* as the creation of a client/consultant relationship that "permits" the client to improve a situation (that they have defined) by perceiving, understanding and acting on "process events that occur within their internal and external environment".

Schein places on the specific philosophical and attitudinal context within which the steps are carried out. This context is best summarised by the "ten principles" that he describes as the "essence" of process consultation (Schein, 1999: 242-245) (see Box 2.2). They reflect the importance that is placed on the client's needs and the distinct role that the consultant is expected to play. Schein (1999: 4) describes this role as "engaging the client in a process that will, in the end, be perceived as having been helpful to the client by both the consultant and client".

Box 2.2. The ten principles that reflect the "essence" of process consultation (Schein, 1999: 243-244).

1. *Always try to be helpful.*
2. *Always stay in touch with the current reality.*
3. *Access your ignorance.*
4. *Everything you do is an intervention.*
5. *It is the client who owns the problem and the solution.*
6. *Go with the flow.*
7. *Timing is crucial.*
8. *Be constructively opportunistic with confrontational interventions.*
9. *Everything is a source of data; errors are inevitable – learn from them.*
10. *When in doubt share the problem.*

This is seen as being in contrast to two other, more traditional roles of consultants, whereby they either: sell their expertise as a basis for telling clients what to do about a particular problem (the "selling-and-telling model"), or identify the problem and sell particular solutions or tools with which they are familiar (the "doctor-patient model" (Schein, 1999: 4). Schein suggests that while the "selling-and-telling" model may solve a particular problem, it is also likely to end the relationship and may, therefore, leave underlying sources of the problem undiscovered. The "doctor-patient" model, on the other hand, places all the power in the hands of the consultant and assumes that s/he has the ability not only to diagnose the problem, but also to prescribe and administer the solution. Schein suggests that it is not surprising that this approach, given its externally driven nature, frequently ends up with reports that are shelved because they are not believed by the client to be of value to the organisation. (Schein 1999: 11-14)

While Schein (1999: 10) recognises that these other models may be of value at some stage in the consultation process, he believes that the process consultation model is "necessary at the beginning of any helping process because it is the only mode that will reveal what is really going on and what kind of help is needed".

Although unique in terms of the context within which it is required to operate, Schein's "group problem solving" model reflects some of the characteristics of what Cummings and Worley (1997: 27) identify as an "action research model" (see Fig. 2.5). They describe this model as "a cyclical process in which initial research about the organization provides information to guide subsequent action". They suggest that it is characterised by: "considerable collaboration" between external and internal change agents (i.e. researchers and members of the organisation); "heavy emphasis on data gathering" prior to planning and action, and "careful evaluation of results" (Cummings and Worley, 1997: 28).

They describe the steps in this model as:

1. "problem identification";

2. "consultation with a behavioural science expert";

3. data gathering and preliminary diagnosis";

4. "feedback to client or group";

5. "joint diagnosis of [the] problem";

6. "joint action planning";

7. "action", and

8. "data gathering after action" (Cummings and Worley, 1997: 29, 30).

The process is cyclical in that the results of the eighth step are fed back to the client and incorporated into joint diagnosis, planning, etc. The steps are self-explanatory and the model is a practical adaptation of the action research approach described in section 2.4.2 above. The emphasis on the use of behavioural science expertise appears in strong contrast

to Schein's model, although it may be that this emphasis is implicit in the latter, as opposed to explicit in the former.

Cummings and Worley (1997: 31) identify a range of "contemporary adaptations" of the action research model, but suggest that all are similar to Lewin's "force field" model in that they tend to include: a preliminary (diagnostic) stage and a closing (evaluation) stage; an emphasis on behavioural science knowledge, and recognition of the interventional nature of the relationship between external and internal change agents. They suggest that the earlier models differ from contemporary approaches in that the former are characterised by limited participant involvement and focus on "fixing problems". This is in contrast to contemporary approaches where external and internal change agents are believed to be treated as "co-learners" and the focus tends to be on applying the strengths of the organisation to the change process (Cummings and Worley, 1997: 32).

Cummings and Worley (1997: 32) use these comparisons to develop what they call a "general framework" for managing change. They believe that the four general steps in this model summarise those included in other models. These generalised steps are: "entering and contracting"; "diagnosing"; "planning and implementing change", and "evaluating and institutionalizing change". The steps include relevant combinations of previously mentioned features.

Three contemporary models deserve mention because, like Schein's process consultation model, they have key features that distinguish them from previously mentioned models. The first is Worley's (1996) "integrated strategic change" model. This model differs from those previously mentioned because it recognises the significance of the organisational environment, linking change management to strategic management (Inkson and Kolb, 1998: 498). The model exists within the context of two states[44] of the organisation, its existing state and its future state. Once the desired state has been defined, a "planned sequence of activities" is used to move the organisation from the existing (undesired) state to the future (desired) state (Worley *et al.*, 1996: 17). The four activities that are suggested

---

[44] Worley *et al.* (1996: 18) emphasise that these *states* must be considered within the context of the organisation's environment, as well as performance. They believe that this makes the model consistent with Porter's (1980) model of strategy, whereby performance is defined within the context of organisational environment and strategic orientation (see 58, below).

for achieving this movement are "strategic analysis", "strategy making", "strategic change plan design", and "strategic change plan implementation" (Worley *et al.,* 1996: 17) (see Fig. 2.6).

Strategic plan design and implementation are similar in essence (apart from their focus) to the planning and implementation stages described in previous models. However, strategic analysis and strategy making contain some notably different components. Strategic analysis involves:

–   assessing the "readiness" of the organisation for change[45];
–   identifying key values, issues and priorities that need to be changed and/or accounted for, and
–   examining the organisation's existing "strategic orientation"[46] (Worley et al., 1996: 26).

Strategy making involves using the outputs from strategic analysis as the basis for "visioning"[47], strategic choice and the design of a new strategic orientation (Worley *et al.,* 1996: 67). Visioning is a particularly significant stage because it involves identifying the desired state of the organisation and provides something that the organisation can work towards.

---

[45] Worley *et al.* (1996: 27) describe *readiness for change* in terms of the readiness and ability of senior managers to oversee and support the change process.

[46] Worley *et al.* (1996: 44-6) consider *strategic orientation* to be important because consideration is given not only to strategy (i.e. the mission, objectives, intent and policies of the organisation), but also to "actual capabilities" for implementation (i.e. theory vs. reality). They define capabilities in terms of core processes, systems and culture.

[47] Worley *et al.* (1996: 68) define *visioning* as "the process of developing a commitment to what an organization *should* become and … why".

Figure 2.6. Integrated strategic change model. Source: Worley *et al.,* 1996.

EXISTING STRATEGY

Strategic analysis

Strategy making

Design of strategic
change plan

Implementation of
strategic change plan

DESIRED STRATEGY
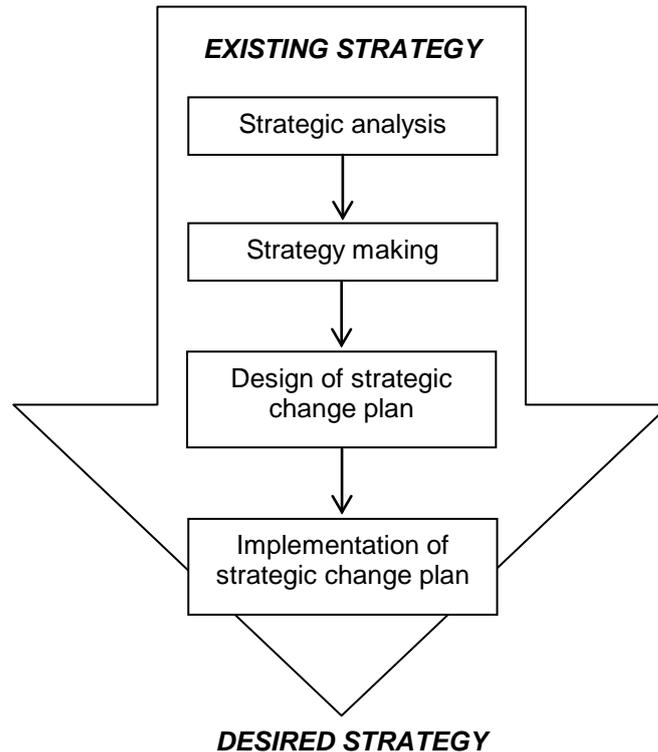
In addition, Worley *et al.*'s (1996: 20-1) model contributes to the discourse on design, planning and implementation by drawing attention to four activities that Beckhard and Pritchard (1992) identify as being essential for "effectively managing a transition". These activities are referred to as: "activity planning", "commitment planning", "communication planning" and "resource planning". The terms are self-explanatory within the context of previously mentioned concepts of relevance to organisational development. It is, however, useful to note the emphasis that the integrated strategic change model places, not only on the obvious aspects of change management, i.e. those to do with activities and resources, but also on the need to manage commitment and communication.

Vision, commitment and communication are three threads that run through another contemporary organisational change model, encapsulated by the term "organisational

learning". Described by Cummings and Worley (1997: 492) as "one of the fastest growing interventions" in change management, the concept of "organisational learning" emerged from the work of Chris Argyris and Donald Schön in the 1970s and was advanced and popularised by Peter Senge in the 1990s (Inkson and Kolb, 1998: 505) (see below).

Argyris and Schön's work provided a link between the learning behaviour of individuals and the learning behaviour of organisations (Cummings and Worley, 1997: 492). Their early work focused on theories of relevance to "human action", particularly in organisations, and how they could be used to bring about changes to the *status quo* (Argyris and Schön, 1974: xi). This led them to an in-depth analysis of organisational learning, which they defined in terms of *outcomes*, as well as the *processes* used to achieve those outcomes. They described two outcomes of learning: the creation of a "match" between intention and effect, and the detection and correction of a "mis-match" (Argyris and Schön, 1974: xi-ii). They pointed out that both outcomes require processes that involve the "framing" or design of an idea, and its implementation. They suggested that the extent to which learning occurs depends on the actor's (or organisation's) "theories-of-use", i.e. the theories[48] that form the basis for deliberate behaviour (Argyris and Schön, 1974: 4). They distinguished theories-of-use from "theories-of-action" in that the former actually govern actions, while the latter are merely espoused (i.e. they are communicated to others, but don't necessarily govern action). Theories-in-use include assumptions not only about "self, others and the situation", but also the relationships between "action, consequence, and situation" (Argyris and Schön, 1974: 7).

This distinction is consistent with Schein's (1992) distinction between "espoused values" and "basic assumptions" (see s2.2.5). It is important because it is believed to provide an explanation for inadequacies in the application of change models based on Lewin's "unfreezing, moving and refreezing" model (Argyris, 1999: 69). While Lewin's model and its derivatives were believed to be of value "at an abstract level", when applied, there were gaps between what was expected to happen and what actually happened. These gaps were

---

[48] Argyris and Schön (1974: 5) identify three different types of *theories* that are relevant to organisational learning, namely "vehicles for explanation, prediction or control". They define "explanatory theories" as those that explain events by "setting forth propositions from which these events may be inferred", "predictive theories" as those that set forth "propositions from which inferences about future events can be made", and "theories of control" as those that describe "the conditions under which events of a certain kind may occur".

attributed to the inadequacy of the model/s in bringing about changes to the basic assumptions or "governing variables" of the individuals' theories-in-action, i.e. their theories-in-use.

In order to develop a model for breaching these gaps, Argyris and Schön (1974: 20-21) advanced the concepts of "single- and double-loop learning". Single-loop learning is described as learning that brings about a change in theories-of-action *without* changing theories-of-use, while double-loop learning brings about changes to the latter (Argyris and Schön, 1996: 20-1). The relationship between these two types of learning is graphically presented in Fig. 2.7.

Figure 2.7. The relationship between single- and double-loop learning within the context of the key components of learning. Source: Argyris, 1999: 68.
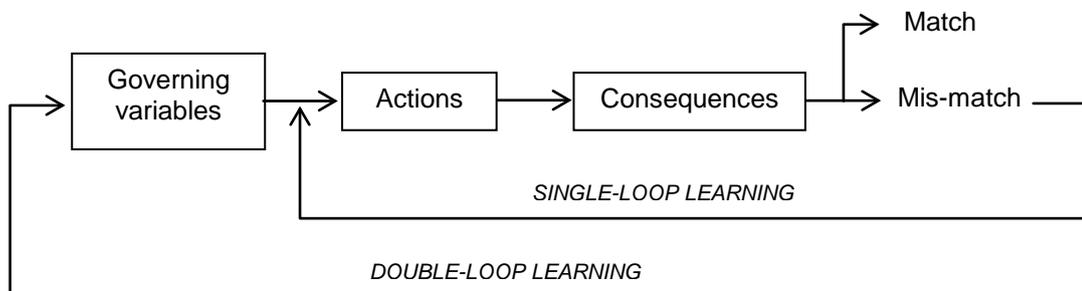
They went on to develop two models that defined the governing variables, action strategies and consequences for single loop learning (Model I) and double-loop learning (Model II), as well as a "transition process" that could be used for moving from Model I to Model II (Argyris and Schön, 1974: 68-9, 87). This process is graphically presented in Fig. 2.8.

Figure 2.8. The transition process from Model I to Model II. Source: Argyris and Schön, 1974: 135.
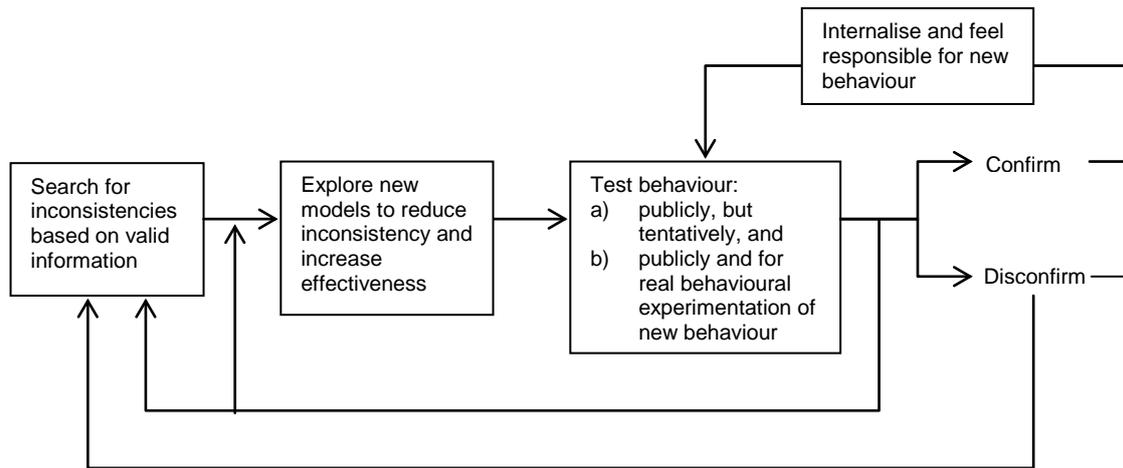
While the stages in this transition process are loosely consistent with Dewey's (1933) four interrelated processes for learning, namely "discovery, invention, production, and generalization" (quoted in Cummings and Worley, 1997: 492), they are innovative within the context of learning in organisations. Argyris and Schön (1996: xvii) believe that the application of such concepts to organisations dramatically increases their ability to adapt and learn (Argyris and Schön, 1996: xviii).

This extrapolation from individual to organisational learning forms the basis of some of the criticisms of the concept of- and models for organisational learning. Weick and Westley (1996: 440) describe the phrase as an "oxymoron" because they believe that learning is the antithesis of organisation and *vice versa*[49]. However, they respond to this by identifying the "images" of organisation that they believe are conducive to learning and therefore support the concept of organisational, as opposed to individual learning.

The first is culture, because it deals with the way that knowledge is embedded in organisations, and has tangible manifestations such as language, artefacts and co-ordinated action (Weick and Westley, 1996: 442). The second is the image of organisations as

---

[49] This is based on Weick and Westley's (1996: 440) characterisation of *learning* as disorder and increased variety, in contrast to *organisation* as orderliness and decreased variety.

"repositories" and "self-designing" systems. The former, because it is characterised by the cumulative build-up of knowledge that provides the basis for reflection and practice, and the latter because it involves "self-diagnostic capabilities" that allow for critical analysis and adjustment (Schon, 1983, and Purser and Pasmore, 1992, both quoted in Weick and Westley, 1996: 443). The inference is that if organisations can embed knowledge, act as repositories and self-design, then they can learn.

Senge (1990a: 3) describes learning organisations as those where "people continually expand their capacity to create the results they truly desire, where new and expansive patterns of thinking are nurtured, where collective aspiration is set free, and where people are continually learning how to learn together". While Argyris and Schön (1996: 184) refer to his work as "Utopian", they acknowledge that it has expanded the concept of organisational learning by including the "methodology of systems dynamics". This innovation, as well as the contribution made by Argyris and Schön's work, can be clearly seen in what Senge identifies as the "disciplines of the learning organization". The disciplines are encapulated by five concepts: "systems thinking", "personal mastery", "mental models", "building shared vision" and "team learning" (Senge, 1990a: 6-10). They are described as follows:

1. "Systems thinking" is a "conceptual framework", as well as a "body of knowledge and tools" that assists in developing an appreciation of the interrelationships between parts of the whole;

2. "Personal mastery" is a commitment to learning through a continual process of clarification, focus, patience and objectivity;

3. "Mental models" are the governing variables or theories-in-use that need to be identified so that they can be improved upon;

4. "Building shared vision" is the practice of uncovering "shared *pictures of the future*" in order to develop a long-term commitment, and

5. "Team learning" is the learning that occurs when team members "suspend assumptions and personal perspectives" and enter into dialogue that enables the "free flow" of thought and the discovery of "insights not attainable

individually". (Senge, 1990a: 6-10)

Although he identifies it first, Senge refers to systems thinking as the "fifth discipline", because it is what draws the other disciplines together. He believes that it is essential for all of these disciplines to be considered as part of a whole, rather than individually.

2.4 Conclusion

This chapter has provided an overview of the most important developments that have occurred in organisation theory. Spanning almost a century, they have been presented here in terms of five different approaches or perspectives: rational/mechanistic; humanist/social; contingency; political, and cultural. It would be possible at this point to consider the extent to which each of these relates to and is reflected in sustainability programmes for business. However, such an exercise would be largely theoretical and it would not necessarily reflect the interplay that clearly exists between the different perspectives.

I intend, therefore, to use the theoretical considerations identified in this chapter to add value to my interpretation of the results of an evaluation of a particular type of sustainability programme (see Ch. 3 and 4). This is done in the discussion in Ch. 5.

In Ch. 5, the conclusions drawn from the results of the evaluation are used as a basis for identifying primary and secondary areas for improvement. The extent to which these areas for improvement are dealt with in the literature on a range of sustainability programmes for business, is considered. The areas for improvement and issues raised are then discussed within the context of relevant developments in organisation theory and the organisational change models identified in s2.3.3, above. In recognition of the interplay between the different perspectives, the discussion does not focus on each of them, but takes more of a meta-analytical approach. It therefore focuses only on the broad transitions between the perspectives, rather than the details of each. The discussion in Ch. 5 is used as a basis for developing a model for improving the effectiveness of sustainability programmes for business.

3 Using the Target Zero project as a case study: Background and research methodology

3.1 Introduction

The overall goal of this thesis is to improve the effectiveness of sustainability programmes for business. In order to achieve this goal, I undertook an evaluation of a particular type of sustainability programme and used organisation theory to add value to my interpretation of the results. This chapter provides an overview of the sustainability programme that was evaluated and the methods that were used.

The programme was that which was used for NZ's Target Zero project (TZ). As mentioned in Ch. 1, a number of different concepts are used to encapsulate the changes required to make businesses more sustainable. They include "pollution prevention" (PP), "cleaner production" (CP), "industrial ecology" and "The Natural Step" (TNS). The TZ project was what is commonly referred to as a CP or PP "demonstration" project – a term that is usually used in reference to projects that are designed to *demonstrate* that the prevention or reduction of wastes and emissions at source can improve the environmental, as well as economic performance of participating organisations.

TZ was the largest project of its kind undertaken in NZ and involved 25 "demonstration" organisations (mostly businesses), as well as a number of supporting organisations (including funders, councils and power companies). During the course of a two-year period, starting in 1996 and finishing in 1998, demonstration organisations were helped to work through a pre-determined programme that was consistent with international CP/PP best practice.

The project was evaluated using different methods that are commonly referred to as "evaluation research" (e.g. Ellis, 1994: 311-330; Robson, 1993: 170-186); or "programme evaluation" (e.g. Posavac and Carey, 1997: 1-21). Ellis (1994: 314) describes evaluation research as a type of applied research that "assesses the effectiveness of programs [that are] intended to alleviate social, health, or interpersonal problems".

Posavac and Carey (1997: 2) focus more on the process, describing programme evaluation as "a collection of methods, skills and sensitivities" that are used to provide insight into various aspects of the effectiveness of programmes. These include: the need for the programme; the likelihood of its use; the likelihood of it meeting identified needs; whether it is provided as planned, and whether it delivers what is desired "at a reasonable cost and without unacceptable side-effects" (Posavac and Carey, 1997: 2).

There are a number of different approaches to evaluation research. Posavac and Carey (1997: 23-27 identify 11 different models, as follows:

1. the "traditional" model, whereby an informal impression of a programme is gained from someone who associated with it in some way;

2. The "social science research", whereby a group participating in the programme (the experimentation group) is compared with another that is not (the control group);

3. The "industrial inspection" model, whereby the product of the programme is inspected upon completion and adjustments are made;

4. The "black box" model, whereby the output of a programme is studied without reference to its internal operation;

5. The "objectives-based" model, whereby the extent to which a programme achieves its stated objectives is measured;

6. The "goal-free" model, whereby the programme itself, as well as its positive and negative effects, are studied without focusing on goals and objectives;

7. The "fiscal" model, whereby financial costs and benefits of a programme are measured;

8. The "accountability" model, whereby the cost-effectiveness of the programme (usually as a recipient of public funding) is measured;

9. The "expert opinion" model, whereby the programme is examined and judged (often in a subjective way) by an expert;

10. The "naturalistic" model, whereby the evaluator is the source of information and s/he uses qualitative methods to enhance sensitivity to the richness of the programme, and

11. The "improvement-focused" model, whereby discrepancies between what was observed and what was planned, are used as a basis for improvement.

The TZ project was evaluated in three parts, using a combination of the traditional, social science research, expert opinion, objectives-based and goal-free models. The models and the specific methods used are presented in s3.4 below. However, as Posavac and Carey (1997: 22) point out, it is necessary to develop a thorough understanding of a programme before it is evaluated. An overview of the TZ project and the programme used are therefore first presented in s3.2 and 3.3 below.

3.2   NZ's "Target Zero" demonstration project

In the nineties, NZ joined the growing list of countries with CP/PP demonstration projects. By the end of 1996, these types of projects had been carried out in NZ in specific sectors, including the tourism, construction, fruit growing and service sectors (Stone, 1997). However, there had been no multi-sector projects such as those that appeared to have been conducted successfully elsewhere, e.g.: the Landskrona project in Sweden (Huisingh, 1989); the PRISMA project in The Netherlands (Huisingh and Baas, 1991), and the Aire and Calder project in the UK (CEST, 1995).

The Target Zero demonstration project (TZ) was the first project in NZ that was comparable with these other, multi-sector projects. It was initiated by NZ's major power generator and wholesaler, the Electricity Corporation of New Zealand (ECNZ)[1]. The

---

[1] As part of the restructuring of the energy sector in NZ, ECNZ no longer exists. In 1999 it was split up into three different organisations.

project began as an extension of ECNZ's "waste minimisation"[2] programme. The company had identified the programme as a way of "adding value" to their service and thereby encouraging clients to buy energy from them, rather than others, after deregulation of the sector (Brown, pers. com., 1997). While this was ECNZ's aim, the project was designed to achieve the following, much broader aims and was funded by NZ's Ministry for the Environment (MfE) on that basis. The main aims of the project were:

1. To *demonstrate* that CP/PP can improve the environmental, as well as economic performance of participating organisations, and

2. To use a multi-company approach to establish a critical mass and thereby enhance the potential for the programme to endure beyond the 2-year project-period (Brown, pers. com., 1997).

The project was funded by MfE through its Sustainable Management Fund, and received financial and in-kind contributions from other participating organisations. The project involved a mixed group of 25 demonstration organisations from two regions, the power retailers and local authorities from those regions, as well as consultants and students.

The 25 demonstration organisations were from nationally significant sectors, with 18 from the manufacturing sector and seven from the service sector. The manufacturers included seven organisations from the food processing sector (ANZSIC 21[3]), six from the fibre, textiles and leather manufacturing sector (ANZSIC 22), two from the petroleum and rubber manufacturing sector (ANZSIC 25), and one each from the wood products, metallic products and equipment manufacturing sectors (ANZSIC 23, 27 and 28, respectively). The organisations from the service sector comprised of two hotels (ANZSIC 57), three local councils (ANZSIC 81), one hospital (ANZSIC 86) and one educational facility (ANZSIC 84). The three councils were from the same region and had elected to work together as a single organisation for the purpose of the demonstration project. Any difficulties that this may have caused in terms of data gathering were alleviated when it became apparent that

---

[2] ECNZ's manual for their waste minimisation programme included methods and outcomes consistent with the WEPA mentioned previously (see ECNZ, 1996). *Waste minimisation* is therefore considered, for the purposes of this research, to be synonymous with cleaner production and pollution prevention.

[3] *ANZSIC* refers to the Australia New Zealand Standard Industry Codes (SICs). They are referred to because they provide a standardised way to describe sectors and can therefore be used for comparing the project with others. At their finest level of distinction, the codes have five digits. The two used represent the groups of industries as described.

only one council was actively involved in the project. One of the organisations from the demonstration group moved to another region and was, therefore, excluded from the evaluation. The final sample size for the evaluation was, therefore, 22 organisations.

The manufacturing sector is the highest employer in NZ, accounting for over 19% of "full-time equivalent persons engaged"[4] (FTEs) (254,178 FTEs) and employing two thirds more people than the second highest employer (retail trade) (Statistics NZ, 1997). It is also the highest employer in each of the two regions included in the demonstration project (22% and 24% of all FTEs). The four other sectors that were represented in TZ - government administration, education and health - are also important employers, together accounting for 24% of FTEs in NZ. In the two regions in question, they account for 26% and 24% of FTEs. The two regions involved in the project together account for approximately 19% of FTEs and 15% of NZ's "business activity units" (AUs).

The demonstration organisations were recruited by staff from ECNZ, participating power retailers and local councils. They were selected largely on the basis of their size, together with the likelihood of their having the potential to benefit from the project. Size was considered to be important because the organisations would have to contribute financially and have staff available to participate in the project. No small organisations were approached because it was believed that they would have difficulties in this regard. The potential for benefit was based on the general knowledge that those involved in the recruitment process had of the industries in their areas (e.g. "wet" industries such as tanners were considered likely to generate wastewater and therefore benefit form wastewater reduction).

It is important to note that there was no coercive power involved in the recruitment process. Organisations were encouraged to participate on the basis of potential benefits and their involvement was purely voluntary. (Brown, pers. com., 2002).

The only people who may have been able to exercise such power would have been those

---

[4] Statistics NZ (1997) defines *full-time equivalent persons engaged* (FTE's) as full-time employees, working proprietors plus half those that are part time.

responsible for compliance within the councils[5]. However, none of the council staff involved in the project had such responsibilities. They tended to have responsibility for waste minimisation and/or CP/PP. Power company staff who were involved in the recruitment were interested in the project only as a means whereby they could demonstrate to potential customers that they could add value to their services.

As mentioned earlier, the project adopted a "club" approach, similar to that used in the UK's Aire and Calder project (CEST, 1997). This meant that the demonstration organisations were encouraged to interact during the project period. Mechanisms that were provided to enable interaction were to occur were the official launch and the training workshop (both in August 1997), as well as monthly club meetings and regular site visits during the project period.

Each demonstration organisation was assigned a consultant to work with them during the course of the project. The consultants' roles were limited to acting as facilitators. They were required to facilitate progress by: visiting the organisations to which they were assigned, once a month; submitting monthly progress reports in a standard format, and by giving advice during the course of the project. The progress reports were used by the project coordinator to ensure that progress was being made and to identify any areas where assistance was required. Consulting fees were paid on a monthly basis by the project manager. (Brown, pers. com., 2001)

Prospective consultants were asked to apply to the project manager (an ECNZ staff member) to participate in the project. They were then selected on the basis of their experience working with industry and their knowledge of CP/PP. The expertise of those selected included: chemical or process engineering; environmental management systems, and environmental training. (Brown, pers. com., 2001)

The paucity of consultants with much experience in CP/PP meant that there was very little choice and it was not possible to choose consultants with similar backgrounds and skill sets. While their expertise varied, this was not believed to be likely to negatively affect the

---

[5] NZ's Ministry for the Environment (MfE) has no regulatory powers and was involved in the project only as a funding agency.

outcomes of the project. They would also be required to attend the initial training workshop and would be supervised in their activities by the project manager, to whom they were responsible.

Representatives from local government and the power industry undertook to provide support for the project by: making monitoring equipment available for use by the demonstration organisations; identifying and providing on-going training opportunities, and contributing to a newsletter that would assist in the dissemination of information to the parties involved. Local government bodies were also expected to use the project as a basis for developing programmes that would encourage the uptake of CP/PP across each of their regions.

The scale and scope of the project, together with the programme used, made it comparable with the more renowned projects that had been conducted abroad. The next section provides a background for the programme and describes it.

3.3 The programme[6]

Early proponents of CP/PP relied on gathering information on practices in pioneering organisations such as 3M (see Ch. 1). They gathered information from these organisations and used it to provide examples of the types of changes that could be undertaken and the environmental and economic benefits that could be gained (e.g. Cambell and Glenn, 1982; Huisingh and Bailey, 1982). Many of the organisations presented in early publications appear to have been responding to increasing regulatory pressure in the US, increasing costs of disposal or treatment of hazardous wastes and active encouragement by some US Federal and State government departments, e.g. US Office of Technology Assessment (USOTA) and Ventura County Dept. of Environmental Health (Huisingh and Baas, 1991: 25). As a result, case studies tended to involve US companies and focus on methods that could be used to eliminate or reduce such wastes (e.g. Hirschhorn *et al.,* 1986; Ventura County Dept. of Environmental Health, 1987; Gardner and Huisingh, 1987).

---

[6] Note that the term *programme* refers to the systematic CP/PP programme that the demonstration organisations were expected to undertake. This is in contrast to the term *project*, which is used n reference to the TZ project as a whole.

A similar, preventive approach appears to have been adopted in the mid-seventies by some US companies operating abroad, e.g. DOW Chemical Company in the Netherlands (Spaas, 1990, quoted in Huisingh and Baas, 1991). However, it was not until the late eighties when concerted efforts were made to begin to apply it to European organisations. Much of the credit for this move across the North Atlantic goes to a US academic, Prof. Don Huisingh, then of North Carolina State University and widely acknowledged as "one of the true pioneers of pollution prevention" (Hirchhorn and Oldenburg, 1991: 72). In 1987, while on sabbatical, Huisingh and researchers from the University of Lund in Sweden undertook to determine whether "European firms and the European environment [could] benefit from CP" (Huisingh and Baas, 1991: 25). They embarked on what was to become the first European demonstration project involving seven "small and medium sized firms" in Landskrona, Sweden (Huisingh, 1989: 4). The researchers worked with "officials and employees" from the companies to identify many ways to prevent or reduce wastes at source (Huisingh and Baas, 1991: 26).

The results of the project were widely reported (e.g. Huisingh *et al*., 1989; Backman *et al*., 1990) and contributed to the establishment of the "PRISMA" project involving ten companies in the Netherlands. This project was noteworthy because, although it was established by the Netherland's Office of Technology Assessment (NOTA), and received significant funding from the Netherlands Parliament and Ministry of Economic Affairs (Huisingh and Baas, 1991: 27), it was conducted within the "framework of work" of the EUREKA/EuroEnviron working group "PREPARE", an acronym for "preventive environmental approaches in Europe" (de Hoo *et al.,* 1991: vi). While one aim was to determine whether "the preventive approach would be effective in the Dutch context" (Huisingh and Baas, 1991: 27), another, more internationally significant one, was "to develop a methodological approach" that could be broadly applied within Europe (de Hoo *et al*., 1991: vi-vii).

The result was the "PREPARE" Manual in three parts:

    Part I.   A "Manual for the Prevention of Waste and Emissions";

    Part II.   A detailed compendium of the "Experiences" of the ten Dutch companies

participating in the PRISMA project, as well as a summary of the results from the Landskrona project in Sweden, and

Part III. A 10 minute video entitled "Prepare for Tomorrow" (de Hoo *et al.*, 1991).

These resources (in English) extended the value of the project beyond The Netherlands and enabled it to be used successfully as a catalyst for many demonstration projects elsewhere in Europe and abroad. Examples include: "Ökoprofit" (Austria); "PROSA", "STIMULAR", "ZEEPRET" (The Netherlands); "SPURT" (Denmark), and "DESIRE" (India) (Stone, 1993).

Part I of the PREPARE manual was developed using as a basis: 1) the USEPA's (1988) "Waste Minimization Opportunity Assessment Manual"; 2) experiences within the demonstration companies, and 3) "scrupulous assessment by a large number of experts with different backgrounds" (de Hoo *et al.,* 1991: vii). The manual, together with the USEPA's updated "Facility Pollution Prevention Guide" (USEPA, 1992a), established a methodological standard CP/PP programmes.

Both manuals identify the following key phases: commitment and policy development; planning and organisation; assessment (including identification of options for improvement); analysis of the feasibility of options; selection and implementation of options, and review and on-going improvement (see Fig. 3.1).

The programme components appear similar to those identified in the International Organization for Standardization's (ISO) quality and environmental management systems standards (the ISO 9000 and ISO 14000 series) and the European Union's Eco-Management Audit Scheme (EMAS). However, neither ISO14001 (the environmental management system standard) nor EMAS are prescriptive in terms of the environmental effects that are required to be addressed nor the specific management methods that should be used. ISO 14001 focuses on the management system itself and is only prescriptive in terms of the system components. EMAS has a similar system focus, although it differs from the ISO standard in that it requires information on audits and achievements to be made available for public scrutiny in the form of an environmental statement (Hutchinson and Hutchinson, 1997: 127).
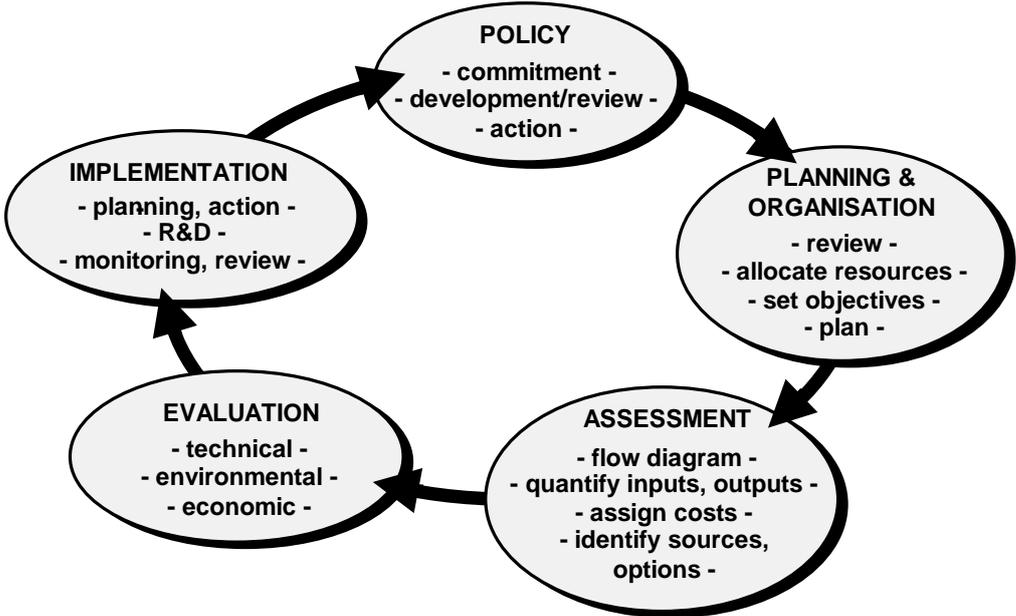
Figure 3.1. Basic stages in a waste and emissions prevention programme. (Adapted from USEPA, 1988, 1992a and de Hoo, 1991.)

In contrast, the CP/PP programme covered in the PREPARE manual and USEPA guide is much more prescriptive. It requires organisations to focus on their wastes and emissions, and to identify and implement options that prevent or reduce those wastes at their source. A CP/PP programme has at its core a "waste and emissions prevention assessment", which

includes the gathering of information on the activities, inputs and outputs of the organisation. Once activities have been identified, a "flow diagram"[7] is drawn up and used as a basis for prioritising and selecting activities for more detailed analysis. Detailed analysis involves identification of specific process units for each of the activities and the assignment of quantities and costs to each of their inputs and outputs. Materials and energy balances[8] are used to ensure that all wastes and emissions are identified. The information gathered is used as a basis for identifying options for preventing wastes and emissions at the source. Organisation of information in terms of inputs, activities and outputs assists in the identification of options for improvement at these levels (see Table 3.1).

This approach provides greater opportunities for identifying preventive options than does

INPUT CHANGES	PROCESS CHANGES	OUTPUT CHANGES

Raw materials & water:
   - reduced use
   - internal re-use
   - internal recycling
   - substitution
 	
 Energy:
   - reduced use
   - recovery & re-use
   - renewable sources
	Scheduling changes
	 Layout changes
	 Improved maintenance
	 Improved operating practices
	
	 Processes:
	   - modification
	   - substitution
	
	 Equipment:
	   - modifications
	   - automation
	   - substitution
		Product re-design to:
		   - increase life
		   - reduce environmental
		     impact
		
		 Waste:
		   - segregation
		   - waste stream
		     separation

←	Improve management practices → Provide training	→

Table 3.1. Generic list for identifying CP/PP options at input, process and output levels, as well as management.

the traditional, waste-based approach that focuses on solid, liquid, gaseous and hazardous wastes (Shrivastava and Hart, 1995: 157). The approach also differs from traditional waste

---

[7] A *flow diagram* is a graphic device that shows how resources flow through the organisation's activities, from entrance as raw materials, water or energy and exit as products, wastes or emissions. It assists in the quantification of wastes and emissions and identification of their sources.

[8] Materials and energy balances are based on the first law of thermodynamics, which holds that energy and materials are conserved. Quantities of outputs are therefore expected to be equal to inputs. If they are not, then losses will need to be identified.

management approaches in that it requires costs to be assigned to inputs as well as outputs. This enables the cost of waste to include resource losses, not just the costs of treatment and disposal. It also enables existing practices to be compared, in economic terms, with options for improvement.

Waste and emissions prevention assessments have, for these reasons, been used in projects designed to demonstrate the economic and environmental benefits of CP/PP. They may be used as a tool in organisations that have ISO or EMAS accreditation, but are not specifically required. Without such an assessment, an ISO or EMAS programme is unlikely to prevent or reduce wastes at source. Since the latter as effects-based and compliance driven, they tend to result in control-oriented approaches.

Because of the well-documented successes that had been achieved in other projects using the CP/PP programme in the PREPARE manual and the USEPA guide, particularly in terms of TZ's first main aim, the programme (as presented in Fig. 3.1 above), was chosen as the basis for the TZ project.

In order to familiarise participants with the programme, a two-day workshop was held at the beginning of the project, in each region. Workshop participants included a team from each of the demonstration organisations, as well as the consultants and others who would be assisting them during the course of the project.

The teams had been selected by the demonstration organisations before hand. The project organisers recommended that they be made up of a mixture of senior and junior staff who would be responsible for the activities that were to be undertaken during the course of the project. It was thought that senior staff on the team would provide appropriate levels of authority to enable the project to progress, while junior staff would provide a broader range of skills and hands-on knowledge of the production processes or services of each demonstration organisation. The project organisers also recommended that the team include staff who were enthusiastic about waste minimisation/CP. (Brown, pers. com. 2002.)

While the composition of the teams at the start of the project suggested that these

recommendations had been taken into consideration, this was not necessarily the case for the duration of the project. The majority of organisations sent teams of four to five people, including a mix of senior and junior staff, to the workshop. However, for the majority of organisations, teams tended to change according to the availability of staff and, by the end of the project, pressures of work and lack of support meant that the "teams" of a number of organisations had been reduced to only one person (see Ch.4, s4.4.5). Participation by junior staff in the team seemed to fluctuate during the course of the year due to staff changes and pressures of work. As a result, those left in the team tended to be more senior (see s3.4.2 and Fig. 3.4).

As mentioned earlier, the workshops were also attended by consultants, as well as representatives from local councils, power retailers and local tertiary education facilities. This was to ensure that they would, when playing their particular roles, all have a clear understanding of the philosophy behind the project and the programme that the demonstration organisations would be expected to undertake. The roles of local council officers and power company staff included: working together to coordinate the programme; developing the networks within the project and for the purpose of extending it to the broader community, and providing technical assistance and equipment (e.g. for monitoring), where necessary. The role of the educators was to encourage students to undertake projects that would assist the organisations during the assessment phase, and to supervise them so that the projects they undertook and the methods they used were consistent with the aims of the TZ project and its programme.

The workshops were conducted by two professional cleaner production educators (an acknowledged international expert on cleaner production training and myself), as well as a representative from ECNZ who acted as the TZ project manager. The international educator, was well known for the consistency of his approach, while my own experience in cleaner production training in NZ and abroad, meant that I could be confident that the programme would be consistent with internationally accepted practice.

My involvement in the delivery of the workshop could be criticised because of the potential it may have had for introducing bias and for confounding results of the evaluation. However, I believe that any criticism would be off-set by the value of being able to personally ensure that the workshop covered and set the scene for a CP/PP

programme that was consistent with those that had been conducted successfully elsewhere. After the workshop, my role focused solely on evaluation, and I played no further role in the implementation of the programme.

The topics covered during the course of the workshop can be summarised as follows:

1. Introduction to CP/PP – a brief history, relevant definitions, the rationale behind the concept, benefits;

2. CP/PP case studies – examples from businesses in NZ and abroad, including information on particular environmental issues faced by each, preventive approaches taken, methods used, specific costs and benefits, as well as payback periods;

3. Environmental policy as a driver for a CP/PP programme – the role of policy, its development and implementation;

4. Management systems and CP/PP – quality management systems (QMS), environmental management systems (EMS) and their relationship to CP/PP, similarities and differences, and how QMS or EMS can be used to assist in the implementation of CP/PP;

5. Essential elements of a CP/PP programme – key components, including allocation of personnel, resources and time, and goal setting;

6. Introduction to waste and emissions prevention assessments/audits – overview of methods and procedures, how to develop flow diagrams, identify inputs, processes and outputs, and the principles of resource balances (materials and energy);

7. Reporting progress – gathering and organising information, and reporting requirements;

8. Identifying sources and causes of wastes – methods for tracking the sources

of wastes and emissions, the use of a "walkthrough"[9], reasons wastes are generated;

9. Identifying options for improvement – methods for developing and using generic and specific "checklists"[10], sources of information, and demonstration of databases containing case studies;

10. Product development and improvement analysis – how life cycle analyses are conducted, including qualitative and quantitative methods, as well as basic criteria for product improvement;

11. Brainstorming and creative thinking;

12. Evaluating options for improvement – using technical, economic and environmental criteria to evaluate options and prioritise;

13. Implementing options for improvement – developing implementation programmes, overcoming barriers, measuring and communicating success;

14. Industrial ecology, sustainable development and local responsibilities for achieving Agenda 21, and

15. Moving forward as a community – possibilities for extending the programme beyond the demonstration organisations.

The workshops included a mixture of direct teaching (lecture style), as well as group exercises. For most group exercises, participants had to work with colleagues from their own organisations. They had been asked to bring with them certain types of information from their own organisations (e.g. policies, diagrams of factory layouts) and used them to help them to undertake some of the required tasks.

At the beginning of the workshops, participants were given a set of notes and a CP/PP manual that had been developed by ECNZ (ECNZ, 1996). Towards the end of the

---

[9] The term *walkthrough* refers to an on-site exercise that involves viewing activities conducted by a business in sequence and following resource flows. It can assist in the development of flow diagrams for the business, as well as the identification of sources and causes of waste and options for improvement.

[10] The term *checklist* is used in reference to a list of possible options for improvement. Such lists are frequently produced by agencies for businesses to use as a source of ideas on how to improve.

workshops, participants were given a set of worksheets to help them to work through the programme. Both manual and the worksheets reflected the main components of the programme as shown in Fig. 3.1 above.

At the end of the workshops participants were asked to complete a questionnaire for evaluation purposes. Because of my involvement, this questionnaire was not included as one of the formal components of the evaluation outlined in s3.4 below. I wanted to be able to take as objective a view as possible of the implementation process for the programme, and, in order to do so, had no further input into the programme once the workshop had been completed. While it is reasonable to assume that my involvement at the start could have compromised impartiality, it is also important to note that the workshop represented only 2 days in a 2-year project. While it set the scene for the project, provided participants with a basic understanding of the programme and provided me with some measure of confidence that the programme would be consistent with standard CP/PP practice, the implementation relied on the support that would be provided by the project manager (who had considerable experience in CP/PP), the support staff from the local councils and power retailers, the consultants and the students. The project manager's role was to ensure, by interacting with other participants, that the project progressed according to its aims and that the programme was implemented.

While differences in style, expertise and experience suggest that the approach taken by individual consultants is likely to have varied, standardisation was reinforced by rigid reporting requirements throughout the two-year period. Reporting requirements reflected the workshop content, which in turn reflected a standard approach to CP/PP programmes. It is useful to note at this stage that the rigidity with which the programme was implemented was identified in the evaluation (see s4.4 below) as one of its drawbacks. While it is therefore recommended that this be changed in future programmes (see s5.3.3 below), it does provide a degree of confidence that the mechanisms in place to standardise the programme worked to ensure that its implementation was reasonably consistent.

At the end of the workshop, participants were asked to evaluate it. This process has not been included in the programme evaluation (see s3.4, below), because it was too early for it to contribute. The responses were summarised in a paper presented to the European CP Roundtable in Budapest (see Stone, 1999).

Overall, the responses to the workshop were predominantly positive. The evaluations suggest that practical aspects and activities were favoured over those that were philosophical. In hindsight, concentration of the training in a single workshop at the start of the programme may have been a mistake. It meant that even the interactive components tended to be theoretical and there were no formal opportunities for enhancing the educational value of the experiences that followed.

More recent training programmes (including those now conducted in one of the TZ regions) have tended to break this training into a series of monthly sessions during which participants share their experiences and learn about subsequent stages. Between the sessions, they work to apply what they learnt in the previous session and prepare for the next. While the different speeds at which people in different organisations work and learn can cause difficulties, it may serve to create more of an on-going learning process during the project period. Some of the innovations in training have come about as a result of the preliminary report on the results of the TZ evaluation (see Stone, 2000), although the programme components themselves (as presented in Fig. 3.1 above) have largely remained consistent.

3.4   The evaluation

3.4.1   Introduction

As mentioned earlier, I chose to evaluate the TZ project and use the results as the basis for developing a model to improve the effectiveness of sustainability programmes for business. The evaluation was conducted in three parts. The issues related to each part and the methods used are covered in detail in s3.4.2-4 below. However, it is useful at this point to provide an overview of the parts. They can be summarised as follows (see Fig. 3.2):

   Part I.   ***Feedback on the effectiveness of the project.*** The purpose of this part was to
            provide insight into participants' perceptions regarding the success of the

project. Representatives[11] from the demonstration organisations were asked to complete an evaluation form immediately after the end of the two-year period.

Part II. ***Broad trends attributable to the project.*** The purpose of this part was to identify changes in the demonstration organisations that could be attributed to participation in the project. The same set of representatives (as referred to in Part I) was surveyed before, during and after the project. Their responses were compared with those from a randomly selected "control" group.

Part III. ***Organisational factors contributing to progress.*** The purpose of this part was to identify organisational factors that contributed to the implementation of the project. The consultants assigned to each organisation were required to submit progress reports in a pre-determined format at monthly intervals.

The methods used for the three parts involved a combination of five of the evaluation models described in s3.1 above. In Part I they are based on the traditional model, while in Part II they are based on the social science model. In Part III they are based on the expert opinion model, with different elements drawing on the objectives-based and goal-free models. Different models and methods were used for triangulation[12] purposes. The methods used for each of the parts were subject to different types of bias. The results were therefore used in conjunction to minimise those biases.

---

[11] *Representative* is not an accurate term, because the staff who were selected were not representing their organisations, as such. Their responses would have reflected their own impressions and perspectives, rather than any agreed organisational position. The term *subject* would usually be used in a programme evaluation, but this is not accurate either since this implies that those in question were *subjected* to the programme. While they did act as conduits for the programme, they were hardly subjected to it in the normal sense of the word. The programme was directed at the organisations they worked for, rather than themselves. The term *participant* may have been more accurate, but this would not have made it possible to readily distinguish between these and other participants. The term *representative* is used here because, while not entirely accurate, it does make it easier to distinguish between participants who were staff of the demonstration organisations and others. It is used subject to the limitations identified above.

[12] *Triangulation* is a method that is used in social science to minimise bias. It involves conducting research using two or more methods, that are subject to different kinds of bias (Frankfort-Nachmias and Nachmias, 1996: 206).

Part I Feedback	PART II Trends	PART III Organisational factors
upon completion of project	*'before', 'during', 'after'*	*monthly*

Demonstration Group

Demonstration vs Control Groups

"Representatives" from organisations

Consultants
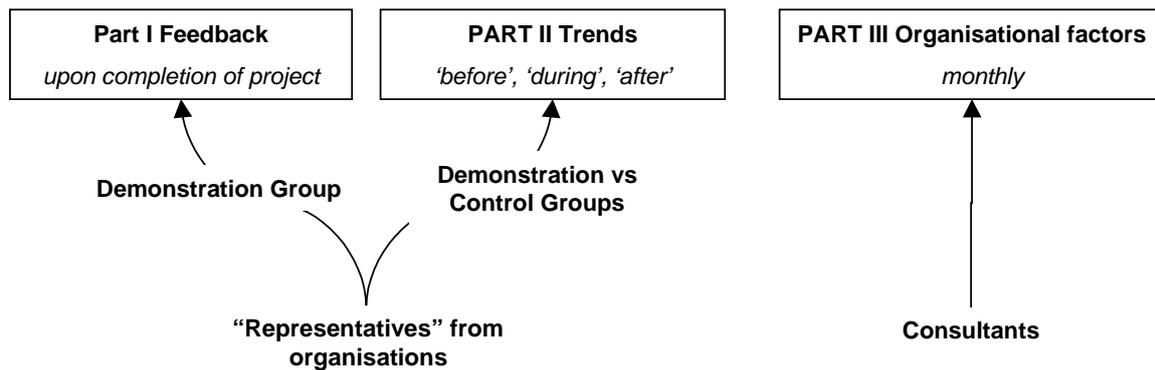
Figure 3.2. Components of the research programme that were designed to evaluate the Target Zero project and used as the basis for this thesis.

It is important to point out that a major feature of the evaluations was that they were essentially goal-free. I did not focus on the main aims of the project when developing the methodology. This is because I did not want the evaluation to be limited by the aims of the project and wanted it to add to the debate on whether participation in CP/PP projects does result in organisational change.

The alternative would have been to focus on the main aims and measure carefully the extent to which the project achieved them. The first aim of the project was to demonstrate that CP/PP can improve the environmental, as well as economic performance of participating organisations. An objectives-based evaluation would have focused on the environmental and economic outcomes of the project. I did not see any point in focusing on these outcomes, because the ability of CP/PP programmes to deliver in this regard is well documented and not really subject to debate (e.g., see Cambell and Glenn, 1982; Overcash, 1986; Martin, 1989; Huisingh, 1989; USEPA, 1992a; CAE 1992; UNEP/IE, 1993, 1994, 1995; MfE, 1994). Also, the evaluation would have been consistent with a traditional (and superficial) approach to the success of a CP/PP programme. While this approach may be valuable for demonstrating benefits and thereby motivating businesses to participate in CP/PP projects, it does not provide insight into the organisational changes within the organisations. It is these changes with which the thesis is concerned.

The second main aim of the TZ project was to use a multi-company approach to establish a

critical mass and thereby enhance the potential for the programme to endure beyond the 2-year project-period. This aim is essentially about the durability of the programme, and, if it focused on durability within the demonstration organisations themselves, it would be more likely to be of relevance to the issues with which this thesis is concerned. However, the main focus with regard to this aim was the ability of support agencies to extend the programme beyond the demonstration group. While durability of the programme within demonstration organisations was implicit and is demonstrated by the cyclical nature of the CP/PP programme chosen (see Fig. 3.1 above), the focus of this aim was durability within the communities within which the project was undertaken, rather than within the organisations themselves.

The TZ project manager was responsible for gathering information that would satisfy the two aims of the project. Demonstration organisations were required to provide information on the specific CP/PP options they identified/implemented during the project period, together with their economic and environmental implications. This information was used to develop a set of case summaries[13] (one for each business) that are typical of the public outputs of CP/PP programmes. They are motivational in nature, focusing on the specific changes that were made (e.g. changes to raw materials, production processes, equipment, etc). They include the environmental and economic benefits, as well as the investments made and time taken to recover them. They were published and disseminated so that the results of the project could be publicised and used to motivate new organisations to participate in subsequent projects.

The environmental and economic benefits of the project are of relevance to the thesis only to the extent that they suggest that the project was, indeed, successful in terms of traditional indicators of success (see Ch.4, s4.1). A major point of the thesis is that success based on these indicators provides no insight into the organisational changes that have (or have not) occurred as a result of the project, and no insight therefore into the likelihood of on-going improvement.

No formal research was conducted to determine whether a critical mass was established

---

[13] The term *case study* is usually used in reference to these types of summaries. The term *case summary* is used here to distinguish between these brief summaries of specific outcomes and the in-depth case study that forms the basis of the research for this thesis.

that would enable the programme to endure beyond the 2-year project period (the second main aim of TZ). This is because the final report on the project was required by the funding agency soon after the 2-year project period. It was believed that insufficient time would have passed to determine whether the project would work as an initiator of future programmes, and the final report was not required to include this aspect. (Brown, pers. com., 2002). I did not include it in my research either because I was more interested with internal, rather than external durability.

The methods used for each part of the evaluation, and the methodological issues that arose are presented in the sections that follow.

3.4.2 Methods used for Part I - Feedback on the effectiveness of the project

As mentioned in the previous section, Part I of the evaluation aimed to provide insight into participants' perceptions regarding the success of the project. The methods used were based on a traditional model for programme evaluation (e.g., see Posavac and Carey, 1997). Traditional models are the least formal types of evaluations and involve asking people who have participated in some way in a programme (or subjects) to give their impressions regarding its effectiveness.

For the TZ project evaluation, this was done at the end of the project period by asking one representative[14] from each demonstration organisation to fill in a questionnaire (see Appendix 1, Questionnaire for Part I). (The selection process for the representatives is outlined below.)

In the questionnaire, representatives were asked to rate the contribution that various external and internal components made to the implementation of the project within their particular organisations. The 'external' components were those that were characteristics of the project that were provided by external sources and were available to all demonstration organisations. They were (see Appendix 1, Part Ia):

  − the 'club' approach, including meetings, training and support from other

---

[14] See footnote no. 11, above, for limitations regarding the use of the term *representative*.

'club' members;

- – organisation-specific training and technical information on options for improvement;
- – participation of ECNZ, the local council and power company, and
- – assistance from students and consultants.

'Internal' components were those that demonstration organisations were expected to undertake or contribute during the course of the project. They were (see Appendix 1, Part 1b):

- – support for the project from the Board, as well as corporate and site management;
- – their environmental policy, a management system to facilitate the project;
- – the TZ team and time availability;
- – communication of progress to staff, staff training and involvement of other staff, and
- – the input/output analysis, waste audit/assessment, cleaner production options report and the financial analysis.

These parts of the questionnaire aimed to provide insight into representatives' perceptions regarding the relative value of the different components, as well as the extent to which they contributed to the implementation process. Because external components were all known to have been available to all demonstration organisations, a simple rating system was considered to be sufficient to provide insight into their perceived value. However, internal components, while required, were not necessarily undertaken or provided in all demonstration organisations. They were identified as requirements for the project because key CP/PP guides and manuals identify them as being important ingredients of success (e.g. USEPA, 1992b; de Hoo *et al*., 1991) and they were identified in the training workshop as being important. Because this was not necessarily sufficient to ensure that they did occur, representatives were asked to indicate whether the components did, indeed, exist within their organisations. Sometimes representatives indicated that the components did not exist, but rated them anyway. In these cases, the ratings were not included for analysis.

In addition to Parts 1a and b, Part 1c of the questionnaire asked each representative:

1. Whether their organisation had benefited from the project, and why;

2. Whether particular types of activities occurred in support of the project;

3. Whether they believed the project was successful, and which factors contributed to its success or otherwise;

4. What were the most valuable aspects;

5. How the project could be improved, and

6. Whether their organisation would continue to pursue CP/PP, and why.

Questions 1, 3 and 4 were asked to determine whether representatives' impressions regarding the project were consistent with organisers' expectations regarding the project's outcomes and the rhetoric they had used to encourage organisations to participate. It was believed that this would help to provide insight into any mismatches between impressions and expected outcomes. If the benefits of the project were different to those that had been used to encourage organisations to participate or if expected benefits did not eventuate, the value of the project may have been undermined and commitment and implementation may have suffered. It is also possible that the project delivered unexpected benefits. If these were valued, they could be recognised and enhanced to add value to future programmes. A distinction was made between benefits to the organisation and "valuable aspects". This was to provide representatives with the opportunity to include aspects that may have contributed to benefits, but also to extend their considerations beyond the benefits themselves.

Question 5 was asked to give representatives the opportunity to make suggestions that could be taken into account in making recommendations for improving future projects. Responses would also provide insight into any areas where there were inadequacies. Some of these may have been the source of difficulties encountered and identified in other parts of the evaluation, particularly Part III (see s3.4.4 below). Question 6 was asked to gain representative's impressions of the likelihood of their organisation continuing with CP/PP beyond the project period, and the reasons for their response. Responses could again be considered in terms of parts of the evaluation that were less subject to bias.

Question 2 is different to the others in that it is a forced choice, rather than open question that was designed to provide insight into whether particular activities occurred. These activities were not specifically covered in Parts II and III, and the information was regarded as necessary because it would help to determine the nature of communication within the organisation during the course of the project. This, in turn would assist with the question of whether the programme was likely to be durable.

All evaluations that use people as the source of data or information are subject to biases. Frankfort-Nachmias and Nachmias (1996: 215-217) identify three different sources of bias: 1) subjects' expectations of what is required of them ("demand characteristics"); 2) observers unintentionally communicating their expectations to subjects ("experimenter" or "observer bias"), and 3) measurement procedures that give hints to subjects about observers' intentions ("measurement artefacts"). While these sources of bias can be reduced, or at least mitigated, by sound research design (e.g., see Frankfort-Nachmias and Nachmias, 1996: 263-66), another form of bias that is less readily alleviated results from the cognitive limitations of subjects and observers. According to Simon (1957a), cognitive limitations cause people to "construct simplified models of the world in order to cope with it" (quoted in Slovic, Fishhoff and Lichtenstein, 1987: 18). Another form of bias is non-response bias, which results when some of the subjects in a sample do not respond to a questionnaire, and the results therefore provide an inaccurate indication of the perceptions of the population from which the sample is drawn (e.g. de Vaus, 1991: 73, 74).

Since they rely heavily on the impressions of the subjects, traditional evaluation models are also subject to bias, particularly that which results from cognitive limitations (Posavac and Carey, 1997: 23). In order to reduce this type of bias, the most senior staff member of each demonstration organisation, who attended the training workshop and remained involved in the TZ project for its duration, was selected as a representative. The majority of those selected had a management role (20), and 13 of those were production or operations managers. The rest were either managers of the organisation itself (3), had non-operational management responsibilities (2) or were quality and/or environmental managers (2). The two representatives who were not managers were operations/production engineers.

This selection process would not have eliminated cognitive bias completely, because the representatives were unlikely to have had the same understanding of the project, its

components and outcomes. Their impressions would have been influenced by these differences, as well as differences in the way the project was carried out in each organisation. Cognitive limitations are also a function of the beliefs, knowledge, background and experiences of the representatives themselves. This is why triangulation is an important feature of social research and why Parts II and III used different methods (see 3.4.3, 4 below).

Other potential sources of bias were identified above as "demand characteristics", observer bias and "measurement artefacts" (see above). The potential for demand characteristics to cause bias was reduced by the use of open questions in Part 1c. However, representatives' experience of the project would still have been different and this, as well as the other differences mentioned above, would have been reflected in their responses.

While the open questions would have reduced demand characteristics, their analysis would have been subject to observer bias and measurement artefacts. This is again why the evaluation used multiple measures that were unlikely to share the same biases (as suggested by Shadish, 1993). Forced choice, closed questions were used in Parts 1a and b to reduce 'observer' bias.

The questionnaire was mailed to the representatives at the end of the project period, and they were asked to complete it and return it in a self-addressed envelope marked "confidential"[15]. Administering the questionnaire by mail would have reduced the potential for bias that results from interactions between the representatives and an interviewer. It would also have given representatives the opportunity to consider more carefully their responses.

Disadvantages of mailed questionnaires as opposed to interviews, for example, are that they require questions to be simple, do not provide an opportunity for probing, provide no control on who fills out the questionnaire and can result in a low response rate (Frankfort-Nachmias and Nachmias, 1996: 225, 226). The simplicity of the questions was believed t be justified by the need to reduce the time it would take to complete the questionnaire.

---

[15] The research undertaken for the purpose of this thesis was approved by- and carried out subject to the requirements of the University of Auckland's Human Subjects Ethics Committee.

Representatives had by this stage already had two years of scrutiny and it was believed that a long or complex questionnaire would reduce the response rate.

The other potential sources of bias were reduced by mailing the questionnaire to the representative in an envelope that was also marked "confidential". The handwriting on the returned questionnaire was compared with samples of hand-writing provided in an earlier questionnaire that was completed at the start of the project and in the presence of the researcher (see Part II below). This process would have presented difficulties if any of the responses were typed and if the handwriting was not easily comparable. However, none of the responses were typed, and the handwriting was easily able to be matched with the earlier questionnaires.

The intent was to get a 100% response rate. In order to achieve this, follow-up telephone calls were made to the representatives at regular intervals until the questionnaires had been returned. One questionnaire was unable to be retrieved because the representative no longer wanted to participate. The final total of returned questionnaires was therefore 21. Unfortunately, this introduces some non-response related bias. However, several attempts indicated that the representative was not going to fill in the questionnaire and, without some type of coercive power, nothing more could be done to retrieve it.

3.4.3   Methods used for Part II - Broad trends attributable to the project

As mentioned in s3.4.1, Part II of the evaluation aimed to identify changes in the demonstration organisations that could be attributed to participation in the project. The methods used were based on a social science research model for programme evaluation (e.g., see Posavac and Carey, 1997: 24). In its purest form, this model is also referred to as an "experimental"[16] model (e.g. Robson, 1993: 83; Ellis, 1994: 221; Frankfort-Nachmias and Nachmias, 1996: 101). It is more formal in its approach and compares a randomly selected "experimental" group with a "control" group. The experimental group is subjected to a particular "treatment"[17], while the control group is not (Robson, 1993: 77-78). Any

---

[16] It is generally recognised that a true experimental model is not possible for programme evaluation (Kolb, pers. com., 2002). Programme evaluations that use this scientific approach are generally referred to as 'quasi-experimental (e.g., see Cook and Campbell, 1979).

[17] The term *treatment* is used in reference to actions whereby independent variables are manipulated by the researcher (Robson, 1993: 79).

statistically valid differences between the control and experimental groups are considered to be attributable to the treatment, rather than chance (Posavac and Carey, 1997: 24).

As implied, the experimental model is most useful in laboratories or clinical trials, when directly comparable subjects can be randomly selected and subjected to specific kinds of treatment. However, most social research takes place outside laboratories and in, what Robson (1993) refers to as the "real world". In reality, a number of issues make experimental social research problematic. These include: 1) comparability of the control and experimental groups; 2) extraneous influences that render the comparison invalid; 3) inaccurate realisation of the variables; 4) the constraints that ethical considerations may place on the research, and 5) time and expense (Robson, 1993: 84-85; Ellis, 1994: 233-234). Recognition of these difficulties has resulted in the term "quasi-experimental" being used to describe research methodologies that are based on the experimental model, but recognised as being subject to the limitations identified above (Ellis, 1994: 241).

Ellis (1994: 242-246) identifies three main categories of quasi-experimental research design: "retrospective" designs, whereby the control and experimental groups are selected after an intervention has occurred (e.g. in the case of exposure to chemicals); "prospective" designs, whereby variations in dependent variables are measured as they occur (e.g. foetal exposure to alcohol during pregnancy), and "time series" designs, whereby variations in dependent variables are followed over time.

Part II of the TZ evaluation used a quasi-experimental research model as a basis. This is because this model is believed to be more rigorous than the traditional model used for Part I, and, while it is still subject to bias, the biases are different and it reduces self-serving biases (e.g., see Posavac and Carey, 1997: 24). The design used was a combination of adaptations of the prospective and time series designs mentioned above.

An experimental group, hereafter referred to as the "demonstration" group, and a "control" group were selected[18]. The demonstration group was made up of a single representative

---

[18] Ellis (1994: 242) recommends the use of the terms *exposure group* and *comparison group* to denote the two groups in quasi-experimental research. This is to emphasise that the research is not experimental. However, not all authors see the need for this and I have chosen to call the exposure group the *demonstration group* and to leave the control group's name as it is.

from each demonstration organisation (22 in total), while the control group was made up of a single representative from a randomly selected group of organisations (also 22 in total). The control organisations were located in the same regions in which the TZ project was being conducted, but were not participating in the programme. Each group was surveyed three times during the project period: 1) at the start of the project (referred to hereafter as 'before' or 'year 0'); secondly, in the middle of the project period, i.e. a year after the start (referred to as 'during' or 'year 1'), and at the end of the project period, i.e. 2 years after the start (referred to as 'after' or 'year 2').

The demonstration group was composed of the same representatives (one for each of the demonstration organisations) who were selected for Part I (see s3.4.2, above). The selection process for the organisations in the control group is outlined below.

1. Since the demonstration group consisted of a set of nationally significant industries, it was decided that the control group should be composed in a similar way. Census data (containing the national and regional profiles of organisations or "Industry Trading Units" (ITU's) in NZ - Statistics NZ, 1997) was used to develop a profile of nationally significant ITU's in each region. The profile contained percentages of organisations in each nationally significant category.

2. Business telephone directories for each region and a random number generator were used to identify a "population"[19] of 100 organisations from which a control group could be selected. The number 100 was used because it was easy to assign numbers to proportions of nationally significant industries (% = no.), and because the budget allowed for that number to be surveyed. While it was intended that there would be equal numbers of organisations in the demonstration and control groups (22 in total), a greater number was selected in the initial stages of the research. This is because it was believed that there was likely to be some attrition[20] during the 2-year project period. The research design required that the same representatives

---

[19] A *population* is the group from which a sample is drawn.

[20] Attrition was expected because it was likely that some organisations would no longer wish to participate in the project and there were also likely to be staff changes.

from each organisation be surveyed each time. It was therefore necessary to have a population that was sufficient in size to ensure that a sample of 22 would still be available at the end of the project.

3. The 100 organisations were contacted and 71 agreed to participate in the research. All 71 organisations were surveyed at the start (year 0) and a year after the start (year 1). As expected, a number of organisations were, by year 1, no longer prepared to participate and there were also staff changes. Organisations that were no longer prepared to participate, as well as those where the original representative had left, were removed from the population.

4. By the end of the project period only a third of the organisations remained. The final sample of 22 control organisations[21] was selected from this population on the basis of the number of employees on the site in question. This was to ensure that the sizes of the organisations in the control group were similar to those in the demonstration group.

The compositions of the two groups (by industry category) are graphically presented in Fig. 3.3. From the figure, it can be seen that the compositions of the two groups are different. This is because of the random nature of the selection process for the control group, the attrition that occurred and the use of size as a basis for selecting the final sample. There was a wider range of organisation types in the demonstration group. While five out of eleven categories were represented in both groups, the demonstration group included organisations from the service sector, while the control group did not. In addition, the demonstration group did not include any printers, while the control group did.

While an attempt was made to ensure that the compositions of the two groups were comparable, in reality, the composition reflected the difficulties that are involved in selecting comparable samples in the "real world". These differences may bring into question the validity of the comparison between the two groups. However, the alternative to using a control group would have been to use the demonstration group itself as a control. (see Ellis, 1994: 244-245). However, this would have required measurements to be taken in

the demonstration group before the TZ project could have exerted any influence. The opportunistic nature of the use of the TZ project for this thesis (see Preface) meant that there was insufficient time before the start of the project to undertake these measurements. In the absence of this, the control group was used to provide an indication of the measurement within uninfluenced organisations.

As mentioned earlier, the representatives for the organisations in the demonstration group were the same individuals who were surveyed for Part I of the evaluation. The original intention was to survey all the team members in each demonstration organisation. This would have provided more detail on each organisation and insight into differences in perceptions amongst a wider range of staff. While all team members were therefore surveyed at the start of the project (a total of 110), the number of team members who were able to be re-surveyed in subsequent years declined. This was due to changes in the teams that resulted from changing responsibilities, increased pressure and staff leaving. It was therefore decided that the responses of only one representative from each demonstration organisation would be included in the final analysis. These representatives were chosen on the basis of seniority, continued involvement in the TZ project and availability for surveying (all three times).

---

[21] While the demonstration and control groups both finally contained 22 organisations, there were only 21 responses in each to the final survey. This was because one organisation in each group withdrew from the research.
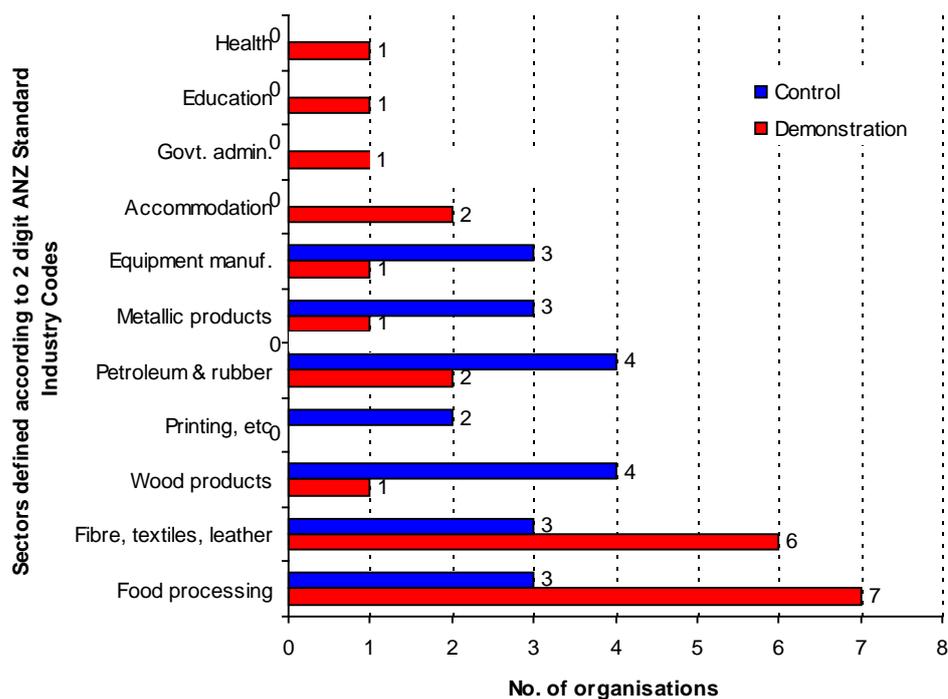
Figure 3.3. Composition of organisations within the control and demonstration groups.

The selection process for the representatives for the organisations in the control group is described below.

The initial contact with the 100 organisations from which control organisations would be selected was made by telephone. Surveyors[22] were instructed to ask to speak to the production or operations manager of each organisation they contacted. This position was the first choice because there was a predominance of production or operations managers in the demonstration group. In addition, production or operations managers were considered likely to:

1. Have an understanding of production/operational, as well as managerial aspects of their organisations;

---

[22] The term *surveyors* is used to describe those making the initial contact with the organisations, because they did so at the same time as conducting the first survey for Part II.

2. Have some understanding of environmental issues and their management within their organisations, and

3. Be able to influence environmental outcomes.

If the organisation did not have a production or operations manager, the operator asked to speak to the "person responsible for environmental management". In organisations that did not have a production/operations manager, it was presumed that there was unlikely to be a position specifically allocated for environmental management and that someone else in management would be identified. These assumptions appear to be supported by the composition of positions of respondents in the control group (see Fig. 3.4).

From Fig. 3.4 it can be seen that all bar one of the representatives in the control group were in management positions. Half were responsible for the overall management of the sites in question, while a third were production or operations managers. Only three were quality or environmental managers, and one of those no longer held that position in later surveys. The demonstration group is similar, in that the majority of respondents had management positions. However, in contrast to the control group, more than half the representatives in the demonstration group were production or operations managers and only a few (between 1 and 3) were responsible for the overall management of their sites.

In summary, the results analysed at the end of the project period were from a total of 44 representatives of demonstration organisations (22 in each group, one from each organisation). Two respondents from each group either refused or were unavailable to carry out the final survey, so the total for that sample is 40 (i.e. 20 in each group, one from each organisation).
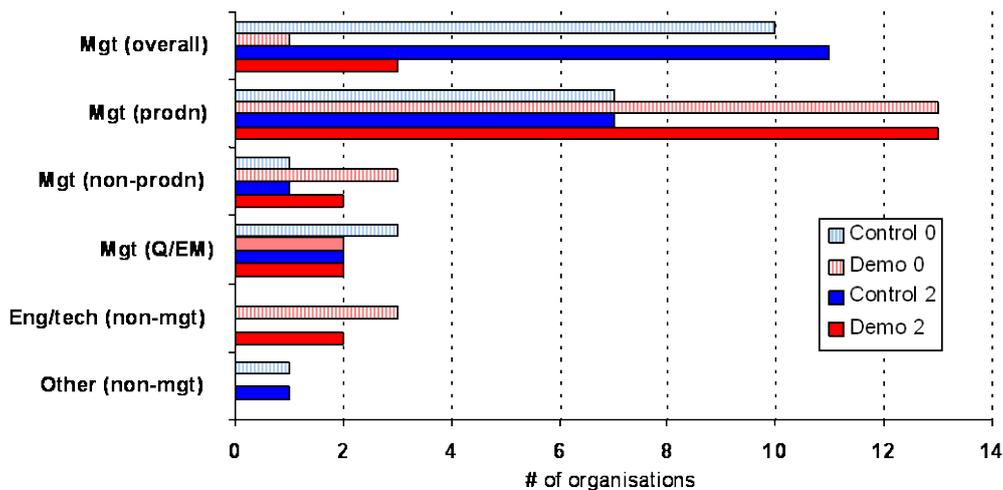
Figure 3.4. Positions of the respondents in the control and demonstration groups.

KEY:

Control 0 and Demo 0 refer to the control and demonstration groups before the start of the project (year 0);

Control 2 and Demo 2 refer to those groups 1 and 2 years after the start of the project;

Mgt (overall) = managers responsible for the business as a whole;

Mgt (production) = managers responsible for production or operations;

Mgt (non-prodn) = managers responsible for other non-production areas (e.g. marketing, sales);

Mgt (Q/EM) = managers responsible for quality and/or environmental management;

Eng/tech = engineers or technicians;

Other (non-mgt) = others with no management role (e.g factory hands).

As mentioned earlier, the measurements were undertaken by means of a questionnaire that was administered at the start of the TZ project (year 0), a year later (year 1) and at the end of the project (year 2).

The questionnaire had two parts. The first (see Appendix 1, Part IIa, i and b, i) was designed to assist in the development of a profile of the organisation and to help TZ organisers to develop an understanding of demonstration organisations' needs. It was not used in the project evaluation. The second (see Appendix 1, Part IIa, ii and b, ii) was designed to "measure" the existence within the demonstration and control organisations of key elements of organisational change that are considered in the literature to indicate: 1) the uptake of environmental management (EM); 2) the uptake of CP/PP; 3) relevant aspects of organisation culture, and 4) relevant attitudes (e.g. USEPA, 1988, 1992;

143

Ledgerwood, *et al.*, 1992; Welford and Gouldson, 1993; UNEP/IE, 1993, 1994, 1995).

This part of the questionnaire was set up in the form of a series of statements, and representatives were required to rate them according to a simple Likert-style scale (e.g., see de Vaus, 1991: 88).

To reduce bias, the statements were arranged in random order. In order to assist the reader, they are presented below in their categories.

1. Indicators of environmental management:

   - "Our [Chief Executive Officer] CEO is committed to improving environmental performance";
   - "Our organisation has a formal environmental policy";
   - "We have a comprehensive environmental management programme";
   - "We have an on-going process for improving environmental performance", and
   - "Environmental criteria are included in our staff performance appraisals".

2. Indicators of CP/PP:

   - "Our company has a formal programme to reduce wastes";
   - "Our company has conducted a waste audit";
   - "We have identified opportunities for cleaner production in our company", and
   - "Our company conducts waste audits as a regular component of business practice".

3. Relevant elements of organisational culture:

   - "Environmental performance is a low priority for our company";
   - "Environmental management is carried out on an ad-hoc basis";
   - "Our environmental programme is driven purely by compliance requirements";

- "Waste treatment and disposal are the main focus of our environmental programme";
- "Our quality, [Occupational Health and Safety] OH&S and environmental management programmes are strongly linked";
- "Senior management presents barriers to improving environmental performance";
- "Company structure makes it difficult for environmental improvements to occur";
- "Our company has a steeply hierarchical structure";
- "Staff are actively encouraged to identify environmental improvements", and
- "We actively seek and encourage input from community groups", and
- "We have a confrontational relationship with community groups".

4. Attitudes considered relevant for CP/PP uptake:

- "It makes good business sense to improve environmental performance";
- "Improving environmental performance will enhance our competitiveness";
- "Improving environmental performance always costs money";
- "There are no economic benefits to be gained from cleaner production";
- "The best way to reduce wastes is by changing processes and products";
- "Wastes are best dealt with by treatment";
- "Wastes are an inevitable consequence of business", and
- "Our company is already doing all it can to reduce wastes".

The questionnaires were piloted in a seminar that was presented to businesses before the TZ project started, and adjustments were made to minimise bias that may have resulted from misinterpretation of any of the statements. However, this would only have minimised biases caused by demand characteristics.

Different types of cognitive biases would have arisen as a result of the different categories. Responses to Categories 1 and 2 were least likely to be subject to cognitive biases because most of the statements are unequivocal, reflecting specific programme components with which representatives could reasonably be expected to be familiar. This is important

because the statements reflect programme components that were required to be implemented during the course of the TZ project. The statements were included to provide insight into which elements had, indeed, been undertaken. An exception is the first statement in category 1, since representatives perspectives of CEO commitment would have depended on whether they had experienced anything that demonstrated CEO commitment, as well as their general perceptions and beliefs regarding the CEO. However, the statement was included because CEO commitment is strongly advocated in the literature as an essential element of EM/CP/PP programmes and it would have been an omission to exclude it.

Responses to statements in Category 3 would have been subject to cognitive biases because they would reflect, to a greater degree, representatives' understanding and interpretations regarding the topics covered. However, they have still been identified in the literature as being important (e.g., see Chandak, 1994; Hillary, 1999), and were included for this reason. Cognitive biases were of less interest in the responses to Category 4, because the statements are meant to reflect attitudes, which are inherently subjective.

The effects that cognitive biases may have had on the results for Part II are further discussed in Ch. 4 (s4.3, below).

An important characteristic of the rationale for the questionnaire format was the ability for it to be completed in a very short period prior to the start of the training workshop. For year 0, the questionnaires were hand-delivered to representatives from the demonstration organisations at the start of the workshop and collected immediately after they had completed them (i.e. immediately before the start of the workshop). For year 1, they were again hand-delivered, but this time by visiting the demonstration organisations and delivering the questionnaires directly to the representatives. This minimised the potential for the questionnaires to be received and filled in by anyone other than the intended recipients. It also increased the potential for a high response rate. For some, arrangements were made to return them in sealed, self-addressed, postage paid envelopes. The final survey was delivered and returned by mail. This was because I was unable to travel to participating regions at the appropriate time.

For the control group, the questionnaire was administered by trained surveyors who contacted the control organisations by telephone. The surveyors were trained as follows: 1) they were asked to read the questionnaire; 2) any difficulties in understanding were discussed and clarified; 3) they practised using the questionnaire by telephoning a small number of randomly selected businesses outside the two regions in which the demonstration project was running; 4) adjustments to the non-substantive parts of the questionnaire were made to assist delivery, and 5) daily discussions were held during the survey period to resolve any new issues that arose.

As mentioned earlier, quasi-experimental evaluation research relies on an analysis of the differences between the experimental group and the control group. If differences in the results for the two groups are statistically significant, the changes in the experimental group are considered likely to be attributable to the treatment. The statistical significances of the results were tested using Fisher's Exact Test (Fisher, 1935). The test calculates the extent to which the null hypothesis applies to the results. A p value of less than 0.05 indicates that there is more than 95% probability that the results are not due to chance.

3.4.4   Methods used for Part III - Organisational factors influencing progress

As mentioned in s3.4.1, Part III of the evaluation aimed to provide insight into the organisational factors that contributed to the implementation of the programme. It was very different to Parts I and II in that it relied on the opinions of the consultants who had been assigned to the demonstration organisations, rather than representatives from those organisations. As a result, the biases would have been quite different (see below).

The methods used for Part III were based on the expert opinion model for evaluation research, with elements that are consistent with objectives-based evaluation and goal-free evaluation (e.g., see Posavac and Carey, 1997: 25, 26). Expert opinion models rely on the impressions of experts. While this suggests that they may be subjective, they are considered more objective when based on specific, quantifiable criteria (Posavac and Carey, 1997: 26).

Both types (subjective and objective) were included in Part III, which required the

consultants to provide monthly[23] reports on the progress of each of the organisations to which they had been assigned, during the course of the project period. The reports were required to be provided in a standard format and contained three parts (see Appendix 1, Parts IIIa-c).

Part IIIa used an objectives-based evaluation model to gain insight into the extent to which the organisations were achieving specific milestones during the course of the programme. The milestones were: an environmental policy and implementation strategy; a walkthrough of the site, an input-output analysis using existing information, and identification of the information and resources needed to complete a materials and energy balance; a waste assessment, including a "live"[24] materials and energy balance, and a written report (see s3.3, above for an explanation of these programme components). This can be considered to be consistent with an objective, rather than subjective, expert opinion model, because an expert (in this case the consultant) was asked to provide insight into the extent to which specific programme components were being achieved. Consultants were also required to provide comments on progress towards achieving these milestones.

Part IIIb, on the other-hand, was more consistent with a goal free model. When an evaluation focuses on goals, there is the possibility that issues that are not directly associated with the goals will be overlooked (e.g., see Posavac and Carey, 1997: 25). Part IIIa is a good example of this. When subjects were asked to comment on the achievement of certain milestones, they were likely to focus their comments on the milestones themselves. Other issues that may have been peripheral, e.g. communication difficulties amongst the team members, may not have been identified. A goal free model attempts to avoid specific goals and thereby uncover issues that are not directly related to them.

For Part IIIb, consultants were required to provide their impressions of:

- What was working well, and why;
- What was not working well, and why not, and

---

[23] While the progress reports were initially required to be provided on a monthly basis, after the first year the reporting period was increased to two months.

[24] The term *live* was used in reference to a materials balance that involved on-site measurement of inputs and outputs, rather than a desktop analysis.

     –   How the issues would be resolved.

They were also asked to comment on any other issues that were being faced or were likely to arise and to identify any additional resource or training needs.

The consultants cannot be considered completely impartial, because they were employed to work with the demonstration organisations to assist them to undertake the project. It could be said that they had a vested interest in the demonstration organisations with which they were working being seen to be successful. While biases could be expected to occur as a result of this, they may have been mitigated by the limitations that were placed on the consultants. It was made very clear in their contracts that they were acting as facilitators only (rather than advisors), and they were only allocated a day a month to spend with each organisation. The reports suggest that consultants were, indeed, candid about the difficulties being faced within the organisations. It is possible that their candour was as a result of them wishing to protect themselves from blame if the project failed. This would, however, have served the aims of the analysis for Part III, which was to identify the organisational factors that influenced progress.

The comments from Parts IIIa and b were used to identify these organisational factors. Content analysis (e.g., see Chadwick, *et al*., 1984) was used to identify all of the factors that were believed to be contributing negatively or positively to progress within each of the organisations. The literature on organisation theory is commonly organised according to the following areas of interest (e.g., see Pugh, 1997): structure, organisational environment, management, people, and organisational change and learning.

These areas of interest were used to categorise the factors. Their distinguishing characteristics are summarised below.

     –   Factors were placed in the 'structure' category when they were part of the way the demonstration programme *or* the organisations themselves were organised. They included the roles played by groups/actors, the way in which these roles were assigned and the interactions between groups/ actors.

     –   Factors were placed in the 'organisational environment' category when they were considered to be outside the direct control of the organisations

themselves, but nevertheless had some influence on their activities.

− Factors were placed in the 'management' category when they were part of decision-making within the organisation, at a corporate or site level.

− Factors were placed in the 'people' category when they directly involved actors or groups of actors, from within as well as outside the organisation.

− Factors were placed in the 'organisational change' category when were considered to have had a direct influence on the organisation's ability to change or learn, including the processes by which change occurred.

It is important to note that this part of the analysis was purely qualitative. The intent was to identify the full *range* of factors that influenced progress and not to assign relative significance to them. This approach was taken because each organisation is different, and factors that are important in one may not be as important in another. The factors were therefore simply categorised as they arose.

The progress reports also contained a section that was used by the project manager for budgeting purposes and was not the subject of this evaluation (see Appendix 1, Part IIIc).

≈

The results from each part were analysed separately. Results that were found to be consistent for all three parts, as well as those which were compelling (and not contradicted) in the others, were used as the basis for developing a set of conclusions regarding the effectiveness of the project. These conclusions were then considered within the context of the literature on EM/CP/PP programmes and relevant developments in organisation theory. This discussion was used as the basis for developing a model to improve the effectiveness of sustainability programmes for business.

4   Effectiveness of the Target Zero project

4.1   Introduction

As mentioned in Ch.1, my thesis is that sustainability programmes could benefit from critical examination of their place and practice within the context of developments in organisation theory. I undertook to test the thesis by: 1) identifying developments in organisation theory that are of relevance to organisational change; 2) evaluating the effectiveness of a particular type of sustainability programme for business, and 3) considering the results of the evaluation within the context of relevant theoretical developments and change management models.

Previous chapters have contributed by providing an overview of these developments (Ch.2), and a background to- and methodologies for evaluating the effectiveness of NZ's Target Zero project (TZ) (Ch. 3). This chapter presents the results of the evaluation.

As mentioned in Ch. 3, the evaluation was undertaken in three parts: Part I was designed to gather feedback on the project's effectiveness; Part II was designed to identify broad trends in the demonstration organisations that could be attributed to participation in the project, and Part III was designed to identify the organisational factors that influenced progress during the programme.

The results of the evaluation are presented in s4.2 (Part I), s4.3 (Part II) and s4.4 (Part III) below. Section 4.5 provides a synthesis of the results and the key conclusions that can be drawn from them. These key conclusions are used to provide a framework for the discussion in Ch.5.

As mentioned in s3.2, above, the TZ project was what is referred to as a cleaner production or pollution prevention (CP/PP) demonstration project. One of its main aims was to demonstrate the environmental and economic benefits of CP/PP. It is important to emphasise that the evaluation conducted for the purpose of this thesis did not intend to evaluate the TZ project on the basis of whether it achieved this aim or not. As mentioned in s3.4, this is because: 1) the ability of the project to deliver in this regard was never really

the subject of debate, and 2) the evaluation aimed to provide insights that would broaden our understanding of the uptake of such programmes and the factors that influence them.

However, much time, effort and money went into the project and it seems only fair to point out that it can, when measured in more traditional terms, be considered to have been successful. During the course of the project, the demonstration organisations identified CP/PP options (i.e. changes to processes and products) worth $3.95 million in annual savings (or an average of 0.7% of turnover). These savings and environmental benefits are summarised in Table 4.1[1].

While these benefits are consistent, in general terms, with benefits that have been realised in other "successful" projects (Watt, Pers. com., 1999), it is important to emphasise that they provide little insight into the organisational change and learning that occurred during the course of the project, and hence its durability. It is hoped, that by contributing to this insight, the results presented in the sections that follow, and the recommendations made, will prove to be an important and unique benefit of the project.

Table 4.1. Environmental and economic benefits resulting from the Target Zero (TZ) project. (te = tonne equivalents). Source: Brown, 2000.

Environmental indicators	Quantities/yr		Savings/yr
	Region 1	Region 2	
Inputs			
Water, m^3	364,200	94,200	$62,190
Fossil fuels, GJ	26,430	17,740	$265,300
Electricity, MWh	430	535	$63,550
Material	$1,155,970	$489,440	$1,645,410
Outputs			
Trade waste, m^3	387,280	123,990	$116,210
Solid waste, te	1,680	890	$239,300
Product	$710,890	$684,160	$1,395,050
CO_2 emissions, te	2,590	1,850	4,440 tonnes

---

[1] Information on the environmental and economic benefits of the project was provided in reports to the TZ project manager, and summarised by him as part of his role.

4.2 Results for Part I: Feedback on the effectiveness of the project

4.2.1 Introduction

As mentioned in s3.4 above, Part I of the evaluation aimed to provide insight into participants' perceptions regarding the effectiveness of the project. Selected representatives from demonstration organisations were asked to provide feedback on the benefits of the project, its success and value, and whether or not their organisation was likely to continue with cleaner production. They were also asked to rate the relative contribution of various internal and external components. The results are presented in two sections: s4.2.2 covers Part Ic, while s4.2.3 covers Parts Ia and b. The results for Part Ic are covered before those for Parts Ia and b, because they are more general in nature. Discussion that relates to both parts is included in s4.2.3. The results for all three are summarised in s4.2.4.

4.2.2 Feedback on the project as a whole

The following section provides a summary of the results for Part Ic of the TZ project evaluation. A single representative from each demonstration organisation (see s3.4.2, above) was asked:

1. Whether his/her organisation had benefited from the project, and why;

2. Whether particular types of recommended, but discretionary activities, occurred during the course of the project;

3. Whether s/he believed the project was successful, and which factors contributed to its success or otherwise;

4. What were the most valuable aspects;

5. How the project could be improved, and

6. Whether her/his organisation would continue to pursue CP/PP, and why.

Their responses are summarised below[2].

In response to the question of whether their organisations had benefited from the TZ project, the majority of respondents[3] (90%) believed that this was the case. The reasons given were: increased awareness (60% of total); financial benefits (35% of total); cleaner production (30% of total), and reduced inputs (10% of total). Reasons given by those who did not believe the project benefited their organisations were lack of time and staff changes or restructuring.

In response to the question of whether the project was successful, three quarters of respondents believed that the project was successful overall. The factors that were believed to have contributed most were: interaction between team members (40% of total); provision of external support (35% of total); measurement of inputs/outputs (10% of total); management support (5% of total); training (5% of total) and cost reduction (5% of total). Factors that were believed to have presented barriers were: staff changes; lack of a team; difficulty in overcoming the inertia of a large organisation; lack of priority given to waste management; changes to management structure, and lack of commitment by those involved.

In response to the question on what were the most valuable aspects of the project, respondents identified: improved knowledge regarding waste management (60% of total); increased profitability (30% of total); increased awareness (20% of total), and external support (15% of total). It is interesting to note that while economic benefit does not appear to have been perceived as being a major *driver* in terms of the success of the project, it was considered by 30% of respondents to have been one of the most valuable aspects of the project.

In response to the question of whether their organisations would continue to pursue cleaner production, almost all believed that this would be the case. The reasons they gave were:

---

[2] Note that the percentages do not always total 100%. This is because the questions were open and some respondents gave more than one answer.

[3] Representatives (as identified in Ch. 3, s3.4.2) will hereafter be referred to as *respondents*. This is to emphasise that they were not representatives of their organisations and that their responses were their own. They were not previously referred to as respondents because they had not yet become so.

enhanced competitiveness and profitability (80% of total), and waste reduction together with improved compliance (50% of total). It is interesting to note that while competitiveness and profitability are consistent with economic benefits (which were identified as benefits of the project), they do not appear to have been considered to be important in terms of the project's success. Human factors were far more common in this regard. This may suggest the durability of the programme was recognised as being reliant on support at higher levels in the organisation, where economic imperatives are of greater direct relevance. They may have been less of an issue in terms of the day-to-day activities associated with implementation, where the importance of human factors may been more noticeable.

When asked how the project could be improved, respondents suggested: allowing more staff time (25% of total); increased management commitment (25% of total); increased external support (20% of total), and involvement on a larger scale (10% of total). A quarter of respondents suggested a wide range of other ways to improve the project, including: enhancing marketing and sales opportunities; separating manufacturing organisations from service organisations; less in-depth analysis; shorter term/specific project focus; stronger leadership and co-ordination, and less management dominance. Only one respondent believed that no improvement was required.

Responses to the question about communication and reporting indicate that site managers received reports in 80% of the demonstration organisations, but corporate management and the Board received reports in only 10% of organisations. It is interesting to note that there did not seem to be a relationship between reporting to the Board and superficial success (when considered in terms of the economic and environmental benefits identified in s4.1, above). Reports to the Board appear to have occurred in only 1 of the top 5 performers. This may reflect the operational, rather than strategic approach, that was taken to the TZ project.

In summary, the perception of the project as a whole appears to have been positive. However, it is interesting to note that, while 90% of respondents believed that the project was beneficial, only a third believed that this was due to the economic benefits and/or cleaner production, and only 10% believed that this was due to reduced inputs. This is

interesting considering that the TZ project was marketed on the basis of its potential for delivering economic benefits and that it did, indeed, result in annual savings that totalled $3.95 million/year (see s4.1, above). In contrast, almost two thirds of respondents believed that the benefit was due to "increased awareness", and an even greater percentage believed that this, together with improved knowledge was the most valuable aspect of the project.

These results suggest that the primary benefit of a CP/PP demonstration project may not be its ability to deliver economic or environmental benefits, but rather its ability to raise the awareness of staff. If this is the case, it may be necessary to consider more carefully the way in which the benefits of the project are presented and success is measured and communicated. It may also be useful to focus on the awareness raising potential of the project and maximise its potential as a catalyst for change.

Fewer respondents, although still a majority (75%), believed that the project as a whole, was successful. The project was not, therefore, considered to have been successful by all of the respondents who thought it was beneficial. This may have been due to a disparity between their expectations and the actual outcomes. One response to these results would be to recommend that the objectives of future projects are properly communicated to participants.

A number of factors were believed to have contributed to the perceived success of the project. It is interesting to note that cost reduction ranked low on the list (only 5% of respondents believed that it made a significant contribution). This suggests that the economic benefits identified by most organisations were not significant drivers for the project. Closer analysis appears to confirm this. Experience suggests that the annual savings of organisations participating in cleaner production demonstration projects average out at approximately 1% of turnover (Watt, pers. com., 2000). Only five of the organisations participating in the TZ project achieved annual savings that were greater than or in the vicinity of 1% (Brown, 2000). Despite this achievement, only one respondent from these organisations believed that cost reduction had been a major factor in the success of the project. The remainder (and the rest of those who believed that the project was successful) identified other contributing factors.

4.2.3 Feedback on specific components

Parts Ia and b were designed to provide insight into the extent to which various programme components contributed to implementation of the programme. Respondents were asked to rate the contribution made by externally provided and internal components.

The responses for *external* components are graphically presented in Fig. 4.1. In summary, they suggest that:

- the 'club' approach contributed well in 90% of organisations[4];
- the 'club' meetings and local council support contributed well in 85% of organisations;
- students contributed well in 80% of organisations;
- ECNZ contributed well in 75% of organisations;
- the TZ appointed consultant contributed well in 70% of organisations;
- 'club' training contributed well in 65% of organisations;
- technical information on options contributed well in 60% of organisations;
- direct support from 'club' members contributed well in 55% of organisations, and
- specific training contributed well in 40% of organisations.

The responses for *internal* components are graphically presented in Fig. 4.2. In summary, they suggest that:

- the waste audit contributed well in 70% of organisations[5];
- the input/output analysis and environmental policy contributed well in 55% of organisations;
- support from site management contributed well in 45% of organisations;
- the cleaner production options report and TZ team contributed well in 40% of organisations;

---

[4] Components are presented in order from the one receiving the highest evaluation to the one receiving the lowest evaluation. The percentages are aggregated and refer to the total percentage of respondents who believed that each particular component made a 'good', 'very good' or 'outstanding' contribution.

[5] The extent to which the internal components existed in each organisation was different, therefore the results for these components do not reflect the potential value of the components for implementing a CP/PP programme. Rather, they provide insight into relative value that they were perceived to have within the context of each particular organisation. This was the case, albeit to a lesser degree, for variable external components, such as students, consultants and specific training.

- financial analysis, other staff, the management system and support from corporate management contributed well in 35% of organisations;
- communication of progress to staff contributed well in 30% of organisations;
- staff training contributed well in 25% of organisations, and
- time availability and support from the Board contributed well in only 20% of organisations.

The results suggest that the external components, particularly those to do with the 'club' approach and meetings, as well as the support provided by the local councils, the students, ECNZ and the consultant, rated higher than any of the internal components. These external components were major features of the TZ project, and the results suggest that they were adequately provided. It seems that where the project fell short was in the on-site implementation. Of the internal components, only waste audits were rated similarly to the external components identified above. Some insight into the reasons for this may be provided in the relatively low ratings given to training. While 'club' training (or training that was directed at the group as a whole) was rated well by 65%, training specific to the needs of each demonstration organisation was rated well by only 40% of respondents. It is possible that difficulties in the implementation had something to do with inadequacies in the ability of the project to cater for the specific needs of each organisation.

It is interesting to note that in Part Ic (see s4.2.2, above) only 35% of participants identified external support as an important contributing factor in the perceived success of the project, and a total of 60% identified internal components. Interaction amongst team members was most commonly identified as an important contributing factor (identified by 40% of respondents), well ahead of management support and training (only 5% of all respondents). It is possible that this reflects differences in the demand characteristics of the forced choice questions in Parts Ia and b, where respondents are obliged to rate specific components, and
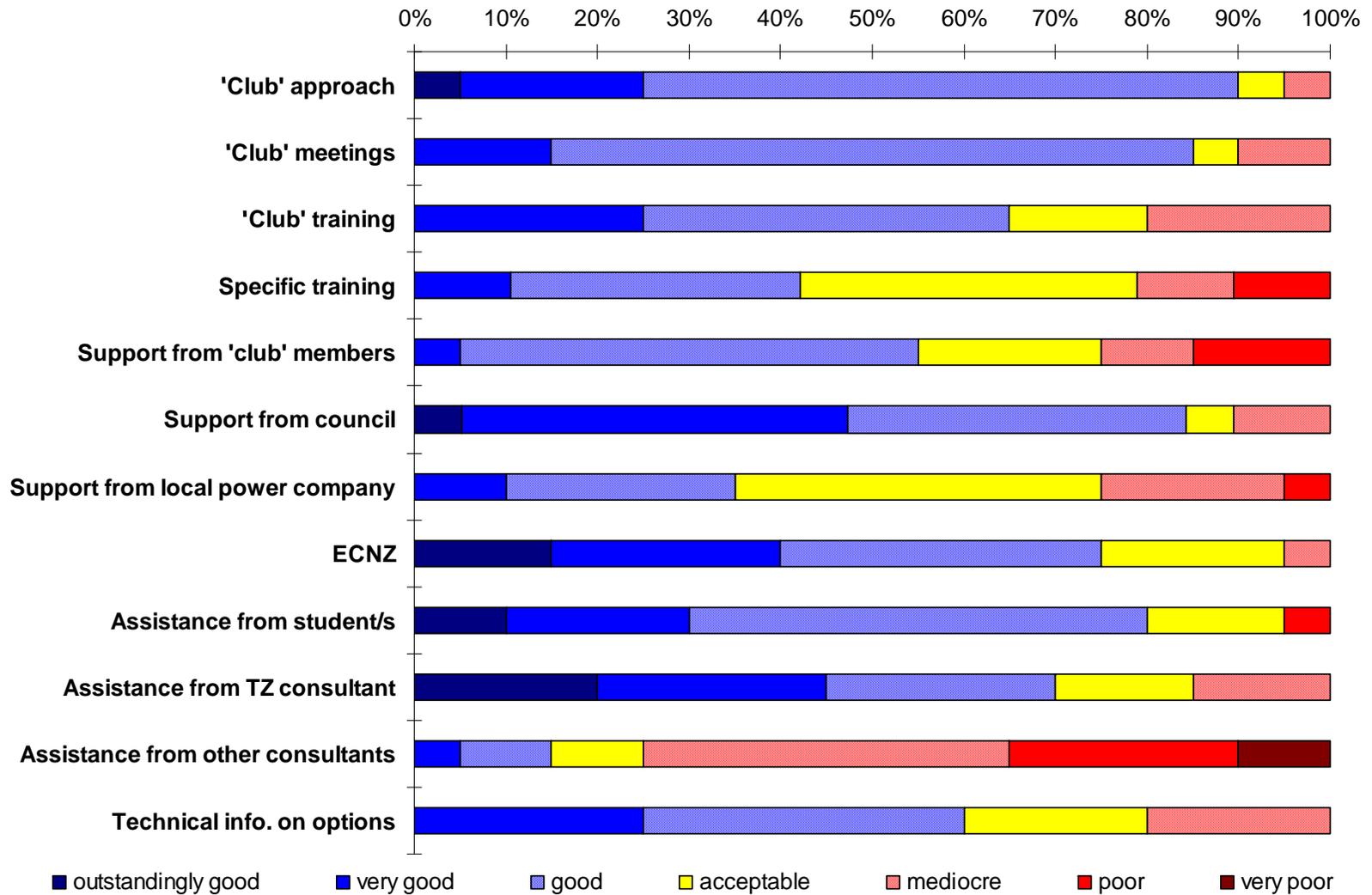
Figure 4.1. The percentage of respondents who assigned various ratings to external components of the programme. Results from surveys of respondents in the demonstration groups at the end of the demonstration project. See Appendix 2 for a key to statement abbreviations.
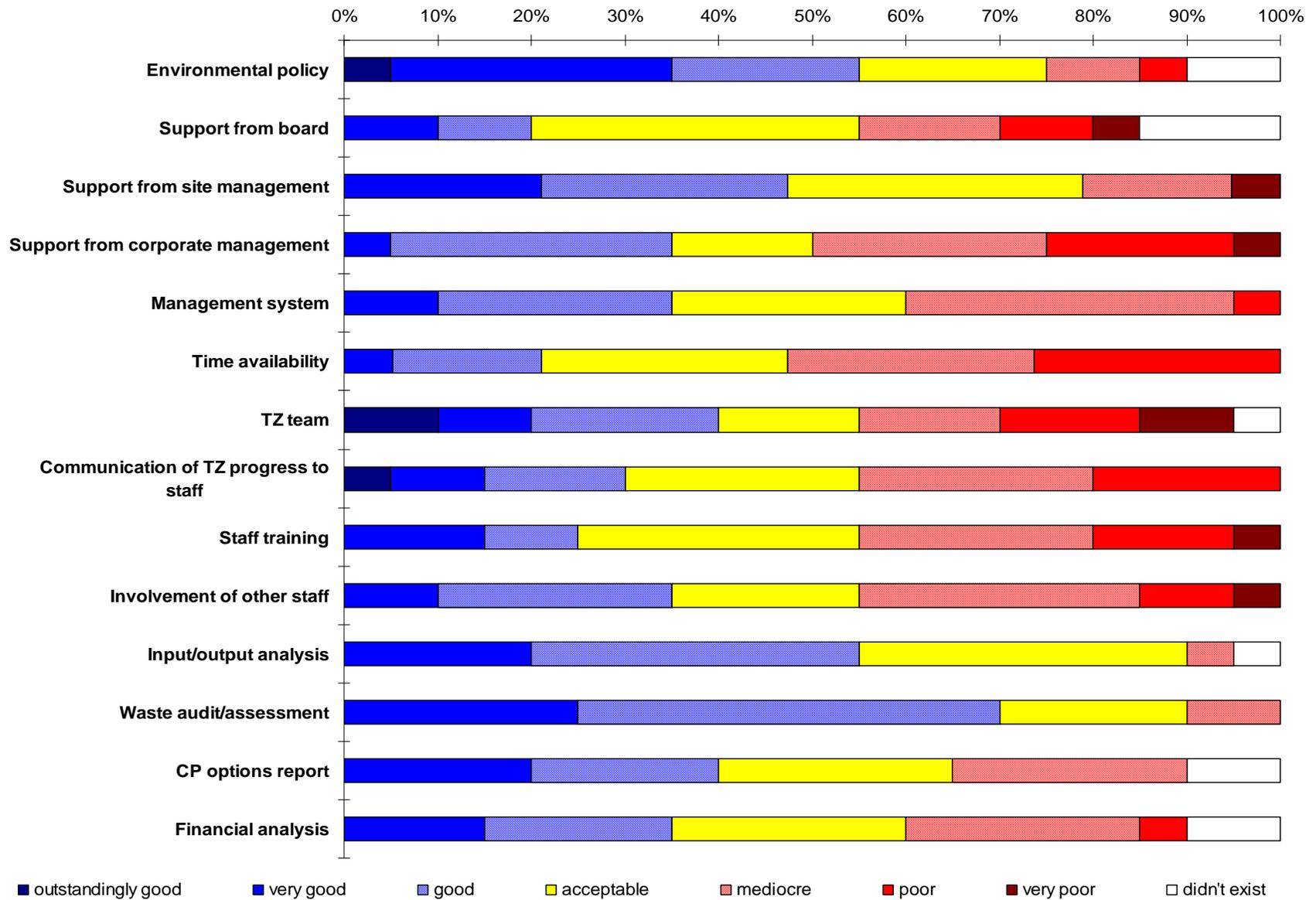
Figure 4.2. The percentage of respondents who assigned various ratings to internal components of the programme. Results from surveys of respondents in the demonstration groups at the end of the demonstration project. See Appendix 2 for a key to statement abbreviations.

the open questions in Part Ic, where no prompts were given. It is possible that respondents rated external support well when obliged to consider it, but that it was not otherwise foremost in their minds as an important contributing factor.

It is interesting to note that the results for Part Ic (as mentioned above) suggest that the interaction between team members was regarded as being more important as a factor influencing success than management support. While the importance of the former is recognised as being important, the latter is generally regarded by practitioners as the most important internal factor in a CP/PP project (e.g. USEPA, 1988, 1992b; de Hoo, 1991). Consequently, its importance was emphasised in the verbal communication, supporting documentation and training associated with the TZ project. It is possible that this is because activities were focused on the waste audit (as suggested in the relatively high ratings given to this component – see Fig. 4.2). Since audits tend to focus on operations, it is possible that support from senior management was not as necessary (and hence not as noteworthy) as it may have been for some of the more organisational components (e.g. policy). The results for Parts Ib and c, when considered together, suggest that there was a low level of support from senior management, and that it contributed well in 20 to 45% of the demonstration organisations. This may be partly due to the low level of reporting to senior managers (see s4.2.2).

It is interesting that the results for Part Ic (see s4.2.2, above) suggest that interaction amongst team members was also more important as a success factor than training. For Part Ib (see Fig. 4.2), the contribution made by the TZ team to implementation of the project is rated well in only 40% of the organisations. The opportunity to interact with team members from the same, as well as other organisations, was identified as one of the most valued aspects of the initial training workshop (see s3.3, above). While the percentages are similar for both parts, the relative significance in Part Ic is higher than in Part Ib. It is possible that interaction within the teams was more highly regarded than the activities actually carried out by the team. This would be consistent with social learning theories that suggest that social modelling and reinforcement are important in the decision-making process, particularly when the outcomes of decisions are subject to uncertainty (see Slovic, Fischhoff and Lichtenstein, 1987). There may be similar reasons for the high ratings assigned by respondents to the 'club' approach and 'club' meetings (see Fig. 4.1).

Results of interviews conducted by the project manager after the end of the project may help to explain the relatively low percentage of respondents who believed that the training programme was a major contributor to the perceived success of the project. Interviewees believed that the training programme was "too theoretical" and not specific enough to the needs of each particular organisation (Brown, pers. com., 2000).

While the results of Part Ic suggest that social interaction was important, a noteworthy feature of the results for Part Ib (see Fig. 4.2) is the contrast between the relatively high ratings for formal internal components (particularly policy, the waste audit and input/output analysis), and the relatively low ratings for all human components (apart from support from site management). These results suggest that technical, rather than social, components were more important for implementation. However, it is important to note that the results for Part Ib (see Fig. 4.2) do not provide insight into the how well the components were undertaken, only how well they were believed to have contributed. The apparent contradiction between the results for Parts Ic and Ib with regard to the importance of social components may suggest that, while social interaction was considered to be important, social components may not have been put to good use during the course of the project. In addition, the importance of social factors was reinforced by those respondents who did not believe that the project was a success overall. They identified a wide range of social factors, although no particular factor was singled out as having been more important than others.

4.2.4 Summary of results

It appears that economic considerations, while important in terms of the overall benefits of a CP/PP project, may not be the most significant drivers during the implementation process. Social factors such as interaction between team members, site management support, stability of staff and structure, commitment of participants and prioritisation were considered to be more important during this phase. Overall, external components tended to be rated higher than internal components. The contribution made by formal components, particularly environmental policy, the waste audit and input/output analysis, were rated relatively high, compared to those internal components to do with staff. Since the internal components identified are considered essential for CP/PP activities to take place, the relatively poor ratings for the majority of these components are likely to reflect difficulties

in implementation. The 'club' approach was highly rated, but the reason is unclear. While the approach was used because of the opportunities that it provided for organisations to support each other, support from 'club' members received a relatively low rating. It is possible that the opportunities it provided for social interaction, rather than direct support contributed to its ratings. Training specific to individual organisations received amongst the lowest ratings. It appears that care needs to be taken to ensure that training programmes respond to the specific needs of each participating organisation.

4.3   Results for Part II: Broad trends attributable to the project

4.3.1   Introduction

As mentioned in s3.4, Part II used a quasi-experimental approach to identify trends that may have been attributable to the project. It was designed to identify relevant changes that may have occurred during the project period and which may have been attributable to the TZ project.

Representatives from demonstration organisations (the same as those surveyed for Part I) were asked to rate a series of statements designed to show whether a set of key indicators existed within their organisations. The indicators were divided into the following categories: 1) general environmental management indicators; 2) indicators specific to cleaner production; 3) indicators of relevant aspects of organisational culture, and 4) indicators of relevant attitudes. The respondents who provided the feedback in Part I were asked to complete the survey immediately before the start of the project (year 0), a year later (year 1) and immediately after the end of the project (year 2). In order to determine whether any relevant changes could be attributed to TZ, the responses from this 'demonstration group' were compared with those from a randomly selected 'control group' of organisations.

The results are presented in 4.3.2-5 and summarised in 4.3.6.

4.3.2 General environmental management indicators

The following were used as indicators of some level of environmental management occurring within the demonstration organisations (see s3.4.3, above):

– a committed Chief Executive Officer (CEO);

– a formal environmental policy;

– an environmental management system (EMS);

– an on-going process for improving environmental performance;

– a comprehensive environmental management programme, and

– the inclusion of environmental criteria in staff performance appraisals.

The trends in these indicators during the project period are shown in Figs. 4.3a and b. Fig. 4.3a shows changes in the number of organisations that were believed by respondents to have in place the above-mentioned indicators. Fig. 4.3b shows changes in ambivalence[6].

Aggregated responses[7] from the control group, as shown in Fig. 4.3a, suggest that there were decreases in all of the above-mentioned indicators during the project period. This downward trend was most apparent in terms of *CEO commitment* and the existence of an *on-going process for improving environmental performance*. The number of respondents who believed that their CEOs were committed appears to have halved (down from 96% before the start of the project to 48%), while their belief in the existence of an on-going process appears to have decreased by a third (down from 68% to 48%).

In the demonstration group, CEO commitment also appears to have decreased (down from 64% to 50%), although there was not as great a reduction here as there was in the control group. However, it is important to note that what was reflected in the results was respondents' *perceptions* of CEO commitment, rather than CEO commitment itself. The

---

[6] When respondents neither agreed nor disagreed with the statements, they were considered to be *ambivalent*.

[7] Respondents were asked to use a Likert scale to rate their responses to the statements. The results shown in Figs. 4.3a-8a are an aggregation of the ratings that were used to reflect agreement. Distinctions between the level of agreement were found to obscure the results (because of the small sample size, few differences at this level of detail were found to be greater than the margin of error). In addition, the meta-analytical nature of the discussion (Ch.5) meant that this level of detail was unnecessary.
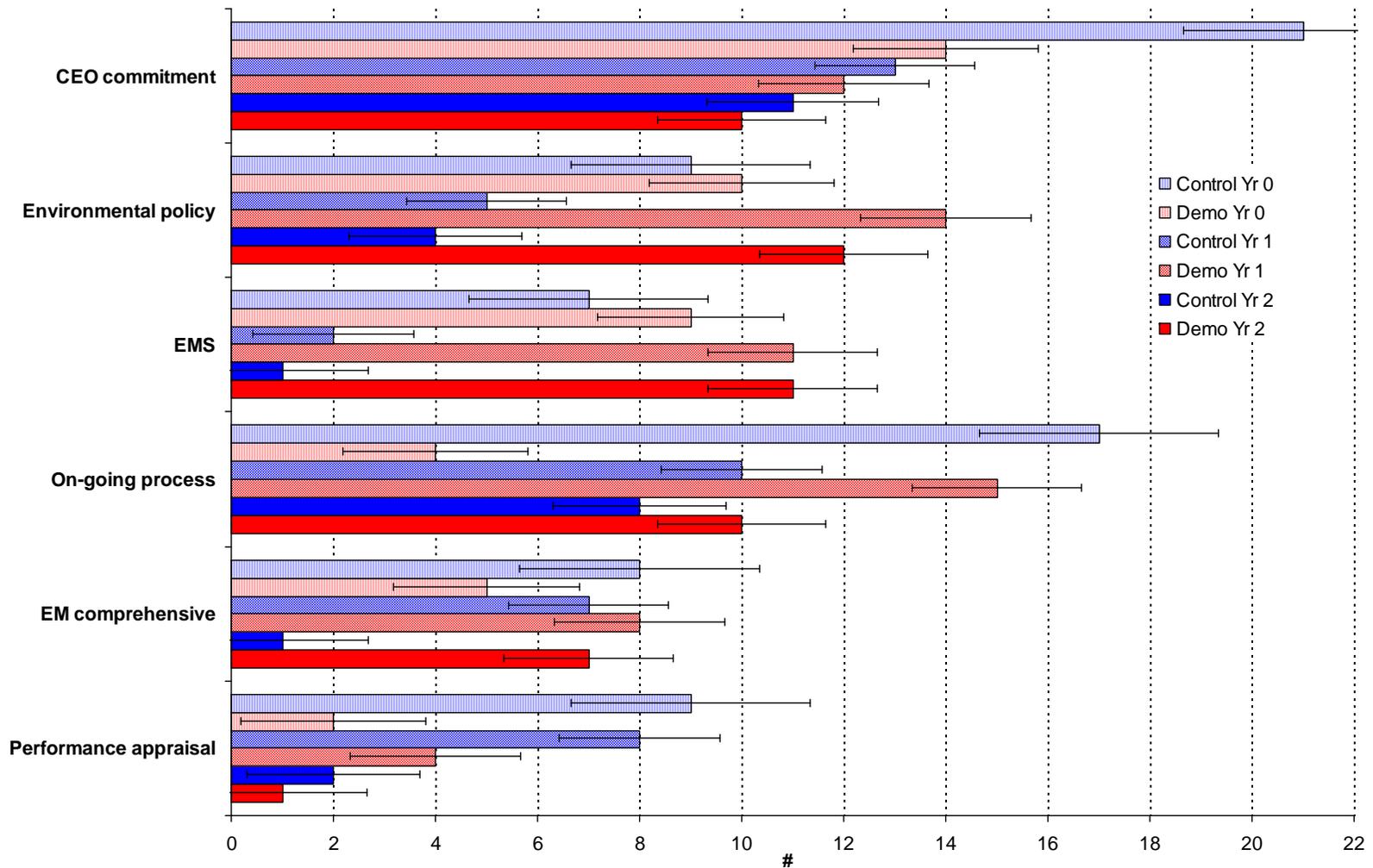
Figure 4.3a. Changes in the number of respondents who believed that their organisations had in place various indicators of environmental management. Results from surveys of respondents in the control and demonstration groups at the start (Yr 0), during (Yr 1) and at the end of the demonstration project (Yr 2). Note: There were only 21 responses in both groups in the final sample. See Appendix 2 for a key to statement abbreviations.
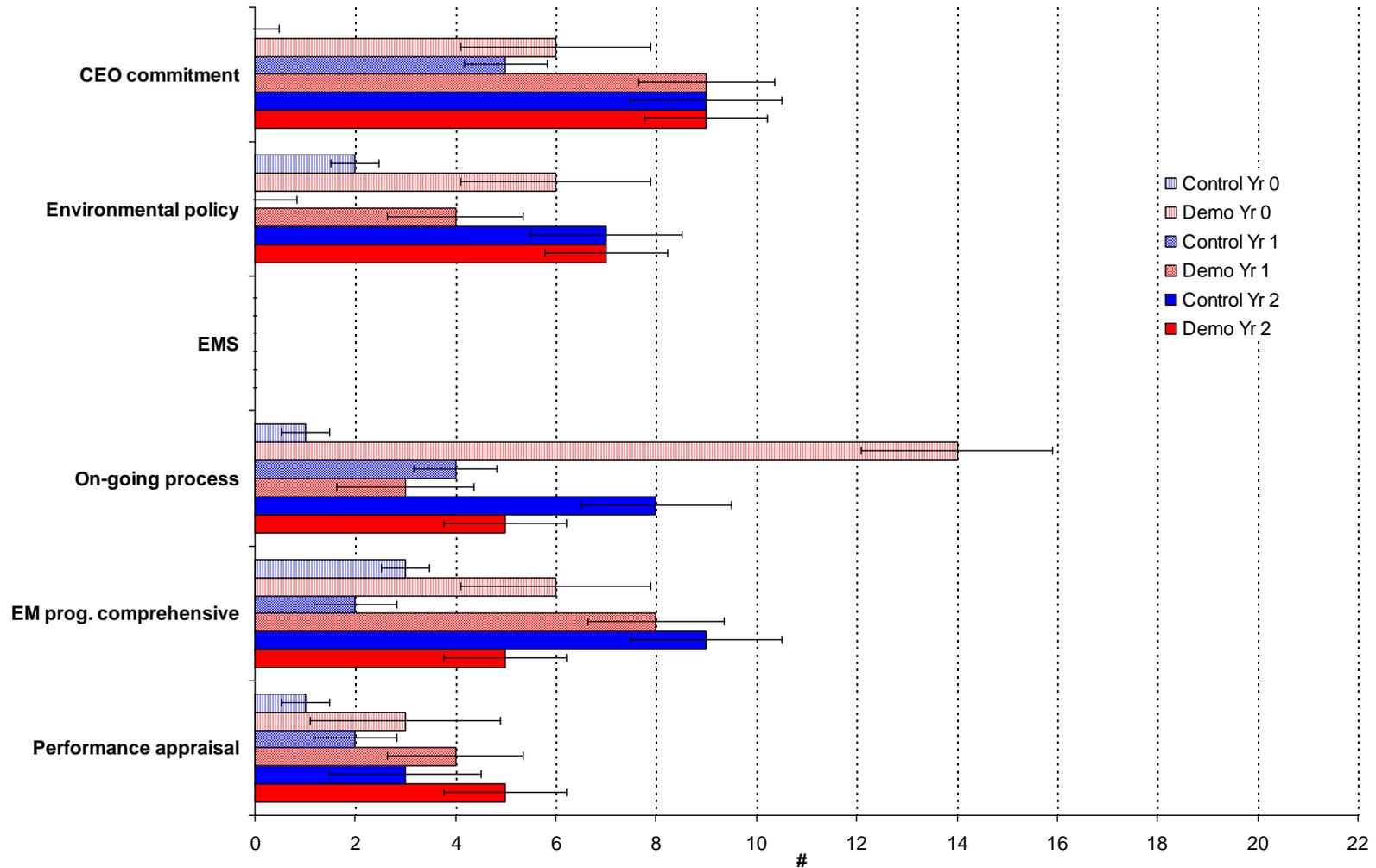
Figure 4.3b. Changes in the number of respondents who were ambivalent about the existence in their organisations of various indicators of environmental management. Results from surveys of respondents in the control and demonstration groups at the start (Yr 0), during (Yr 1) and at the end of the demonstration project (Yr 2). Note: There were only 21 responses in both groups in the final sample. No bars are included for EMS because the information was derived from Part IIa of the questionnaire, where no ambivalence was possible. See Appendix 2 for a key to statement abbreviations.

apparent decreases in CEO commitment in both groups may have been as a result of changing perceptions, rather than actual reductions.

It is possible that respondents were initially overstating CEO commitment and that they changed their minds in the absence of any demonstrations of CEO commitment during the project period (see below). This appears to be supported by the relatively high level of ambivalence found in both groups at the end of the project period. Ambivalence increased in both groups, although the increase was greater in the control group (from 0% up to 41%) than it was in the demonstration group (where the increase from 27% to 41% was just inside the margin of error). Overstatement of commitment to sustainability is a common response of organisations (e.g., see Beder, 1997; Greenpeace, 1992). In NZ, this may be exacerbated by relatively high levels of environmental awareness (e.g., Taylor, *et al*., 1994: 25) and evidence that New Zealanders, in general, are known to be proud of their environment (e.g. MfE 1997: 4.9). It is quite possible that, in the evidence of evidence to the contrary, respondents may have assumed that their CEOs were committed to improving environmental performance.

Comparison of these results with other studies (e.g. Manfed, 1992; Coopers and Lybrand, 1993; Worley, 1995, 1997 - see Table 4.2) appears to confirm that overstatement may have occurred, at least initially. The final percentage for CEO commitment is 52%, which is more consistent with these other studies.

Irrespective of the reason, the absence of a significant difference between the trends in the two groups ($p = 0.50$)[8] strongly suggests that participation in the project did not cause CEO commitment to improve, as would perhaps have been anticipated. The prominence that CEO commitment receives in the literature on EM and CP/PP suggests that this may have been a significant failure for the project (see Ch.5, s5.2.1 for further discussion).

The only environmental management indicator where there was a statistically significant difference between the demonstration and control groups was the existence of an *on-going process for improvement* ($p = 0.01$). In the control group it decreased from 77% to 38%, while in the demonstration group it increased from 18% to 48% (see Fig. 4.3a). The large

---

[8] *p* Values are rounded to 2 decimal points.

discrepancy between the demonstration and control groups at the start of the project may suggest that the groups are incomparable. However, this variable is one of those where overstatement (as discussed above) is quite likely to have occur. Relatively high environmental awareness, together with NZ's perceived clean and green image, may have caused respondents to wish to be "seen to be green". If the reality was different (as is commonly suggested by environmental groups, it is possible that respondents may have wanted to mitigate the situation (or please the interviewer) by saying that they had on-going processes for improvement.

The relatively high level of ambivalence in this indicator in the demonstration group at the start of the project (see Fig. 4.3b), suggests that two thirds of respondents started off with little understanding of whether their organisation had an on-going process or not. The marked decrease in ambivalence (to only 14%) suggests that this understanding developed during the course of the project. However, it is important to note that, by the end of the project, more than half the demonstration organisations still did not have a process for on-going improvement.

A high percentage of respondents from the demonstration group believed, during the course of the project (i.e. at year 1), that their organisations had on-going processes for improvement (up from 18% to 68%, see Fig. 4.3a). This suggests that the work that was being conducted as part of the project gave some respondents the impression that such processes existed. The decrease, from this high of 68% to 48% at the end of the project, suggests that they may by then have realised that this was not the case.

Table 4.2. Comparison between the results of the TZ evaluation and those of four surveys conducted by the NZ Manufacturer's Federation (Manfed - 1992), Coopers and Lybrand (1993), and Worley Consultants (1995, 1997).

Indicator	Manfed, 1992	Coopers and Lybrand, 1993	Worley, 1995	Worley, 1997	Control group, 1997→1999	Demo group, 1997→1999
CEO commitment	40%(a)	na	+/-60%(a)	na	96% → 52%	64% → 48%
Environmental policy	23%	54%	56%	35-83%(h)	41% → 19%	46% → 57%
EMS	17-26%(b)	26%	50%	74%	32% → 5%	41% → 52%
On-going process	"	69%	na	59%(d)	77% → 38%	18% → 48%
Staff performance appraisal	10%(c)	31/36%(f)	na	na	41% → 10%	9% → 5%
Waste reduction programme	na	na	na	na	68% → 24%	14% → 48%
Waste audit	20-22%(d)	49-58%(g)	31%	na	64% → 33%	27% → 86%
Regular waste audits	na	na	na	59%(d)	50% → 10%	18% → 14%
Identification of opportunities for waste minimisation	16-77%(e)	49%	31%	na	96% → 86%	55% → 91%

KEY
na   not specifically included in the study
(a)   environmental responsibility at a senior management level
(b)   environmental guidelines, monitoring and contingency plans
(c)   at management level
(d)   general environmental assessment/auditing
(e)   for specific types of media
(f)   staff/management levels; varying degrees of inclusion (more than "slight")
(g)   resource use and disposal
(h)   55% had stand-alone environmental policies, and only 35% (of the total) were published

In summary, there was a significant difference between the two groups only with the regard to on-going improvement. While participation in the project does appear to have increased the existence of on-going processes for improvement, more than half the organisations do not appear to have had such processes in place by the end of the project. In the demonstration group, participation in the TZ project does not appear to have improved

CEO commitment, neither did it bring about environmental policies, EMSs, comprehensive environmental management programmes or the inclusion of environmental management in staff performance appraisals. In addition, it is important to note that by the end of the project period, only approximately half the respondents from the demonstration group believed that their CEO was committed, and that their organisation had an environmental policy, an EMS and an on-going process for improvement. Only a third believed that their organisation had a comprehensive environmental management programme and only one believed that their organisation included environmental performance in staff appraisals.

4.3.3   *Indicators specific to cleaner production*

The following were use as indicators of cleaner production:

- – a formal programme to reduce wastes;
- – conducting a waste audit;
- – waste audits as a regular component of business, and
- – identification of opportunities for waste minimisation.

The trends in these indicators during the project period are shown in Figs. 4.4a and b. Fig. 4.4a shows changes in the number of organisations that were believed by respondents to have in place the above-mentioned indicators. Fig. 4.4b shows changes in ambivalence.

In the control group there appear to have been decreases in most of the cleaner production indicators (see Fig. 4.4a). The most notable decreases were in the existence of formal waste reduction programmes (down from 68% to 24%), in waste audits (down from 64% to 33%) and the regular occurrence of such audits (down from 50% to 10%).

The decreases in the control group raise similar issues to those raised in s4.3.2, i.e. those to do with respondents' changing perceptions. It is not possible for a waste audit, having once been conducted, to end up not having been conducted. The only possible explanation is that representatives from the control group over-stated the existence of cleaner production indicators at the start of the project. The case for overstatement is to some extent supported by two studies that appear to have specifically included waste audits (Manfed, 1992; Coopers and Lybrand, 1993) and three that appear to have included the identification of waste minimisation opportunities (Manfed, 1992; Coopers and Lybrand, 1993; Worley,

1995). Although not as recent as TZ, the percentages for these indicators are consistently lower than those in the control group.

Relatively high levels of ambivalence in the control group at the end of the project period (see Fig. 4.4b), particularly in terms of a formal waste reduction programme and regular waste audits, could support the suggestion that some respondents changed their minds regarding the existence of these indicators. However, ambivalence does not help to explain the extent to which options identification, in particular, decreased in the control group.

There were statistically significant differences between the trends in the two groups regarding: 1) the perception that a *formal waste reduction programme existed* ($p = 0.01$), and 2) the perception that a *waste audit* had been undertaken ($p = 0.02$). It is seems reasonable to assume that participation in the project increased these indicators in the demonstration group.

The most noteworthy change in the demonstration group was the increase in the number of respondents who believed that their organisations had conducted *waste audit* (up from 27% to 86%). This increase is not unexpected, given that a waste audit is considered to be a key component of a cleaner production programme. It enables inputs and outputs to classified and quantified, their sources and causes to be identified, and options for improvement to be found. Its importance was emphasised in the training programme. Participants were taught how to conduct such an audit, they were assisted in their efforts to do so by consultants, students, council officers and electricity retailers, and they were required to report on their progress in this regard. A waste assessment, including a walk-through and input/output analysis were milestones that were required to be reported on in the progress reports.

It is unexpected, however, given the prominence of waste auditing in the programme, that four demonstration organisations do not appear to have carried out a waste audit by the end of the project period. In addition, the respondents from two of those were still unsure of what a waste audit was (see Fig. 4.4b).

In the demonstration group, there were also increases in the number of respondents who believed that their organisations had a *formal waste reduction programme* (up from 14% to

48%) and had identified *cleaner production options* (up from 55% to 91%). Differences between the two groups were not significant for the latter ($p = 0.33$). Neither were the differences in the number of organisations that were perceived to incorporate *waste audits as a regular component of business* ($p = 0.18$). By the end of the project only three in the demonstration group appear to have done so. This, together with the relatively high level of ambivalence in the demonstration group (48% - see Fig. 4.4.b), may bring into question the likelihood of on-going improvement in most of the demonstration organisations (despite respondents' claims to the contrary – see s4.2.2 above).

However, it is also possible that the timeframe meant that respondents did not yet know whether their organisations would conduct audits regularly. This suggestion may be confirmed by the relatively high level of ambivalence in the demonstration group (57%) at the end of the project period.

In summary, the differences between the two groups appear to have been significant only in terms of the existence of a formal waste reduction programme and a waste audit having been conducted. These results are not unexpected, given the prominence given to these elements in the project. In the demonstration group, participation in the TZ project appears to have resulted in increases in cleaner production indicators. The greatest increases appear to have been in waste audits, followed by formal waste reduction programmes and the identification of opportunities for waste minimisation. However, it is important to note that about half the organisations in the demonstration do not appear at the end of the project period to have had a formal waste reduction programme. This, together with the low number of respondents who believed that their organisation would conduct regular audits (14%), brings into question the likelihood of on-going improvement, as suggested in s4.2.2 and s4.3.2.
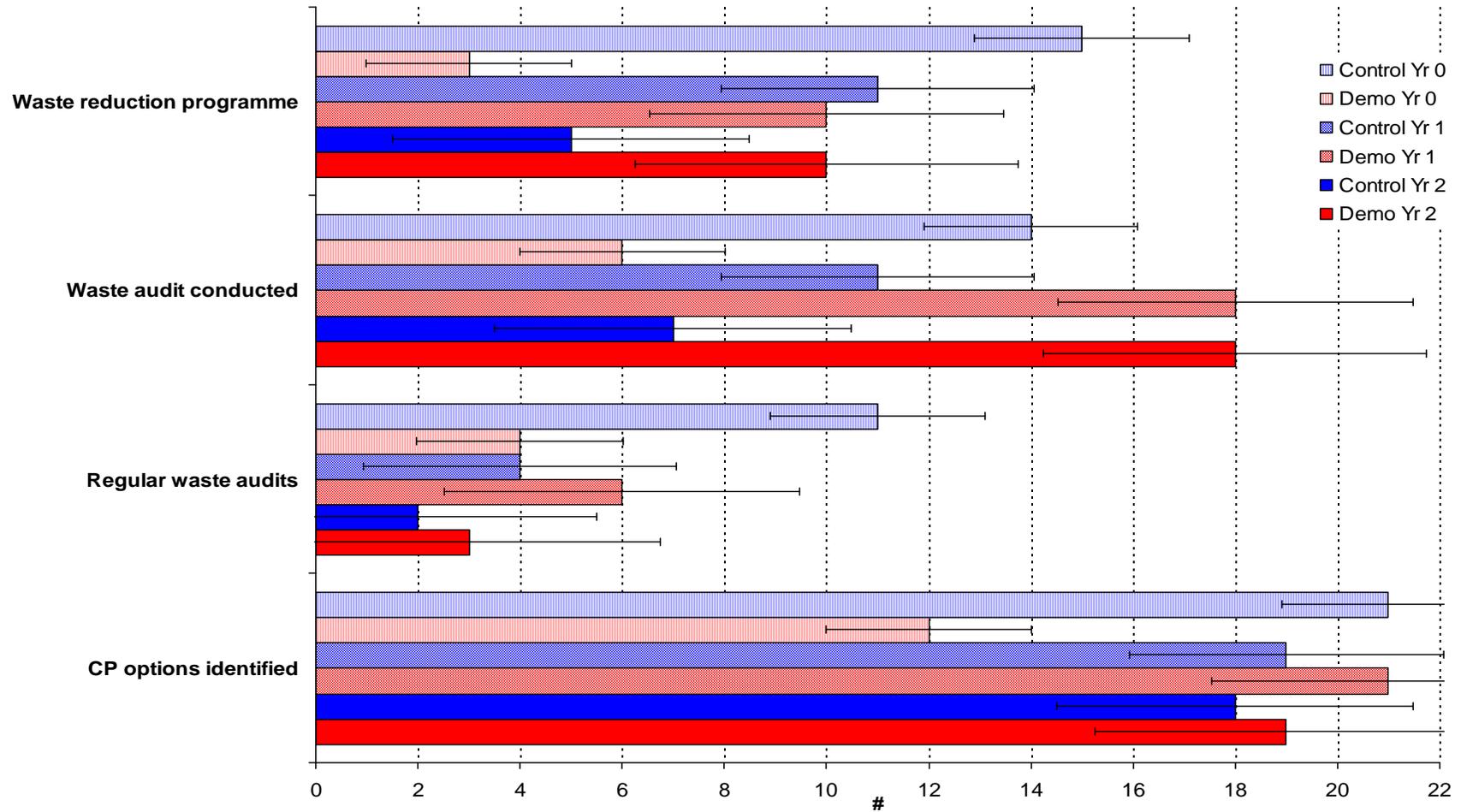
Figure 4.4a. Changes in the number of respondents who believed that their organisations had in place various indicators of cleaner production. Results from surveys of respondents in the control and demonstration groups at the start (Yr 0), during (Yr 1) and at the end of the demonstration project (Yr 2). Note: There were only 21 responses in both groups in the final sample. See Appendix 2 for a key to statement abbreviations.
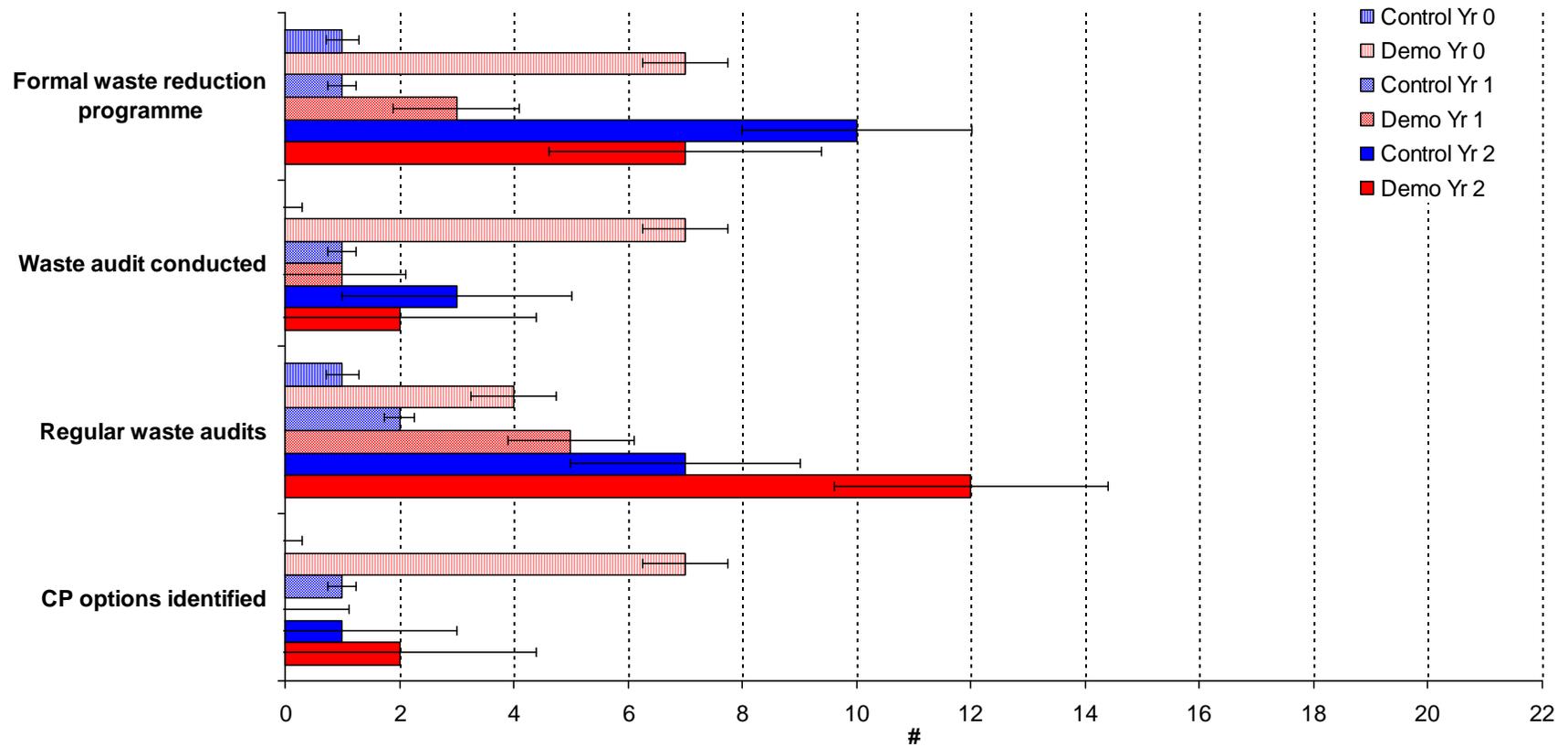
Figure 4.4b. Changes in the number of respondents who were ambivalent about the existence in their organisations of various indicators of cleaner production. Results from surveys of respondents in the control and demonstration groups at the start (Yr 0), during (Yr 1) and at the end of the demonstration project (Yr 2). Note: There were only 21 responses in both groups in the final sample. See Appendix 2 for a key to statement abbreviations.

4.3.4   Indicators of relevant aspects of organisational culture

Indicators of organisational culture considered relevant to the uptake of cleaner production were:

– the priority given to environmental performance improvement;
– the degree to which environmental management was considered to be ad-hoc;
– the degree to which environmental management programmes were compliance driven;
– treatment and disposal focus;
– linkages between quality, occupational safety and health and environmental management programmes;
– barriers presented by senior management;
– structure-related difficulties;
– steepness of organisational hierarchy;
– encouragement of staff;
– seeking community input, and
– confrontational relationship with community groups.

The trends for these indicators during the project period are graphically presented in Figs. 4.5a, b and 4.6a, b. It is important to note that responses in this section were more subject to bias than the majority of those in the previous two sections. This is because they are not as readily identifiable as waste audits, for example. However, they are still of value because they provide some insight into organisational factors that are not able to be evaluated using standard EM/CP indicators.

There were no noteworthy changes in the control group in terms the priority given to environmental performance, the ad-hoc nature of environmental management, nor compliance as a driver for environmental programmes (see Fig. 4.5a). The first two indicators peaked during the project, and then dropped. It is possible that something of environmental significance was done within the organisations involved that suggested to

respondents that their initial responses were incorrect, but there is no evidence in this regard.

There were decreases in the control group in: the focus that organisations had on treatment/disposal (down from 64% to 48%), and the links between quality, occupational health and safety, and environmental management programmes (down from 86% to 24%). Fig. 4.5b shows a relatively high level of ambivalence in terms of the ad-hoc nature of environmental management (48% at the end of the project) and the linkages between programmes (38% ").

In contrast, there appears to have been a decrease in the demonstration group in terms of the compliance-driven nature of environmental management (down from 36% to 19%) (Fig. 4.5a). This may have occurred as a result of some positive responses to improvements identified as a result of participation in the project. A relatively high level of ambivalence towards this indicator (43% at the end of the project) (Fig. 4.5b) suggests that it was difficult for almost half the respondents to determine whether their programmes were compliance-driven or not.

In the demonstration group, there also appears to have been an increase in a treatment/disposal focus (up from 18% to 38%) (Fig. 4.5a). This is contrary to expectations and seems to contradict the positive feedback received from the majority of respondents regarding the benefits and value. The whole point of CP/PP is to avoid a treatment/disposal focus, and the economic and environmental benefits suggest that this is justified. It is difficult to believe that this increase would have been directly as a result of the project. Participation in the project may again have provided an opportunity for respondents to evaluate the focus of their organisations. They may have encountered difficulties in the implementation of CP that led them to believe that their organisations did, indeed, have a treatment and/or disposal focus. However, the high level of ambivalence for this indicator suggests that 43% of respondents still did not know what the focus of their organisation was by the end of the project (Fig. 4.5b).
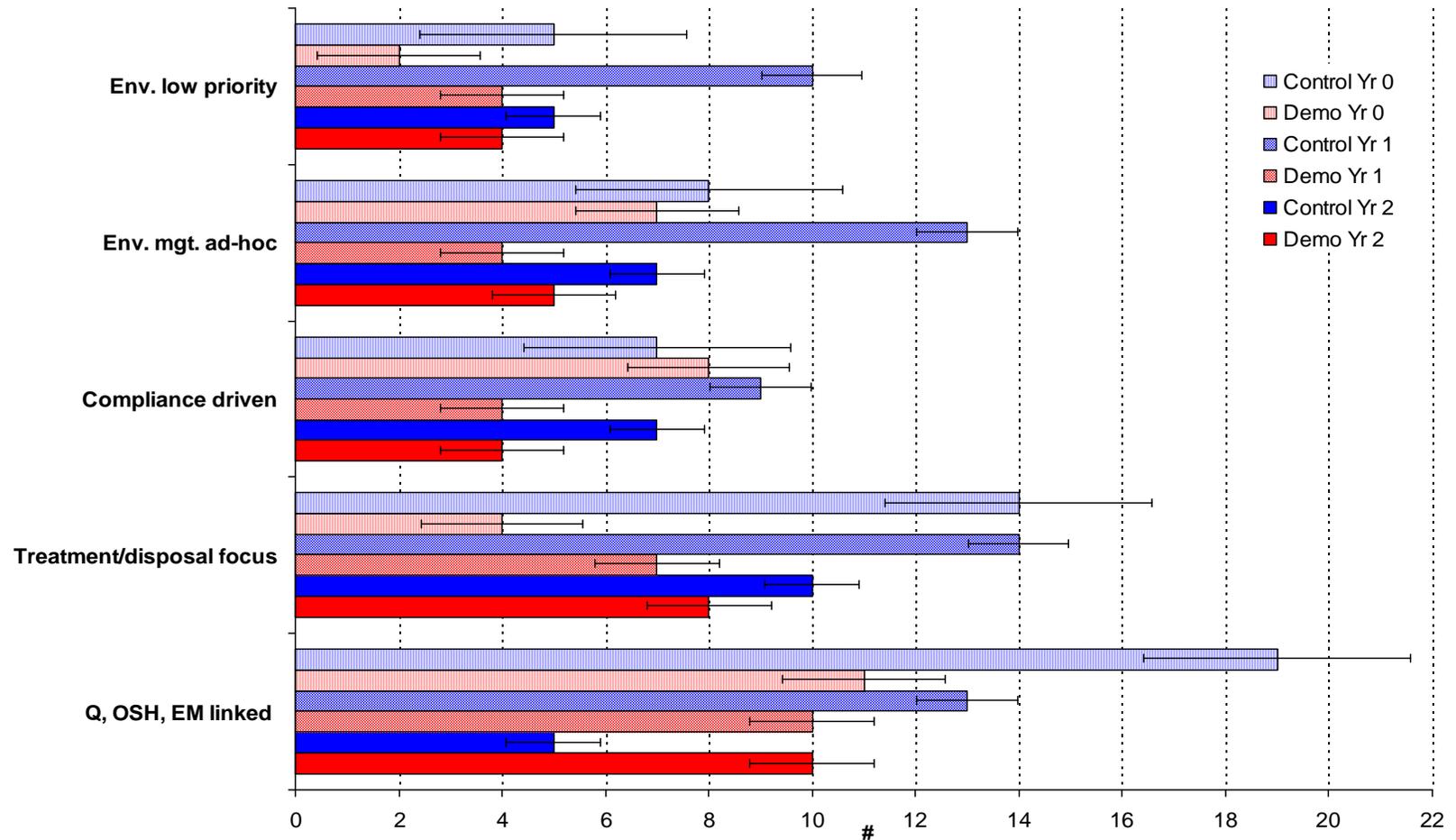
Figure 4.5a. Changes in the number of respondents who believed that their organisations had in place various indicators of organisation culture, specifically the nature, focus and integration of environmental management. Results from surveys of respondents in the control and demonstration groups at the start (Yr 0), during (Yr 1) and at the end of the demonstration project (Yr 2). Note: There were only 21 responses in both groups in the final sample. See Appendix 2 for a key to statement abbreviations.
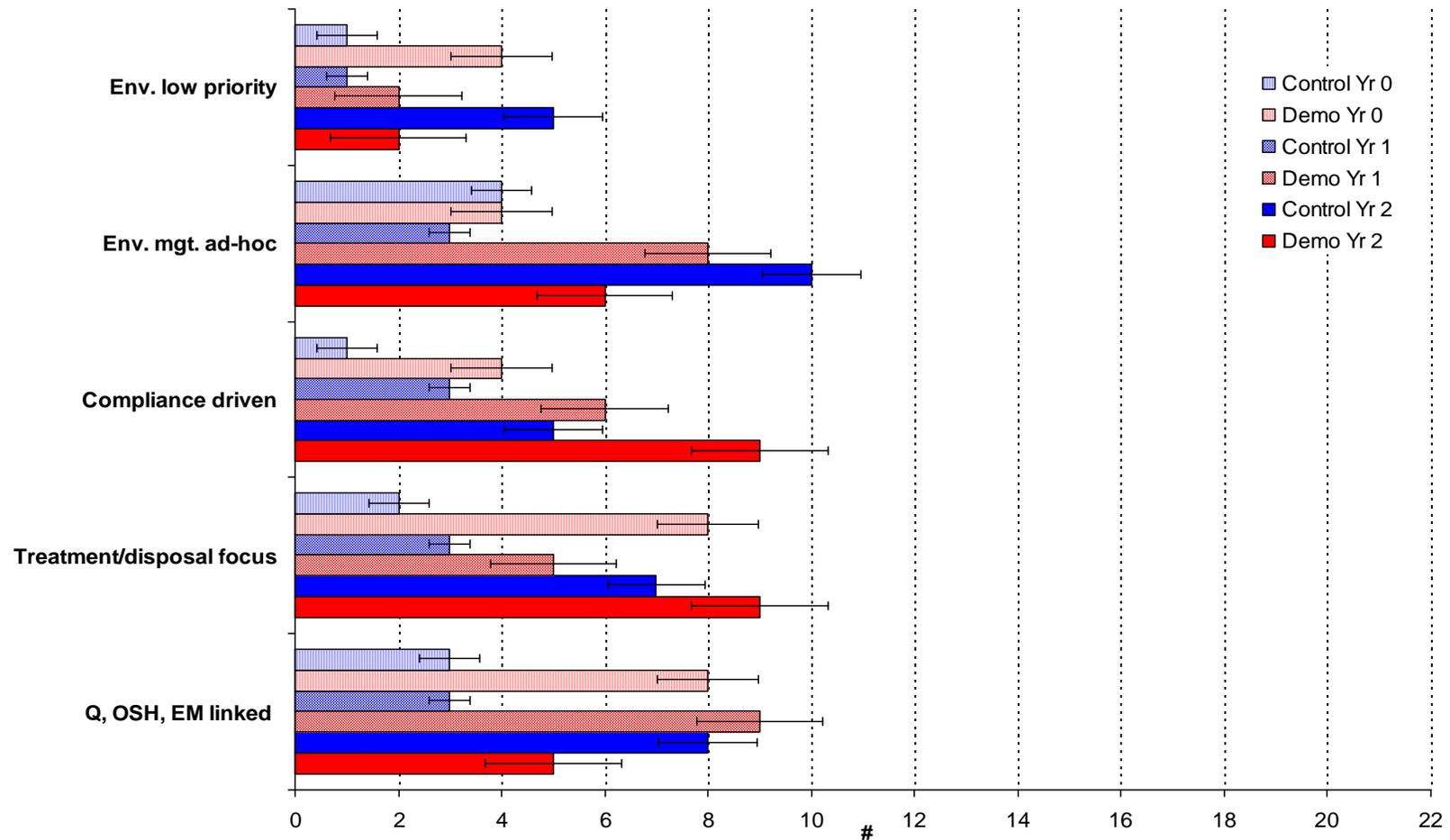
Figure 4.5b. Changes in the number of respondents who were ambivalent about the existence in their organisations of various indicators of organisation culture, specifically the nature, focus and integration of environmental management. Results from surveys of respondents in the control and demonstration groups at the start (Yr 0), during (Yr 1) and at the end of the demonstration project (Yr 2). Note: There were only 21 responses in both groups in the final sample. See Appendix 2 for a key to statement abbreviations.

There were no significant changes in the control group in terms of the barriers presented by senior managers, the difficulties caused by structure, the steepness of the hierarchy, the extent to which they seek community input was sought, nor the extent of confrontation with community groups (see Fig. 4.6a).

This appears to be in contrast to the demonstration group where there appear to have been increases in the barriers presented by senior management (up from 0% to 19%) and the difficulties caused by structure (up from 9% to 29). While the total number of respondents who had these perceptions was still relatively low, both are contrary to expectations. Participation in TZ may again have demonstrated these negative characteristics to respondents. They may, for example, have experienced difficulties in getting approval or as a result of lack of autonomy, as identified in s4.4.4 below. However, the increase in ambivalence towards the existence of structural difficulties (up from 5% to 19%) (Fig. 4.6b), may suggest that a quarter of respondents were still not aware by the end of the project of any links between structure and environmental improvements.

The only significant differences, in this category, between the demonstration and control groups were with regard the perceived barriers presented by management ($p = 0.03$); the perceived difficulties caused by structure ($p = 0.01$), and the encouragement of staff ($p = 0.05$). It seems reasonable to assume that participation in the project again gave respondents the opportunity to identify barriers to cleaner production.

Fig. 4.6a shows the opposite trends in the control and demonstration groups regarding staff encouragement. In the control group, this indicator appears to have decreased (down from 77% to 57%), while in the demonstration group it appears to have increased (up from 14% to 48%). The increase is not unexpected, given the nature of the cleaner production approach (participants were encouraged to involve staff in the programme), but it is important to note that more than half the respondents still did not believe at the end of the project that this was occurring or were uncertain (Fig. 4.6b).

In summary, participation in the TZ project appears to have resulted in an increase in the encouragement of staff to identify environmental improvements and decreases in the compliance driven and ad-hoc nature of environmental programmes. However, the staff in

at least half the organisations still don't appear to be encouraged. Participation also appears to have increased the focus on treatment and disposal, the barriers presented by senior management, and the difficulties caused by structure. The results suggest that TZ provided opportunities in at least some of the organisations for negative perceptions to develop regarding these indicators. While the increases were small, the totals still suggest that about a third of the respondents recognised these difficulties in their organisations.

4.3.5   Indicators of relevant attitudes

Attitudes considered to be relevant to cleaner production uptake were encapsulated in the following statements:

- "It makes good business sense to improve environmental performance";
- "Improving environmental performance will enhance competitiveness";
- "Improving environmental performance always costs money";
- "There are no economic benefits to be gained from cleaner production";
- "The best way to reduce wastes is by changing processes and products";
- "Wastes are best dealt with by treatment";
- "Wastes are an inevitable consequence of business", and
- "Our company is already doing all it can to reduce wastes".

The responses to these statements are completely subjective. They were included because it was thought that they may provide insight into the extent to which attitudes were influenced by participation in the TZ project.

The results are graphically presented in Figs. 4.7a, b and 4.8a, b. There were no significant differences between the demonstration and control groups for any of the statements. This suggests that participation in the TZ project had no effect at all on the attitudes studied.

There was a high positive response in the demonstration group to the statements regarding the value of environmental performance improvement for business, overall and specific to competitiveness (Fig. 4.7a). However, the latter was lower, and also had a greater level of ambivalence (33% at the end of the project) than the former (19% at the end of the project). (Fig. 4.7b).
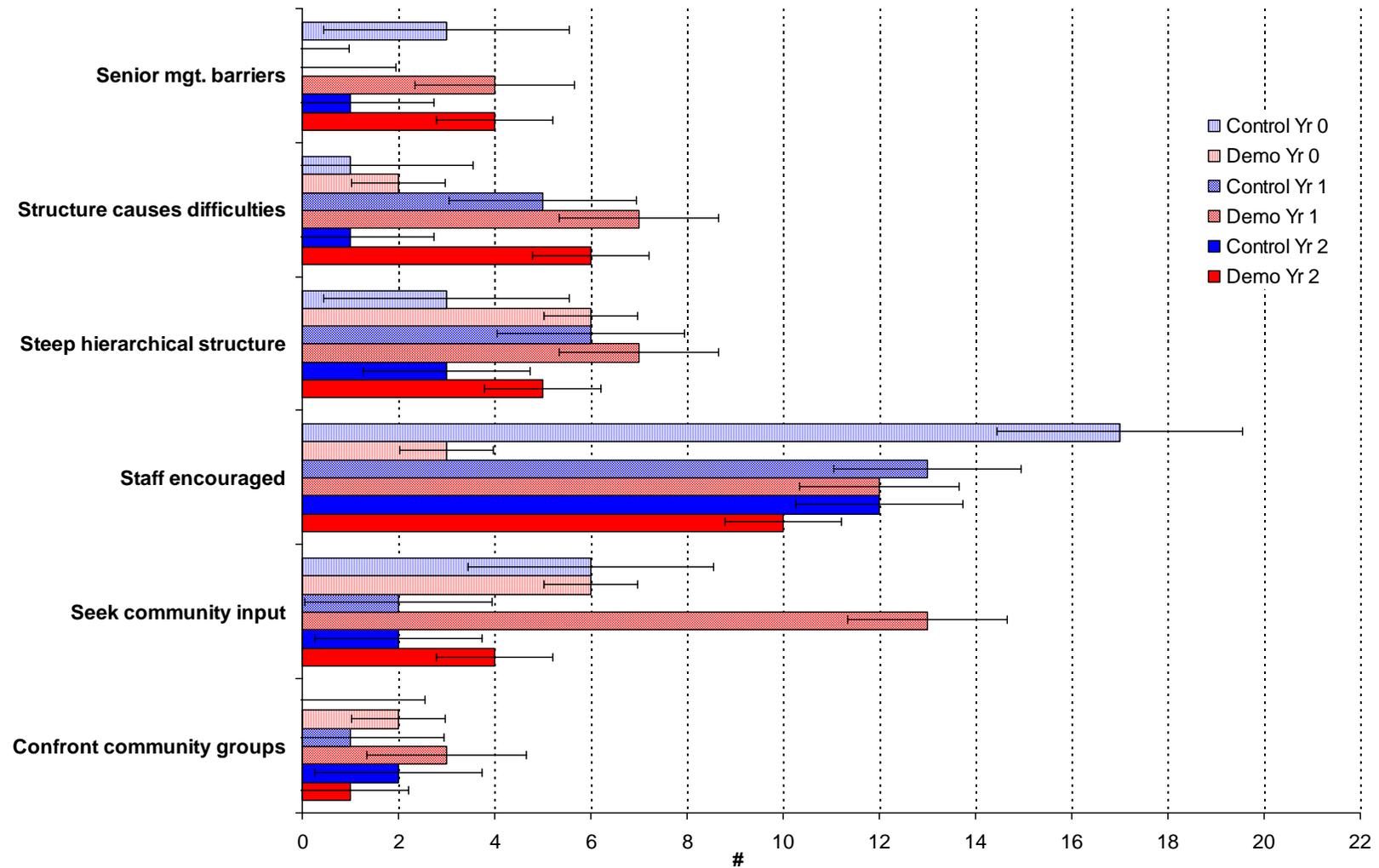
Figure 4.6a. Changes in the number of respondents who believed that their organisations had in place various indicators of organisation culture, specifically management, structure and the encouragement of staff and community involvement. Results from surveys of respondents in the control and demonstration groups at the start (Yr 0), during (Yr 1) and at the end of the demonstration project (Yr 2). Note: There were only 21 responses in both groups in the final sample. See Appendix 2 for a key to statement abbreviations.
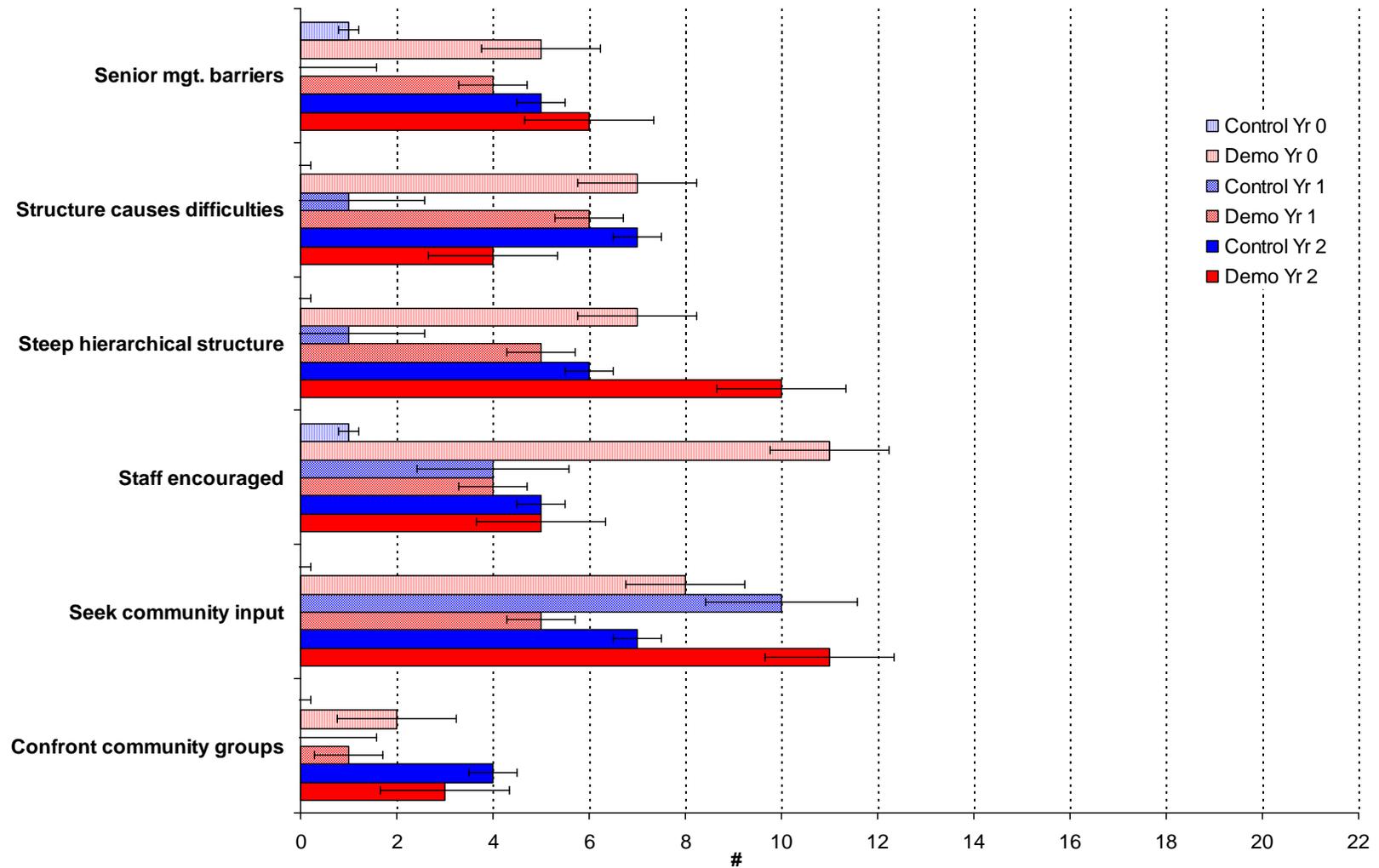
Figure 4.6b. Changes in the number of respondents who were ambivalent about the existence in their organisations of various indicators of organisation culture, specifically management, structure and the encouragement of staff and community involvement. Results from surveys of respondents in the control and demonstration groups at the start (Yr 0), during (Yr 1) and at the end of the demonstration project (Yr 2). Note: There were only 21 responses in both groups in the final sample. See Appendix 2 for a key to statement abbreviations.

Fig. 4.8a suggests that there were decreases in the control group in terms of the value of product and process changes (down from 86% to 38%) and treatment (down from 55% to 19%), and the inevitability of wastes (down from 86% to 29%). There also appears to have been relatively high ambivalence with regard to the value of process and product changes (38% at the end of the project) and treatment (33% at the end of the project) (Fig. 4.8b).

There was also a decrease in the demonstration group regarding the inevitability of wastes (down from 59% to 29%), although this was lower overall than it was in the control group. This, together with descreasing ambivalence (Fig. 4.8b) may suggest a more positive outlook in demonstration group regarding wastes. The extent to which respondents believed that their organisations were already doing all they could to reduce wastes was also significantly lower in the demonstration group than it was in the control group.

In summary, participation in TZ project does not appear to have had significant effects on attitudes relevant to cleaner production uptake. Respondents in the demo group appear to consistently have had more positive attitudes towards business and environment.

4.3.6   Summary of results

Results for Part II show that there appear to have been opposite trends in the demonstration and control groups. In the demonstration group the trends appear to be *towards* certain indicators of environmental management and cleaner production, while in the control group, they tend to be *away* from such indicators.

In the demonstration group there appear to have been significant trends towards: an on-going process for improving environmental performance; a formal waste reduction programme; a waste audit, and the identification of cleaner production options. In the control group, there appear to have been significant trends away from all indicators of environmental management and cleaner production[9]. A notable exception to these trends is the apparent reduction in CEO commitment in the demonstration group.

---

[9] Because of the unavoidably small sample size, the trends in the control group cannot be assumed to be representative of trends in the larger population.

Despite the positive changes in the demonstration group, there were still at the end of the project period, a number of organisations in which positive changes had not occurred. Half the organisations did not appear to have formal waste reduction programmes, on-going processes for improvement and the encouragement of staff. A third were still believed to have had a treatment and disposal focus, and barriers caused by senior management and structure.

In half the organisations, participation in the project does not appear to have had any noteworthy effect on CEO commitment nor on environmental policy and EMSs. By the end of the project, the majority of demonstration organisations still did not appear to include environmental performance in their staff appraisals, nor did they appear to conduct regular wastes audits.

On a positive note, the majority of respondents still believed that environmental performance improvement makes business sense. However only half believed that it enhances competitiveness and there was no change in this regard as a result of participation in the project. The implications of the results are discussed in s4.5 below.
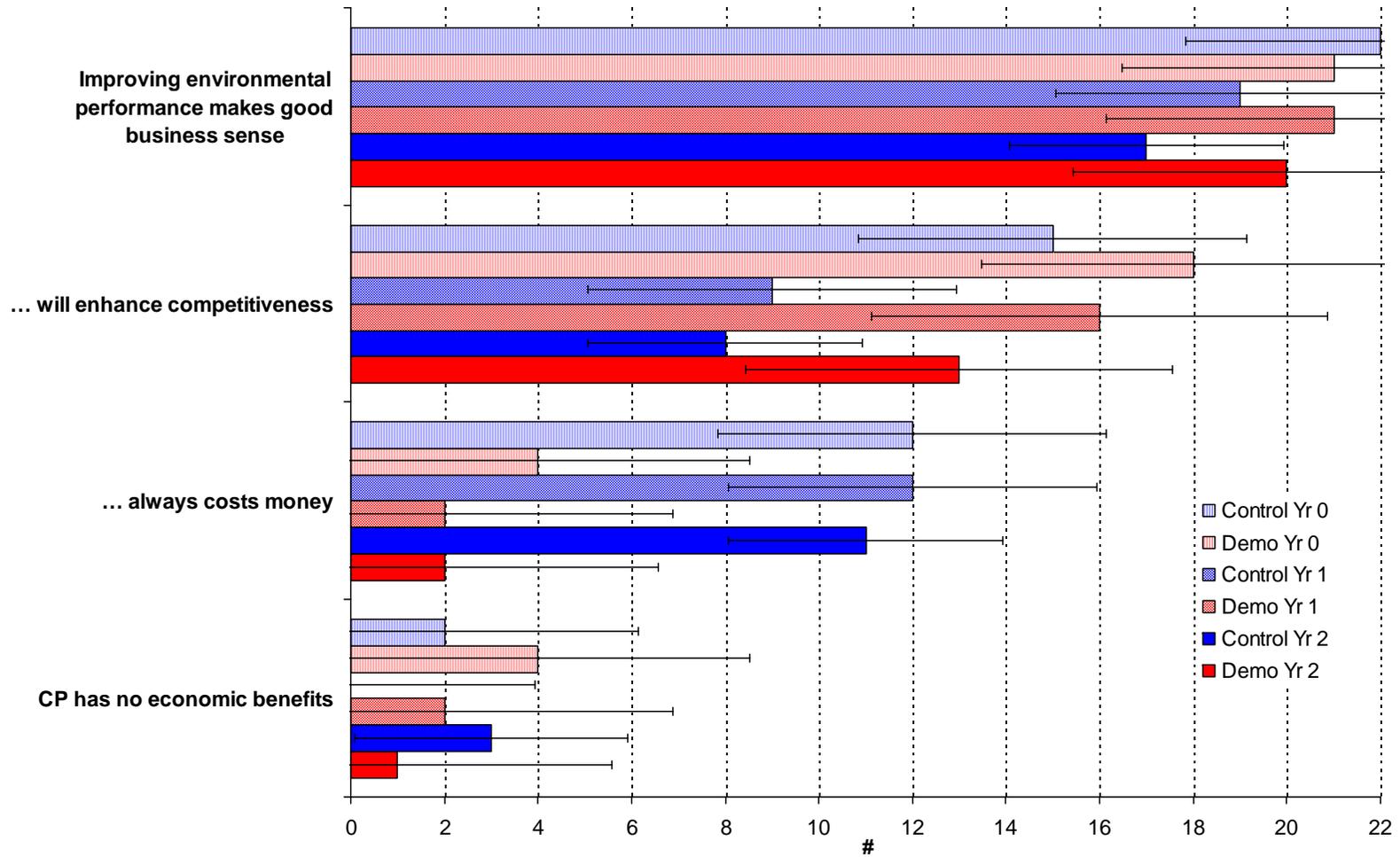
Figure 4.7a. Changes in the number of respondents who appeared to have various attitudes. Results from surveys of respondents in the control and demonstration groups at the start (Yr 0), during (Yr 1) and at the end of the demonstration project (Yr 2). Note: There were only 21 responses in both groups in the final sample. See Appendix 2 for a key to statement abbreviations.
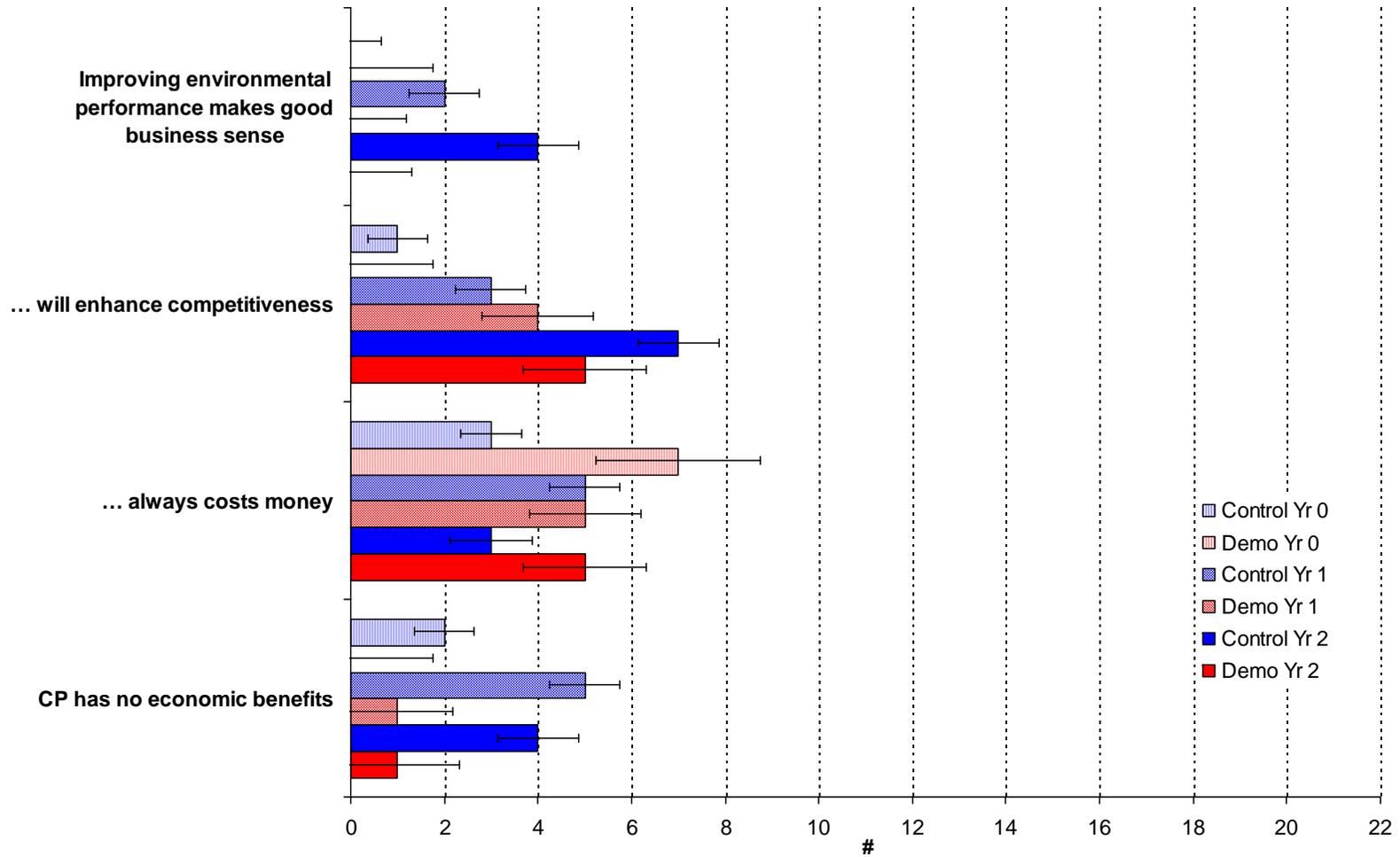
Figure 4.7b. Changes in the number of respondents who were ambivalent about various attitudes. Results from surveys of respondents in the control and demonstration groups at the start (Yr 0), during (Yr 1) and at the end of the demonstration project (Yr 2). Note: There were only 21 responses in both groups in the final sample. See Appendix 2 for a key to statement abbreviations.
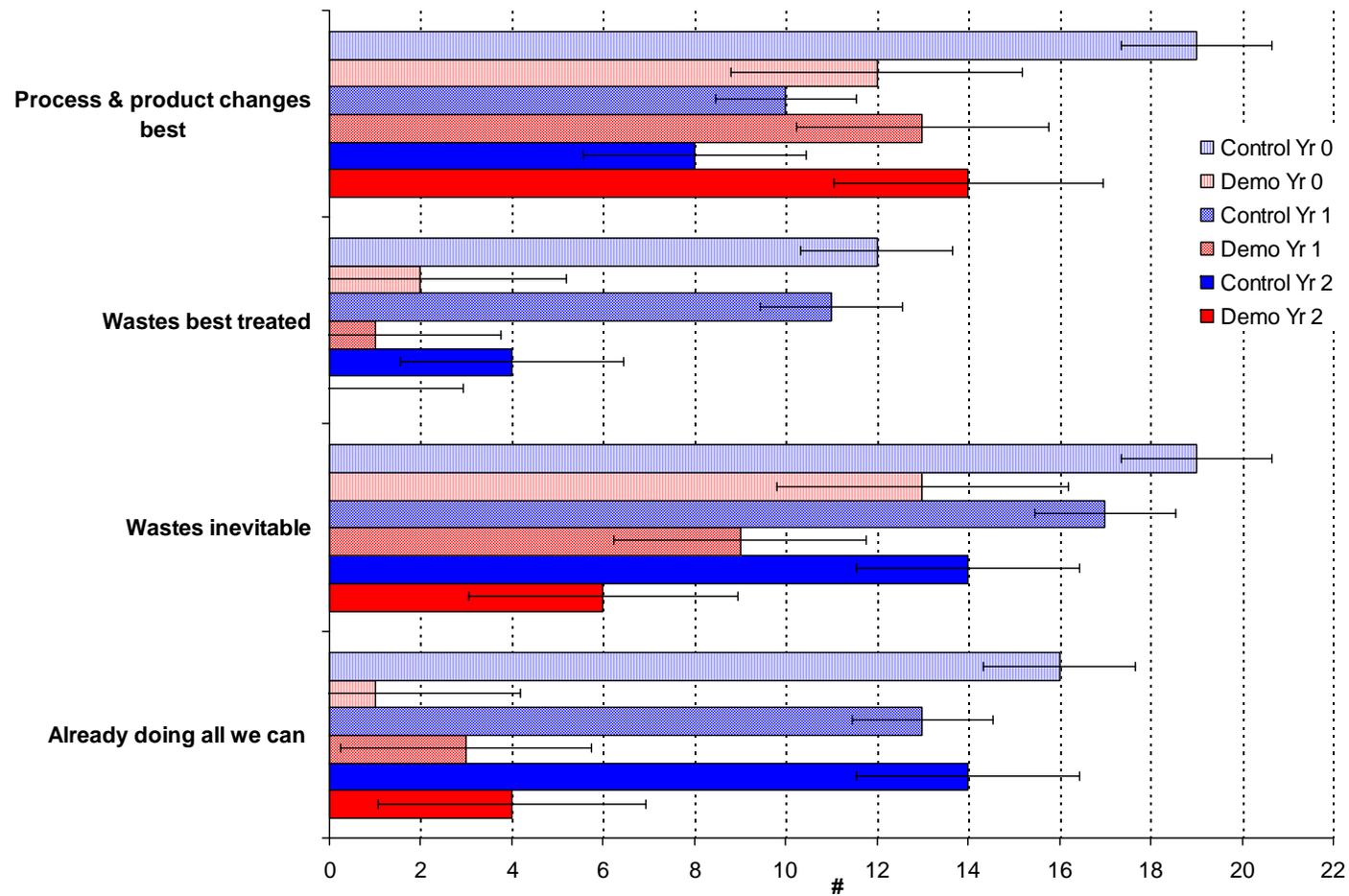
Figure 4.8a. Changes in the number of respondents who appeared to have various attitudes. Results from surveys of respondents in the control and demonstration groups at the start (Yr 0), during (Yr 1) and at the end of the demonstration project (Yr 2). Note: There were only 21 responses in both groups in the final sample. See Appendix 2 for a key to statement abbreviations.
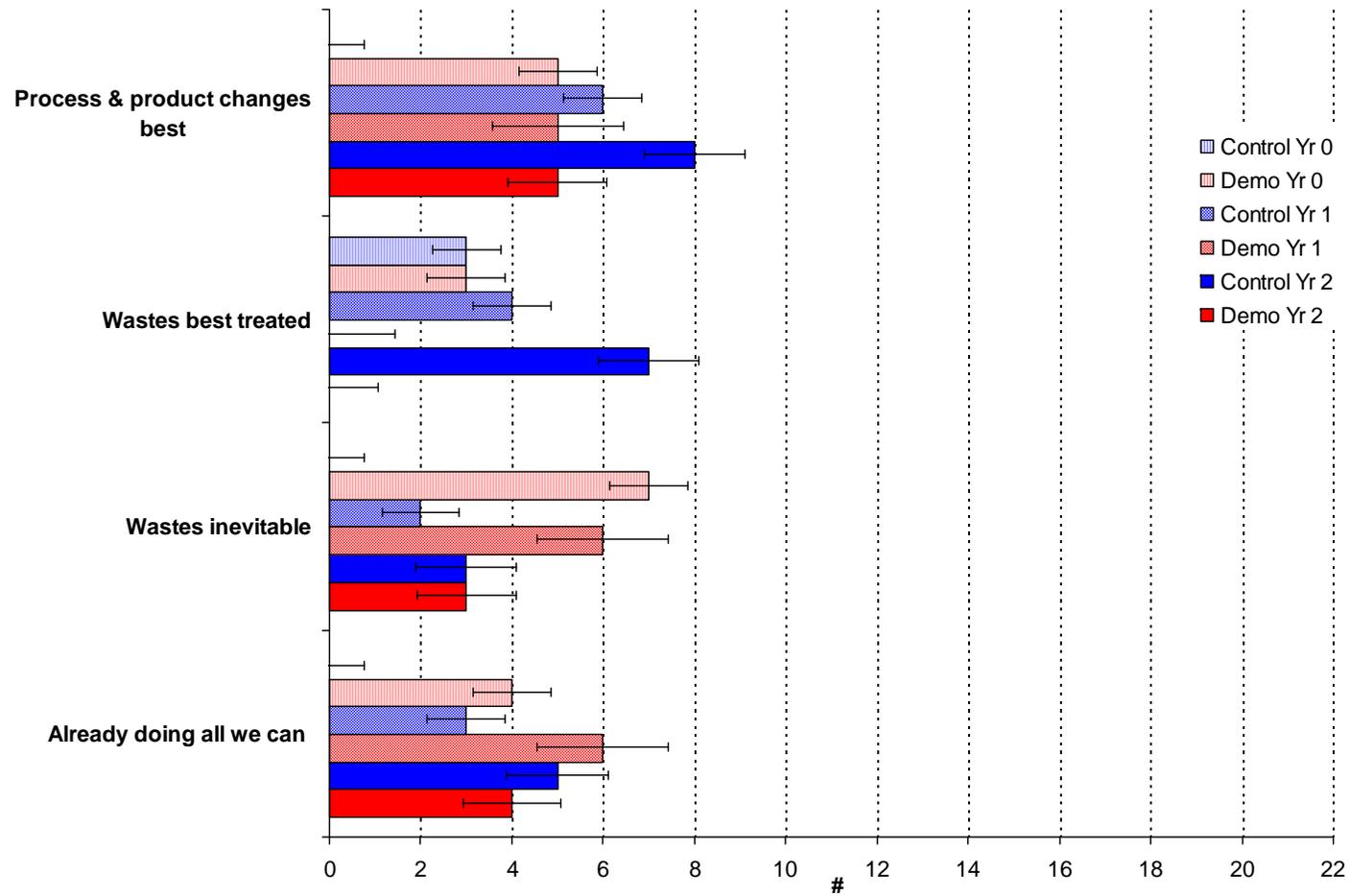
Figure 4.8b. Changes in the number of respondents who were ambivalent about various attitudes. Results from surveys of respondents in the control and demonstration groups at the start (Yr 0), during (Yr 1) and at the end of the demonstration project (Yr 2). Note: There were only 21 responses in both groups in the final sample. See Appendix 2 for a key to statement abbreviations.

4.4 Results for Part III: Organisational factors influencing progress

4.4.1 Introduction

A wide range of factors that are believed to have influenced progress during the course of the project were identified in the monthly progress reports of individual organisations. They were categorised according to the five key elements of organisational theory as identified by Pugh (1997) (see s2.1 above): structure, organisational environment, management, people and organisational change and learning.

The key factors identified for each of the five categories are summarised below. Note that the factors are drawn collectively from the progress reports of all of the organisations. This section is qualitative in nature and does not attempt to provide an in-depth analysis into each specific factor that contributed to progress (or lack of it) within each individual organisation. Neither does it place any emphasis on any particular factors. Rather, it provides a summary of the range of factors that appear to have influenced progress and makes suggestions for overcoming some of the difficulties encountered.

4.4.2 Structure

Structural factors identified in the progress reports could be divided into two separate sub-categories: those that were relevant to the structure of the demonstration *project* and those relevant to the structure of the demonstration *organisation* itself.

Demonstration project

The key structural factors that were identified within this sub-category concerned the roles and responsibilities of the participants in the project and the links between them. Participants in the project included councils, power companies, demonstration organisations, consultants, students and researchers.

It appears that all participants need to have a very clear understanding of their roles, those of other participants, and the links between them. One progress report identified the need

for key performance indicators for all participants. These would certainly help to communicate roles and assist in the measurement of progress.

Clear lines of communication need to be established and participants need to be well informed about how to go about communicating with others when they need to. The interface between consultants, students and staff from demonstration organisations appears to have been particularly important. There needs to be some flexibility in the availability of funds for consultants, students and equipment so that additional funds are available to be moved into areas of need. Processes for applying for such funds and other assistance (e.g. monitoring equipment) need to be clear.

Demonstration organisation

Factors relevant to the structure of the demonstration organisations themselves concerned leadership, the project team/s and the links between them. Leadership was found to be important in terms of the role that management played in establishing teams, the allocation of responsibility, and the provision of on-going encouragement and support.

Structural issues that limited progress in some demonstration organisations were: lack of formal establishment of the team/s; lack of clarity regarding the role of the team/s, and lack of understanding of the relationships between management, team members and others (e.g. student, consultant, other staff).

The composition of the programme team/s was also found to be an important influencing factor. In some[10] organisations the team was either never formally established or disintegrated for various reasons. Team members left the organisation for various reasons and were not always replaced. In these cases, one person tended to have sole responsibility for the TZ programme and progress tended to be slow or non-existent.

---

[10] It is important to note that this part of the evaluation was qualitative, not quantitative. It was designed to identify as full a range of factors as possible without assigning relative significance to them. The number of organisations wherein a particular factor was found to be influential is not identified here because all organisations are different, and it can be assumed that the influence of any particular factor will depend on the organisation in question. When the term some is used in reference to the number of organisations, it can be assumed that reference was being made to more than one organisation. It seems reasonable to assume that if the factor was found to be influential in more than one organisation, that it has the potential to be influential in others.

In other instances, pressures of work made it difficult for the team/s to function. This appeared to be a common factor in organisations with heavily seasonal activities. During the peak season, staff tended to be under extreme pressure, finding little time for TZ work. Such difficulties were exacerbated if team members worked on different shifts and team-work had to be undertaken outside work hours. In the off-season, staff numbers tended to be reduced to the bare minimum. Continuity of team involvement became a problem and low, or sometimes non-existent production made it difficult or impossible to obtain meaningful data for analysis.

The results appear to confirm that it is essential for project teams to be formally established, for team members to be replaced when they leave and for mechanisms to be put in place to ensure continuity of knowledge and work. In addition, team members must be supported, particularly by ensuring that they have adequate time available to carry out the responsibilities assigned to them. These factors need special consideration when organisations are expected to have variations in activity and staff levels.

4.4.3 Organisational environment

Factors of relevance to the organisational environment included the influences of government, other organisations and seasonality.

Governmental influences

Apart from the significant influence of the funding provided by the Ministry for the Environment, the main governmental influences were those that related to the role undertaken by territorial authorities participating in the project. These authorities influenced the project by providing encouragement, support, networking opportunities, communication, additional training and by making specific types of monitoring equipment available for hire. A thorough analysis of the effectiveness of each of these contributions was beyond the scope of this research project, but results from the overall evaluations indicate a positive response to the participation of local government (see s4.2.2).

However, in a few instances, delays in the availability and/or calibration of monitoring equipment, as well as difficulties with its use, were found to negatively influence progress. It is necessary to ensure that the availability of monitoring equipment and any other

services is sufficient to meet demands and that it will be able to be used effectively. Council staff need to be available to assist in its use and to train team members. Training needs to include methodological issues that will influence the validity of the results gained using the monitoring equipment (see s4.4.6).

Influences of other organisations

Factors relevant to the influences of other organisations were: acquisitions or mergers; closure of competitors; increasing costs of resources, and the availability of role models.

A number of the demonstration organisations were either taken over by or merged with other organisations during the course of the demonstration project. This hindered progress because it tended to overshadow all other projects, shifting management focus and causing uncertainty amongst staff. In some cases, the resultant restructuring and redundancies gutted the teams and undermined the confidence and contribution of remaining staff. Any focus that they may have had on TZ prior to such changes appears to have been lost in favour of more immediate, survival-oriented priorities. Redundancies also tended to increase pressure on team members by further reducing time availability for TZ work. In other cases, the closure of competing plants or new contracts increased the load on demonstration organisations and exacerbated pressures on staff.

There was only one clear case of suppliers directly influencing progress, i.e. an increase in the cost of natural gas. The increase is believed to have improved the potential for economic benefits and therefore motivated the demonstration organisation to pursue options for reducing energy use. In another case, a visit and talk by a representative from a similar organisation that had already successfully implemented a cleaner production programme, encouraged progress.

Industry representative bodies were believed by some organisations to have the potential to influence progress by providing opportunities for networking, information sharing and collective tackling of problems. While these contributions were not evident to any great extent during the course of the demonstration project, it would be valuable to harness their potential in future projects.

Most of the above-mentioned external influences are difficult, if not impossible to control. Voluntary types of programmes such as the TZ project are unlikely to survive while they are considered peripheral. Mechanisms need to be put in place to elevate their importance and to provide some form of security for- and continuity of key staff who have developed skills and knowledge in relevant areas.

Other external influences

Seasonality was the only other external influence that was identified in the progress reports. Unlike the previous external influences, the timing of the extremes that it creates is relatively predictable. The influence of seasonality is summarised in section 5.1.2 above. Some of the difficulties encountered as a result of seasonality will be avoided by careful planning around the extremes caused by peak and off-peak periods. The project team/s need/s to be structured in a way that ensures continuity from peak to off-peak season and from shift to shift.

4.4.4   Management

Managerial factors that appeared to influence progress were: the role and participation of management; responses to competing demands, and the focus for the project.

Role and participation of management

The role of management was found to be important in terms of: leadership, planning, approval, support, allocation of responsibility and mechanisms for ensuring progress.

The progress reports indicated that there were few clear expressions of support from corporate or senior management (see s4.3.2 and s4.3.4 for confirmation). Additional factors that concerned team members from some organisations were an apparent lack of awareness amongst management of the project, its potential for benefiting the organisation and the contributions that staff were making.

Team members from many organisations worked under extreme pressure without any assistance from senior management. The pressure was exacerbated when team members left and were not replaced. In some cases, management approvals for various indicators of the project, from environmental policy to funding for monitoring equipment, were delayed

or never eventuated. In one organisation, team members had to wait a year for approval of funding for monitoring equipment, despite it costing only a fraction of the amount they had already saved as part of the project.

These factors tended to reduce enthusiasm in staff and cause a subsequent loss of momentum and progress. The perceived reduction in CEO commitment during the course of the programme may be due to these types of difficulties (see s4.3.2). Conversely, staff enthusiasm and progress appear to have been positively affected when management commitment and approval for the project was given a high profile (e.g. by means of a formal launch and social function for staff).

Some progress reports suggest that management needs to review strategic plans, develop systems and drive objective setting that will elevate the status of environmental performance improvement within the organisations. They also identify a need to improve their own awareness of- and responses to the programme. A mechanism for ensuring a quick turn around in approvals or requests for funding would help to maintain progress and enthusiasm.

It appears to have been essential for the project team/s to be formally established and for prompt attention to be given to the replacement of team members if they leave. Management is also expected to provide incentives for staff involvement and include cleaner production in the induction process for new staff.

Competing demands

Competing demands tended to take the form of takeovers and mergers, restructuring, financial difficulties and other projects. The effects of takeovers, mergers and restructuring are summarised in s4.4.3. Similarly, financial difficulties tended to result in increased pressure on staff. In some cases, TZ work tended to be considered by management to be peripheral and was not, therefore, considered worthy of attention. In a few cases, staff were pressurised to focus on "quick wins"[11]. A disadvantage of this approach was that it tended to result in little attention being paid to the gathering of baseline information. In one case

---

[11] "Quick wins" are changes that result in financial benefit with no or little effort.

this, in turn, is believed to have led to an under-reporting of potential gains and a consequent loss of management support for the project.

Other projects that were found to influence progress included plant expansion, replacement of equipment and, in a few cases, the development of an environmental management system (EMS) for ISO 14001 certification. Plant expansion and equipment replacement were recognised by some team members as opportunities for improving environmental performance and monitoring, but they were not necessarily treated as such by management. Where these projects had already been approved, they tended to continue without further reference to environmental performance opportunities. In one case, plant expansion caused considerable delays for the TZ project, because it took place in the seasonal shut-down period. Staff could not use or analyse data from the previous season's production period and had to wait 8 months before the expansion was completed, start-up difficulties were overcome and monitoring could begin.

An EMS can be used to identify and implement cleaner production options. However, it will not necessarily be used for this purpose, particularly if the latter is not specifically included in the organisation's environmental policy. In one demonstration organisation, an EMS was developed at the expense of the TZ project, apparently because the project leader was only interested in the minimum requirements for ISO 14001 certification. In another organisation, the opposite appeared to be the case, because the project leader recognised the additional benefits that could result from cleaner production. The EMS was integrated with the system developed for the purpose of the TZ project.

Project focus

Organisations tended to have a range of ways in which they approached the TZ project and the specific areas of focus that they chose appear to have influenced progress. Some organisations focused on major projects (e.g. major refits or expansion of the plant), others on "quick wins", and others on specific waste streams. It appears that the focus improved outcomes in some organisations.

While plant expansion or refitting were seen by team members and consultants as providing ideal opportunities for enhancing environmental performance, they did not always live up to such expectations. In one case, the project focus had already been decided

and only senior staff were involved. The exclusive nature of the work meant that there was no flow on effect to the rest of the staff and there were no opportunities for their input or participation.

In other cases, the project focus was on specific waste streams. This did not appear to negatively influence progress if the focus was part of a staged process and there was progression from one waste stream to the next. However, the potential of the project did not appear to be fully realised when the focus was permanent, e.g. a focus on water for compliance purposes, with no intention to progress to other wastes.

In other cases the focus was on insignificant waste streams or on "quick wins". The effects of these are summarised in s4.4.6.

4.4.5 People

Personnel factors could be divided into those that involved the managers and staff[12] of the demonstration organisation, as well as the consultants, students and other external people working with the organisation.

Managers and staff of the demonstration organisation

Factors that were identified in this sub-category concerned managers, the programme leader or champion, the project team/s and other staff.

The following management positions appear to have the potential to influence progress[13] (suggestions for overcoming negative influences identified in the progress reports are shown in brackets):

- General manager (needs to have knowledge of the programme, to provide direction and must ensure that the project team has management skills);
- Administration manager (must be prepared to work with the project team);

---

[12] As mentioned in a previous footnote, it is important to re-iterate that the factors presented here were identified using the progress reports that were provided by the consultants. The term *staff* is used to describe non-management staff who may or may not have been directly involved in the project. Where a distinction between different types of staff is necessary (e.g. TZ teams), this is included. Managers are identified separately.

[13] Note that this list has been compiled using the progress reports from all the demonstration organisations. No single organisation identified all of these positions as influencing progress.

- Plant/factory manager (must be responsible for motivating and ensuring staff involvement);
- Quality manager (must recognise the significance of the project and integrate it with quality programmes), and
- Line managers/supervisors (must be engaged so that they do not obstruct the project team's efforts and must be required to release staff for project purposes, when necessary).

The following characteristics were identified as being important for the project champion or leader: enthusiasm; skills in project management; ability to motivate and empower (team members and other staff); ability to maximise the use of human and other resources; ability to delegate; top down approach can de-motivate team preparedness to follow suggestions, and technical knowledge. Most importantly, they need to have seniority/status and the ability to make decisions that can enable the project to progress. The loss of a team leader tended to be a significant event that could damage the entire project. It was suggested that team leaders themselves need encouragement and guidance.

Characteristics that were identified as being important for the project team/s were: enthusiasm; focus; good dynamics and teamwork. It was suggested that a systematic approach, synonymous with total quality management would be helpful. The main role of the project team was believed to be the progression of the project, with members taking an active role in collating information, evaluating options, and providing one-on-one support for other staff.

It appears that the team should be composed of members who: are motivated and have the drive to see the project through; have experience in project management and team work; have a mix of non-technical and technical skills (including production and site layout); are representative of staff groups (in terms of skills, knowledge and personalities) and have sufficient status to enable them to secure staff involvement. It was also noted that management must be prepared to adjust team composition if necessary to enhance its effectiveness.

Difficulties that teams face and that need to be overcome include: pressure of work due to long hours, tiredness, seasonal peaks or off season lay-offs; re-location of staff (to other

duties, projects or plants); absence due to travel, sickness or personal circumstances, and conflict (within the team and with other staff members). Exclusion of particular staff members from the team (namely, the site engineer, factory floor supervisors or office staff) was found to cause difficulties in some organisations.

It is essential for team members who leave to be replaced, for continuity to be maintained and for opportunities to be provided for absent and new team members to catch up with progress. It appears that lack of progress can result in loss of motivation, so it is important for mechanisms such as performance indicators to be put in place to ensure that progress occurs.

Mechanisms are also necessary to develop and enhance the interest, motivation and involvement of other staff. They need to be available to assist the team and to contribute to progression of the project. When other staff become involved, their contribution needs to be recognised and their suggestions need to be acknowledged and followed up. Staff can become suspicious of the motives underlying waste audits and may be nervous that the results will reflect poorly on their own performance. They may become obstructive or affect the validity of data in some way. It is important to allay these concerns and to take steps to engage, rather than antagonise them. The training and informational requirements of team members and other staff need to be recognised and provided for (see s4.4.6).

Consultant/s

The role played by consultants, their characteristics, and the constraints or difficulties they encountered were factors that were found to influence progress in some demonstration organisations. Consultants appeared to play an important role by: providing guidance and encouragement; maintaining the focus of the team; reviewing methods and results; identifying appropriate case studies/examples; sharing previous experiences; passing on information regarding regulatory requirements and council expectations, and assisting with training. In some cases they played a direct, "hands-on" role as part of the TZ team, while in others this did not appear to be possible (when the demonstration organisation had a guarded, insular approach) or necessary (when the team was able to progress well with minimal external assistance). Most consultants appear to have played an important role in guiding the students, particularly when the latter were unable to gain much input from staff.

It appears to have been important for consultants to be creative and flexible enough to recognise the specific characteristics and needs of the organisations with which they are working and to provide advice on adapting the recommended project process to those needs. It also appears to have been important for consultants to be easily accessible to demonstration organisations and for travel time and costs not to impact on accessibility or availability.

It appears that the periods between visits by the consultant can result in a "vacuum" and lack of progress. A mechanism is therefore needed to ensure that progress does indeed occur during these periods.

Student/s

On the whole, students appear to have made positive and constructive contributions to progress and to have helped to alleviate pressures on staff. Part of their value appears to have been attributed to enthusiasm and the blocks of time that they had to devote to the project. In many cases they acted as a catalyst for progress and their work helped to raise the awareness of the project amongst staff. They tended to play significant roles in the characterisation of waste streams, data gathering, and report writing.

The availability of funding for students was considered to have been valuable as a source of motivation and reward for their efforts. In order to maximise the value of their work, students appear to require sufficient guidance, assistance and supervision, as well as a clear project brief. The project brief needs clarity in terms of goals, scope, reporting requirements and deadlines.

The consultants appear to have played an important role in providing for these needs. In some cases, students had little or no supervision, support or other input from staff. The responsibility for specific TZ outputs seems to have rested to a large degree on students and consultants. In these cases there tended to be little further progress when the student left.

In other cases, pressure on staff resulted in delays in the provision of students with data or in the review of their material and progress was hampered and/or reports delayed. Most consultants drew attention to the need for data that was collected by students to be

validated by team members/staff and for reports written by students to be thoroughly reviewed. Without this validation, the reliability of the information cannot be confirmed.

In some cases, differences between the times when students were available and the specific needs of the demonstration organisation or the project, were found to cause difficulties. Care must be taken to ensure that students will be available when necessary (e.g. by planning the project with this in mind or by negotiating some flexibility with their institutions). It is also important to ensure that they have sufficient knowledge of the rationale behind the project and the processes necessary to achieve results that are consistent with its goals.

4.4.6   Organisational change and learning

Factors that were found to be important in terms of organisational change were: the culture of the organisation; the process whereby the project was carried out; the different components of that process; training, and communication. The factors that were found to influence progress in these sub-categories are summarised below.

Organisational culture

Cultural factors that were found to influence progress were the organisations' receptiveness to change and the compatibility of organisational culture with the project. Organisations appear to have been less receptive to the project when they were complacent due to existing initiatives, when they were unable to accept the possibility of change, or when they had an inherently antagonistic relationship between labour and management. In the case of the latter, the TZ project was seen as a management initiative and it was difficult to overcome the negative connotations resulting from this attitude. Progress within one organisation appears to have been hindered by its insular nature and a resultant difficulty in accepting external input where this would have been useful (e.g. in the provision of additional training or support).

It appears that care needs to be taken before the start of a project to ensure that participating organisations are fully prepared for and receptive to the potential changes that will need to occur for the project to be successful.

Process

Factors relevant to the process undertaken during the demonstration project itself were: preparation and time lines for the specific tasks that were required to be carried out, and mechanisms for continuous improvement. Identification of existing initiatives and disposal practices were found to be important during the preparation for the project. In particular, it appears to have been valuable to identify the types of wastes involved and the costs/benefits of existing initiatives. These could then be recognised and used as sources of motivation and could contribute to the development of baselines.

While time lines are necessary to ensure that progress occurs within a given period, other pressures on staff meant that project time lines were frequently ignored. Some flexibility appears to have been necessary, so that staff do not begin to feel threatened when they are unable to meet deadlines.

Specific tasks

The specific tasks that were expected to be carried out during the course of the project were: development and implementation of an environmental policy; a waste audit/assessment, and options identification, evaluation and implementation.

Factors that were found to contribute positively to policy development were: the availability of examples that could be used as a basis for development; staff involvement (e.g. in the identification of issues for inclusion), and recognition of the effect that the policy might have on staff. Difficulties appear to have been encountered when the significance of policy was not fully recognised and/or when an existing policy was believed to be sufficient, despite its general nature. Delayed approval for- or endorsement of either a new policy or changes to an old policy appear to have hampered progress and de-motivated staff, particularly when they had been actively involved in the development process. The need to review or "fine tune" the policy and to include this as part of a formal implementation strategy were also identified as being important.

Factors that were identified as significant for the waste audit/assessment were specific to: preparation; the work sheets used; the walk-through; the development of a flow diagram, and the input/output analysis. It appears to have been important to prepare for the

assessment by first determining: its scope, goals, and informational requirements; how resources will be allocated; existing initiatives and their potential effects, and the barriers likely to be encountered.

Projects appear to have been most successful when the team/s was/were assigned to specific areas of focus, rather than having to tackle the whole organisation or even the whole plant simultaneously. Small pilot studies were found to be useful because they provided a practical opportunity for testing the methodology, as well as the knowledge and skills of staff. They were also found to provide opportunities for enthusing staff, developing their experience and preventing them from being overwhelmed. However, the importance of choosing an appropriate focus for the pilot study needs to be emphasised. In one case, the waste stream chosen for the pilot study was relatively insignificant and outside the core activities of the organisation. It did not, therefore, serve to motivate staff involved in core activities, and it made it difficult to extend the project to other, more significant waste streams.

The importance of gathering baseline information before setting of goals was identified. The baseline information that was used included: types of wastes; flows; quantities, and the costs of processes, resources, wastes and labour. Consideration needed to be given to: the units to be used; internal (e.g. accounts, stores) and external (e.g. internet, experts, databases/case studies, industry representative or research organisations) sources of information, and collation.

Gaps in information appear to have been due to: detailed accounting systems and difficulties in extracting relevant information; restricted access to possible information sources; shutdowns; the non-representative nature of the data or activities chosen for study, and the lack of expertise of staff. In some cases, lack of knowledge regarding plant layout, particularly the drainage system or the siting of electricity sub-boards, became a problem. In other cases, staff had difficulty siting meters, using or recording data and/or developing monitoring programmes that would deliver accurate data.

Methodological difficulties included: characterisation of the wastes; understanding of the level of detail required; the time necessary and/or available; the budget; plant

design/layout; the duration and frequency of sampling and its implications; the comparability and/or accuracy of data, and verification by appropriate staff members. In a few cases, pre-occupation with detail is believed to have resulted in a "loss of the big-picture", while in others, a focus on action, rather than measurement, resulted in options being implemented before baseline information could be gathered. As a result, gains could not be accurately presented and their value as a source of motivation for further, on-going action was undermined.

Difficulties that were encountered specifically during the initial phases of the project and which appear to have had a delaying effect were: the complexity of processes; large numbers of products; large plants, or time lines that were incompatible with plant operation (e.g. the start of the project during the off-peak period when production for one organisation was non-existent).

In some cases, there were difficulties in the use of work sheets. These difficulties appear to have been due to a lack of understanding of their purpose and the processes necessary to complete them, as well as a lack of time and/or motivation to do so. Staff appear to have required training in their use, as well as how to adapt them to make them easier to use and more applicable to a specific organisation.

The "walk-through" was found to be valuable as a means of: filling in gaps in knowledge; engaging staff; generating enthusiasm, and identifying options for improvement. Timing was found to be important to ensure that activities/throughput are representative. Some consultants advocated the use an existing "site inspection protocol", but it is not known whether this was found to be useful or not. A walk-through video was filmed and used by some organisations for training senior, as well as shop floor staff and for identifying potential improvements. The use of this tool was delayed in organisations where seasonal shutdowns occurred in the initial stages of the demonstration project. It is important to ensure that progress in organisations with unusual patterns of production is not delayed by expectations that they conform to the same process used in other organisations.

The development of a flow diagram was identified as being useful because it can provide a basis for identifying priority areas upon which to focus. Identification of priorities and

focus appear to have been important factors contributing to the success of the input/output analysis. For some organisations the availability and calibration of metering equipment was also important. The value of such equipment appears to have depended upon the extent to which staff were skilled in its use. In one case, the only person who had the skills to operate a particular piece of monitoring equipment had recently been made redundant. In some organisations, delays in approval and installation of monitoring equipment hindered progress.

In some cases, the NZ Waste Analysis Protocol (WAP) was used as a basis for categorising and quantifying solid waste. However, it appears that many organisations had difficulty with the quantification of other wastes. Flow meters provided by local government were not always used effectively and this resulted in errors. In one case, errors resulted in waste quantities that were lower than expected, which in turn lead to complacency and loss of motivation to participate in the project. External assistance was generally needed for measuring energy wasted by equipment such as boilers.

A common difficulty that had to be overcome during the initial stages of the waste assessment was staff not knowing where to start. This appears to have been particularly important with large plants and/or complex processes. In one case, these difficulties appear to have been exacerbated by an expansion programme that was occurring concurrently with the initial phases of the demonstration project. Existing data could not be used because they were out of date and staff could not progress with the project until expansion was complete and the plant was operating properly. By this time, their motivation and enthusiasm appear to have diminished considerably.

Staff input, particularly from the "shop floor" was identified as a potential source for ideas on options for improvement. Questionnaires, brainstorming, suggestion boxes and award systems were identified as methods for gaining staff input. Some organisations used one or more of these methods, but the enthusiasm of staff appears to have diminished in the absence of responses from management. In these cases, it appears that staff believed their input to be a waste of time and would, as a result, have been less likely to contribute in future. In other cases, there appears to have been a poor response to attempts to generate ideas.

For most organisations, economic and technical evaluations of options appear to have been carried out, but there appears to have been little emphasis on environmental evaluation. Social evaluations were not undertaken in any of the demonstration organisations. The technical evaluations appear to have focused on the potential effects that options could have on feedstock quality, product quality and operating parameters, such as temperature. Some organisations conducted trials as part of their options evaluation processes.

Factors that were found to influence implementation of options were: cooperation with other organisations (e.g. in the form of equipment sharing); the availability of resources necessary to acquire additional- or modify existing equipment, and the availability of new equipment. Delays in implementation tended to be as a result of difficulties experienced with the input/output analysis (as mentioned above).

Training

Factors found to be relevant for training were the content of training programmes, the types of target audiences and the means of delivery. There appears to have been a need for training programmes with technical, as well as non-technical content. Training programmes included concepts as well as processes and were sometimes based on the results of site visits.

Potential target audiences for training were considered to be: new or existing team members; supervisors; other staff (e.g. from specific departments or key production units), and students. It was believed that teams, in particular, could benefit from training on technical topics such as the methodological aspects of measurement, monitoring and data gathering, as well as non-technical topics such as team building, group work and communication. In organisations where there was an antagonistic relationship between management and labour, it was believed that training for union representatives could be valuable.

Consultants, councils officers, power company staff and representatives from other organisations that were similar to the demonstration organisation, acted as trainers. The types of resource materials that were identified as being useful were videos of the walk-through, case studies and results or potential benefits of the project. There was no consensus on the best timing for training. Some consultants believed that the only time

available would have been during "smoko" or lunch breaks. These suggestions are possibly more as a result of lack of time availability, than realistic.

Communication

Factors that were found to be relevant to communication were: its management; the people between which communication was occurring; the types of information being transferred; the methods used, and their effectiveness. The key roles identified for management appear to have been to prevent misunderstandings re. the project, policy and process, as well as to identify parties between whom communication needed to occur. It was found to be important for the project leader or team to communicate regularly with corporate and site management, supervisors and line workers, other staff (including administration staff), the consultant and the student. In some cases, it was found to be necessary to keep suppliers informed and to incorporate them into the process, particularly where identification of options for improvement was concerned.

It was found to be necessary for the following types of information to be available: on the project, its overall goals and specific objectives; on the assessment process; potential or achieved benefits (e.g. streamlined resource consent applications, cost savings, market advantages); experiences (of the demonstration- and other organisations); specific results (e.g. "quick wins"), and the need for staff involvement.

Methods that were identified as being useful for communication were: corporate magazines, newsletters, information sheets, minutes of meetings (including action/responsibility notes), memo's from the general manager, reports (e.g. to management), presentations to all staff web pages and prominent displays. It also appears to have been useful to encourage interaction between people, e.g. "pep" talks by management. In the case of meetings, it is clear that it is important to ensure that they have a specific purpose (e.g. to promote commitment or to generate ideas) and that staff have adequate advance warning of their timing.

It appears that the effectiveness of communication and training is enhanced by simplification of the information that is being presented. Effectiveness can be measured in terms of staff dedication, as well as management commitment.

4.4.7 Summary of results

The main categories of factors that appear to have influenced progress in some way during the course of the demonstration project were as follows[14]:

- Structure of the demonstration project and the participating organisation.
- Environmental/contextual factors, including: national, local, legislative and other requirements; acquisitors, competitors, role models, customers, suppliers and industry representative bodies, and seasonality.
- Management & decision-making factors, including: leadership, planning and responses to programme; takeovers, mergers, financial status, restructuring and other projects; management awareness, approval and support; allocation of responsibilities; mechanisms for ensuring progress, and programme focus.
- People, including: management, programme champion/leader, team/s and other staff; consultants, and students.
- Organisational change and learning factors, including: organisational culture; process; specific tasks; training, and communication.

4.5 Key conclusions regarding the effectiveness of the project as derived from the research results

The results from Part I (feedback – s4.2), suggest that respondents perceived the Target Zero (TZ) project to be successful and beneficial to participating organisations. Key factors that were believed to have contributed to the perceived success of the project were the provision of external support (also identified as a most valuable aspect) and the opportunities that the project provided for interaction amongst team members (internally, as well as externally). Other factors that were believed to have contributed were: the input/output analysis that was required to be undertaken by all participants; management support that resulted from participation; the training provided, and the savings that were realised. The main benefit that was believed to have resulted from the project was increased awareness - as a whole and specific to waste management. Economic and

---

[14] The list of factors has been compiled from the progress reports of all of the organisations. It provides an indication of the range of factors, not their relative significance. Not all of the factors listed here influenced progress within each organisation.

environmental outcomes were also perceived as benefits, and enhanced profitability was identified as having been particularly valuable. Reductions in inputs were also identified as benefits, and were identified as distinct from economic or environmental benefits.

The majority of respondents also believed that the project was likely to result in continued pursuit of cleaner production in their organisations. They believed that this was because of the opportunities that application of the concept provides for enhanced competitiveness and profitability, as well as waste reduction and compliance.

Before conclusions regarding the success of the project are drawn from the above-mentioned results, it is important to note that the remaining results (using less direct forms of questioning) suggest that respondents may have been over-stating both the success of the project and the likelihood of on-going improvement.

The first demonstration of this can be found in the ratings respondents allocated to specific project components. For external components (or those that were provided as part of the project), the ratings suggest that the 'club' approach, the 'club' meetings and the support provided by councils, students and ECNZ made valuable contributions to the programmes conducted by the majority of organisations. The contributions made by the rest of the external components were less consistent. 'Club' training, the assistance provided by the TZ-appointed consultant and the provision of technical information appear to have contributed well in about two thirds of cases. The support provided by other 'club' members appears to have contributed well in about half the cases, while on-site training, as well as support from the local power provider appear to have contributed well in less than half the cases.

Inconsistency is further demonstrated for internal components (or those required to be undertaken by the organisations themselves), which tended to be rated lower than external components. An exception was the waste audit, which was well-rated in three quarters of cases. In contrast, the input/output analysis and environmental policy were well rated in just over half the cases. Support from site and corporate management, a specially developed management system, the TZ team, other staff, the cleaner production options report and the economic analysis of options, were well rated in fewer than half the cases.

Communication of progress to staff other than those involved in the TZ team and their training were well rated in fewer than a third of cases, while support from the Board and time availability were well rated in fewer than a quarter of cases.

It can be concluded that while TZ's 'club' approach and the support that it provided were valuable, its effectiveness in providing training for the majority of internal components (with the notable exception of waste auditing) was inconsistent at best, and in some cases poor.

The results from Part II (the surveys conducted before, during and after the project – s4.3) appear to confirm that TZ appears to have been most effective in providing training for waste auditing. They also suggest that the project was effective in providing for the identification of options for improvement, and (to a lesser extent) a movement away from compliance-driven environmental programmes. It is unclear from the results whether waste auditing and options identification were solely as a result of external input (e.g. from consultants or students) or enhanced capability of participants. Since the input of consultants and students was highly rated and they seem to have conducted the input/output analysis and/or written the options reports (in the majority of cases), it seems likely that they were responsible.

While the results for waste audits and options identification are consistent with some of the results from Part I, the rest of the results for Part II appear to confirm that the feedback from respondents over-stated the likelihood of on-going improvement. When asked less directly (i.e. using a statement and a Likert scale for rating it), fewer than half the respondents believed at the end of the project that their organisations had an *'on-going process for improving environmental performance'* and almost a quarter were unsure.

Other, less direct results also draw into question the likelihood of on-going improvement in the majority of organisations. They suggest that TZ was only partially effective in terms of programme formalisation and the encouragement of staff to identify improvements. These important indicators did increase during the course of the project, but by the end of it they were only apparent in half the cases. In addition, other elements that would normally suggest on-going improvement (i.e. environmental policy, an environmental management

system, and the inclusion of environmental criteria in staff performance appraisals, as well as regular waste audits), remained unaffected by participation in the TZ project.

An environmental policy appears to have been developed in only two organisations during the course of the project and more than half did not have one by the end. The development of such a policy was required to be included in the progress reports key outcome expected of participating organisations. It can be concluded from these results that the training provided for environmental policy development was inadequate.

TZ appears to have been similarly ineffectual in the development of comprehensive environmental management programmes or systems and, more specifically, the incorporation of environmental criteria in staff appraisals. Only two organisations appear to have developed environmental management programmes/systems during the course of the project, with more than half not having such programmes/systems by the end. None undertook, during the course of the project, to include environmental criteria in their staff appraisals and there was only one organisation that used such criteria. Nor did they actively seek community input. While four organisations appeared by the end of the project to actively seek community input, none had developed this approach during its course. From these results it can be concluded that the training provided by TZ was ineffectual in bringing about a more inclusive approach to environmental performance improvement (either internally in terms of staff involvement or externally in terms of community involvement).

These results are not really unexpected since these outcomes were not specifically required to be developed during the course of the project. However, the TZ training did draw attention to their importance for environmental management as a whole and in terms of cleaner production. Two further conclusions can be drawn from these results. Firstly, that the training provided by TZ was ineffectual with regard to these more systemic and cultural elements. Secondly, that they do not result simply as by-products of cleaner production programmes. Specific training is clearly required.

Another result demonstrates more directly how ineffectual the TZ project appears to have been in bringing about on-going improvement. By the end of the project there were only

three organisations that were believed to conduct waste audits regularly and no changes appear to have occurred in this regard during its course. TZ appears to have been particularly ineffectual in bringing about the regular use of waste audits as a tool for on-going improvement. It therefore seems reasonable to conclude that the majority of waste audits that were carried out during the course of the project were once-off and unlikely to be repeated.

Over confidence regarding the likelihood of on-going improvement may reflect poor understanding of the requirements for such improvement, and/or it may reflect a difference between perceptions and reality.

Some unexpected results for Part II suggest that there were other areas where there may, at least initially, have been disparities between what respondents thought and what was actually the case. Contrary to expectations, there was during the course of the project a *decrease* in CEO commitment, *increases* in the barriers presented by senior management and organisational structure, and an *increase* in the incidence of environmental programmes that focused on treatment and disposal.. By the end of the project less than half the CEO's were believed to be committed to improving environmental performance, while the other barriers were identified in approximately a third of cases.

It can be concluded that participation in the project caused these changes to occur. However, since the project didn't set out to achieve them, a likely explanation is that participation in the programme provided respondents with opportunities to recognise the existence within their organisations of structural, management and culture-related barriers to environmental performance improvement. It can still be concluded that the TZ training did not provide the understanding necessary to improve CEO commitment (in more than half the organisations) or to enable the other barriers to be alleviated (in more than a third of organisations).

On a more positive note, TZ appears to have had no detrimental effects on relevant attitudes. By the end of the project, there was still almost unanimous agreement that *'improving environmental performance makes business sense'* and disagreement that it *'always costs money'* and *'has no economic benefits'*. There was unanimous disagreement

that *'wastes are best dealt with by treatment'*. TZ did not, therefore, change respondent's positive perceptions with regard to these issues.

Neither does the project appear to have changed perceptions about the relationship between environmental performance improvement and competitiveness. However, there was less unanimity in this regard. By the end of the project, a third of respondents did not believe that environmental performance improvement would increase competitiveness. There was a similar result regarding the perceived value of product and process changes for the purposes of reducing wastes. By the end of the project, the same proportion of respondents did not believe that product and process changes were *'the best way'* to reduce wastes.

Both results suggest that there were inconsistencies between the marketing of the project and its outcomes. Enhanced competitiveness is commonly used to motivate organisations to improve their environmental performance and, in this case, it was used to encourage them to participate in the project. This would be inappropriate if the relationship was unlikely to be demonstrated during the course of a programme. Product and process changes demonstrate progress towards a more preventive approach to environmental protection and they were therefore emphasised during the course of the training programme. Clearly, the project failed to adequately demonstrate the benefits of such changes in more than a third of cases.

In summary, it can be concluded from Part II that changes in the demonstration organisations did not extend much beyond waste audits and the identification of options for improvement. The project does not appear to have brought about relevant systemic changes within the majority of organisations, and it seems unlikely that progress will continue in more than half the organisations.

Despite the positive feedback that the majority of respondents gave on the project, they also identified a range of options whereby it could be improved. They suggested that the project needed to improve in its ability to:

1. Generate and maintain commitment (from CEO's, senior management, as
   well as others involved);

2. Increase the level of priority assigned to waste management;

3. Minimise the negative effects of the organisational environment and restructuring;

4. Encourage management to provide leadership (without domination) and provide the necessary support for staff (in terms of time and other resources);

5. Motivate and empower staff to become involved (the team, as well as others), and

6. Maximise the opportunities for increased change and learning throughout the organisation.

The project should also maximise the external support, leadership and coordination that it provides; be conducted on a larger scale (although manufacturing and service organisations should be dealt with separately), and enhance opportunities for marketing and sales.

The majority of these suggestions are consistent with the conclusions drawn from the results for Part II. They are useful for identifying gaps in the TZ training programme from the participants' points of view. However, they do not add much to our knowledge regarding what causes the gaps and how to fill them. Indeed, some (e.g. CEO commitment and staff involvement) are very similar to the components that have, for at least a decade, been identified as essential ingredients of a cleaner production programme (see Huisingh's "ten steps" as identified in s3.3). However, it is very clear from the results mentioned to date, that merely identifying them as essential ingredients is insufficient to prevent the difficulties that arise during the implementation of a cleaner production programme.

The results from Parts I and II did not identify the full range of difficulties encountered by participants, nor did they provide sufficient information on how to prevent them from arising. The results from Part III (progress reports – s4.4) provide the necessary detail on the wide range of organisational factors that appear to have contributed to the success or failure of the project within a particular organisation. In addition, they provide the first in-depth analysis of the dynamics of change within organisations implementing a cleaner

production programme (Huisingh, pers. com., 1999). They are therefore valuable as a basis for more substantive conclusions about how to improve the effectiveness of such programmes. Since the value of the results from Part III lies in the details, they will not be summarised here. However, the following conclusions have been drawn from the detail.

Design (project, components, focus). Programme components (such as policy, audits, options identification) need to be designed in a way that maximises opportunities for developing and implementing change and learning programmes within each organisation. For example, an organisation with a treatment and disposal approach may need to focus on gathering and processing information that makes the costs and benefits of alternative approaches directly comparable. An organisation that is compliance driven may need to focus on the wastes that are subject to regulatory control before adopting a wider approach.

A comprehensive waste audit can place significant demands on time and other resources. Difficulties encountered during the process may delay results and demotivate staff. Small, focused "pilot" audits are more likely to encourage staff, and provide manageable opportunities for gaining experience and developing skills. They need to be carefully targeted, so that results can be used to demonstrate benefits and thereby gain support (including resource allocation) for future stages

Compatibility (culture, needs, projects). Existing projects (e.g. plant upgrades) may conflict with and/or hamper the ability of staff to concentrate on a cleaner production project. The relationships between such projects need to be identified in advance. It may be necessary to adjust the cleaner production project focus and/or timing to ensure that conflicts don't arise. If running the projects concurrently is possible, the first stage in the cleaner production project can be designed so that it enhances the outcomes of the existing project and demonstrates the value of an integrated approach. The programme needs to be developed and implemented in a way that is cognisant of- and responsive to the factors that motivate and influence staff at all levels. There needs to be far more flexibility, so that the needs of particular organisations are met. The presentation of results must be tailored to suit the perceptions and expectations of decision-makers.

Objectives (motivation, learning, on-going change, support). The overall objectives of the project need to be consistent with the development of a culture of learning within the organisation. The objectives must be developed so that results will be able to be used to motivate those involved and provide on-going support for the programme.

Roles, working relationships (clarity, action, allocation of authority). The most serious causes of difficulties in the implementation of the programme of change within participating organizations were:

- Lack of recognition and understanding of the roles that need to be played by personnel involved (including the CEO, senior management, plant and operations managers, supervisors and other staff);
- Ill-defined working relationships and poor communication between the wide range of personnel involved.

These difficulties served to demotivate staff and hinder (or even prevent) progress. Mechanisms need to be put in place to ensure that all staff are aware of their roles, understand how and when to undertake them, and are motivated to do so. They must also have feedback, recognition of their contribution and be able to benefit from it in some tangible way. Clear lines of communication need to be established and maintained. Inclusion of policy development in a cleaner production programme may stall progress. Policy development and waste auditing require different interests, skills and levels of authority. Policy development needs to occur at an organisational level, while waste auditing may be more effective if it is conducted discreetly. Responsibility must be allocated accordingly.

Communication (existing, new). In some cases, existing lines of communication and authority may not serve the needs of a cleaner production programme. New lines of communication may need to be established (e.g. between the audit team and the CEO) and authority allocated according to project requirements. It is necessary to ensure such changes do not cause staff who have an important role to play (e.g. supervisors) to feel excluded from the process. This can lead to apathy, at best, and active obstruction, at worst.

Evaluation of effectiveness. Waste audits and options identification processes need to be subject to quality control criteria, including an assessment of the extent to which staff participate, and the knowledge and skills they develop as a result. A waste audit that is conducted by a student and written up by a consultant without staff input will not enable personnel to develop the skills necessary to participate in and contribute to an on-going process of change. Criteria against which to measure achievement can be developed by staff in advance of the process, applied once each stage is completed and the results can be used as a basis for on-going programme development.

5 Improving sustainability programmes for business

5.1 Introduction

The overall goal of this thesis is to assist practitioners to improve the effectiveness of sustainability programmes for business. In pursuit of this goal, I have considered the social and theoretical contexts within which such programmes occur (Chapters 1 and 2) and have evaluated, as an example, the effectiveness of a cleaner production demonstration project (Chapters 3 and 4).

The purpose of this chapter is threefold:

1. To discuss key results of the evaluation within the context of relevant literature on cleaner production/pollution prevention (CP/PP) and environmental management (EM), as well as developments in organisation theory;

2. To use this discussion as a basis for developing a model that may be used by practitioners to improve the effectiveness of sustainability programmes for business, and

3. To draw conclusions about the application of the model in light of the social context within which businesses operate.

The evaluation of the Target Zero (TZ) project was conducted in three parts. Part I gained feedback from respondents regarding the value, benefits and success of the project, as well as the improvements that could be made (see s4.2). Part II tracked changes during the course of the project in key indicators of EM, CP/PP, organisational culture and attitudes (see s4.3). Part III provided in-depth insight into the factors that contributed to progress (see s4.4).

The results of Part I suggest that respondents believed the project to be successful and of benefit to their organisations. They attributed this perceived success to the external support that was provided by councils, students and the Electricity Corporation of NZ (ECNZ). They believed that the main benefits were increased awareness of environmental management, as well as the economic and environmental benefits that resulted from the implementation of

CP/PP options.

While the economic and environmental benefits associated with the project are well documented and significant (see Brown, 2000), the results from Part II and Part III of the evaluation suggest that respondents were overstating the project's success in other respects. The results from Part II suggest that the project was effective in bringing about waste audits and the identification of options for improvement, but its effectiveness in bringing about the systemic, management and cultural changes necessary for continuous improvement was inconsistent at best, and in some cases poor.

The results from Part III provide insight into a wide range of organisational factors that influenced implementation. They are particularly useful for identifying the range of difficulties faced by organisations trying to adopt cleaner production practices and ways in which the training could be improved to alleviate them.

The discussion will not focus on these specific improvements, but rather a few crucial areas that appear to have had significant effects on the implementation of the TZ project as a whole. They are:

- Commitment, particularly by top level managers[1];

- Continuous improvement;

- Leadership and support provided by top level managers;

- Communication with- and involvement of staff, and

- Compatibility of the project to each organisation.

Poor commitment and/or the failure of top level managers to express their commitment through leadership and support, appears to have greatly devalued the project and de-motivated staff. Poor communication between those who were directly involved in the project resulted in confusion regarding roles and responsibilities. Poor communication with other staff reduced

---

[1] The term *top level managers* is used to describe CEO's and/or senior managers. It is recognised that these two groups play different roles. However, they tend not to be distinguished within the cleaner production/pollution prevention and environmental management literature. In addition, the TZ results do not provide enough detail to warrant separate discussions. The two groups will be referred to separately only when the results warrant it and when relevant for learning outcomes and/ or processes.

involvement. Incompatibility with the culture, needs and existing projects of each organisation appears to have prevented the principles of cleaner production from being embedded in culture, and caused the project and its results to be marginalised. Most significantly, failure in the above-mentioned areas prevented organisational (as opposed to individual) learning and *minimised the likelihood of continuous improvement*.

I believe that the failure to achieve continuous improvement cuts to the core of sustainability. This is because businesses are unlikely to undertake the magnitude of changes required of them in one great leap. All of the best practice guides on CP/PP and EM strongly emphasise the need for continuous improvement (e.g. de Hoo et al., 1991; USEPA, 1992; Ledgerwood et al., 1992; Welford and Gouldson, 1993; ECNZ, 1996; Harrington and Knight, 1999). This is because they assume that organisations will be unlikely to eliminate environmentally unsustainable practices with the first attempt and that they will therefore need to use a series of incremental improvements.

While this incremental approach is criticised by some authors (e.g. Newton and Harte, 1997), it serves to moderate the ideologically driven calls for environmental improvement in businesses, and is therefore likely to be the only approach that businesses will be prepared to support. It also appears more consistent with the model for organisational learning as described by Argyris and Schön (1974: 135 - see Fig. 2.8, above) and discussed below. This model recognises that learning occurs as part of an iterative process whereby actors are able to discover, explore, test and internalise new models of behaviour.

The structure of the following discussion is based on three basic assumptions. Firstly, that continuous improvement is the most important measure of success in a sustainability programme. Secondly, that it is inextricably linked to commitment. Thirdly, that failure in these two areas will render successes in others meaningless. Commitment and continuous improvement will therefore be identified and discussed as *primary* areas for improvement (s5.2 below). Commitment will be discussed first, because it plays such an important role as a *driver* for learning and change within organisations (s5.2.1). Continuous improvement will be discussed next, because it is the *ultimate goal* of sustainability programmes (s5.2.2).

Because of their subservience to commitment and continuous improvement, leadership,

support, communication, involvement and compatibility will be identified and discussed as *secondary* areas for improvement (s5.3 below). Leadership and support will be discussed first, because they are manifestations of top level commitment (s5.3.1). Communication and involvement will be discussed next because they represent the means by which people are encouraged to *engage* in the programme (s5.2.2). Communication and involvement are identified in the CP/PP and EM literature as essential ingredients for success and are consistent with developments in organisation theory that show a movement from top-down, mechanistic approaches to humanist approaches. Compatibility of the project, which is covered last, concerns the *process* whereby learning and change occur (s5.2.3). It is important because it raises issues that are consistent with developments in organisation theory that show a movement from prescriptive, mechanistic approaches to cultural approaches.

A large number of books, papers, guides and manuals have been written over the past decade on the application of sustainability to business. It is not my intention to cover all of these. For each of the key areas identified above, the discussion will begin with a summary of how the area was dealt with in the CP/PP literature that contributed to the process that was advocated and training that was provided for the TZ project. The discussion will therefore begin by focusing on the approach taken by two key texts - The Netherlands Office of Technology Assessment's (NOTA's) "Manual for the Prevention of Wastes and Emissions" (de Hoo *et al.*, 1991) and the USEPA's "Facility Pollution Prevention Guide" (USEPA, 1992). These manuals were widely used in Europe and the US prior to the start of the TZ project and contributed significantly to the development of the resource materials that were provided for TZ participants (including ECNZ, 1996 and Stone, 1996). Recent publications suggest that they (or at least the methods they advocate) are still in use today (e.g. de Bruijn and Hofman, 2000; Sage, 2000).

The summary will be followed by discussion of the way in which each area was dealt with by a representative sample of the early literature on environmental management as well as more recent literature on CP/PP and EM. This will enable consideration of the extent to which limitations in the approach used for the TZ project are dealt with in the broader and more recent literature. The issues raised in the discussion for each area will then be considered within the context of developments in organisation theory. I do not intend to revisit the details provided on this subject in Ch. 2. This part of the discussion will therefore take the form of a

meta-analysis, focusing not on the details of organisation theory, but rather the broad transitions between stages in its development, i.e. from rational/mechanistic approaches (including contingency theory) to social approaches (including humanist, political and cultural). Further detail will only be provided if it is useful for and adds to the discussion.

The issues raised are then discussed within the context of the organisational change models that were identified in Ch. 2, s2.3.3 (s5.4). This provides an opportunity for comparing cleaner production/pollution prevention and environmental management best practice with theories regarding learning and change in organisations. The discussion is used as the basis for developing a model for improving the effectiveness of sustainability programmes in businesses (s5.5).

The thesis began with a summary of the social context (or environment) within which businesses operate and sustainability programmes occurs. However, because of limitations, this context was excluded from further consideration during the course of the thesis. Since context is likely to play an important role in the shift from theory to reality, it seems fitting for the thesis to end by again considering the broader social context for business and drawing conclusions about the application of the model therein (s5.6).

5.2   Primary areas for improvement

5.2.1   Commitment

Within the literature on cleaner production/pollution prevention (CP/PP) and environmental management (EM), discussion of commitment generally centres around top level management. This may be due, in part, to the formal authority that is vested in top level managers and the expectation that can play a significant role in driving change within organisations. Important elements of their role with regard to sustainability, would be to ensure that the governance, vision and mission of the organisation are based on sustainability. Since the importance of top level management dominates the literature, and was highly regarded by respondents in the TZ evaluation, this seems to be a useful place to begin the discussion.

Two unexpected changes that appear to have occurred in the demonstration group during the course of the TZ project were of particular relevance to top level management. Firstly, CEO commitment appears to have *decreased* and secondly, the barriers presented by senior managers appear to have *increased*. While both of these results are more likely to have been as a result of enhanced awareness amongst respondents, than direct cause and effect, they still suggest that the project did nothing to enable participants to gain or enhance commitment from top level managers.

A wide range of authors stress the importance of top level commitment as the basis for a successful environmental programme (e.g. Ledgerwood *et al.*, 1992: 54; Welford and Gouldson, 1993: 13; Higgins, 1995: 60; James and Stewart, 1996: 154; Hutchinson and Hutchinson, 1997: 150; Harrington and Knight, 1999: 15), and provide suggestions for gaining or enhancing commitment its course[2].

Early literature on the implementation of CP/PP identifies top level commitment as being essential for success. Widely used sources for the TZ project were the USEPA's "Facility Pollution Prevention Guide" (1992) and NOTA's "Manual for the Prevention of Wastes and Emissions" (de Hoo *et al.*, 1991). However, despite stressing the importance of top level commitment, they pay little attention to the process of actually *gaining* or *enhancing* it.

USEPA (1992) suggests that a "high-level pre-assessment" be undertaken to identify "several low-cost, quick pay-off pollution prevention techniques that can be implemented readily". However, it is not clear who will undertake this and how they will justify it in the *absence* of top level commitment. De Hoo *et al.* (1991: 14-16) are similarly vague. They confidently declare that the "management of a company will support a waste prevention programme if such a programme can reduce ... costs" (1991: 14). Having done so, they simply list the types of benefits and costs. It is implied that someone will gather these together, present them to management and support will be guaranteed.

In retrospect, it is apparent that the training for the TZ project was similarly deficient. While

---

2 Note that, in keeping with the limitations of the thesis (see Ch. 1, s1.7), this discussion does not include external mechanisms for gaining top level commitment, such as regulations, economic instruments or the marketing and promotion exercises that may precede a voluntary initiative. Rather, it is limited to the training that occurs once an organisation's participation in a voluntary initiative has been secured.

the importance of commitment was stressed at the start of the project and included in the training materials given to participants, little advice was given on how to achieve it. In the "Waste Minimisation Programme" guide (ECNZ, 1996: s1) that was included in these materials, it is stressed that senior management needs to be committed *before* resources will be made available for a project. However, the guide provides even less help than the USEPA and NOTA guides on *gaining* commitment. Advice is limited to the suggestion that the role of gaining such commitment be allocated to a "project champion" who would do so by making use of the brochure, video and case studies that accompanied the guide. (The brochure summarised the reasons for and methodology used in a waste minimisation programme, while the video presented benefits and a range of examples.)

The approach in the ECNZ guide relies on the assumption that a generic set of materials will be sufficiently relevant to "sell" the concept to senior management for any organisation and, if not, that the project champion will be able to render them relevant. Feedback from respondents in the TZ evaluation suggests that the first assumption cannot be relied upon. Participants appear to have responded negatively to generic information, particularly case studies from other sectors, and it seems reasonable to assume that such material may be equally insufficient to gain commitment from senior managers. The second assumption also has a tenuous base, given the lack of understanding and skills in change facilitation that respondents' backgrounds suggest (see Fig. 3.4). It also uses a mechanistic approach. The contents suggest that the existence of benefits (economic, as well as environmental) and a "step-by-step" approach to realising them would be sufficient to commit top level managers to the project.

It is possible that little attention was paid to this in the training because the TZ project facilitators mistakenly assumed that agreement to participate in the project and payment of the fee (approximately NZ$10,000 per organisation – Brown, pers. com., 2001) meant that top level managers were committed to it. It appears from the results that this was not the case for the majority of organisations.

The literature on the implementation of EM also identifies the links between CEO commitment and success, but there is again a paucity of information on how to gain commitment. Ledgerwood *et al.* (1992) and Harrington and Knight (1999) are examples of

best practice guides that provide some advice in this regard. In their guide to the "Environmental Audit and Business Strategy", Ledgerwood *et al.* (1992: 54, 55) suggest that the success of an environmental programme within the corporate setting relies on its ability to be perceived as a "positive contributor to corporate success, rather than a negative bringer of bad news and destroyer of profitable businesses". They suggest that this positive image can be achieved by transforming "externally driven necessity" into "internally driven desirability" (1992: 55). They describe this transformation process as a marketing exercise, whereby a marketing audit[3] and SWOT analysis[4] are undertaken, target markets (their term for sympathetic top level managers) are identified, and a marketing plan[5] (for the environmental programme) is developed (1992: 123-127). They believe that such a process will "easily" lead the majority of the board, the CEO and chair to become committed "not only to [the environmental programme's] purposes but also its procedures, priorities, form and operational resourcing" (1992: 126). (The lack of expertise that respondents' backgrounds suggest they would have in the areas of marketing, bring this approach into question.)

In another example, Harrington and Knight's guide to upgrading "ISO 14000 Implementation", the authors stress the need for "a sense of personal responsibility and dedication" (1999: 15). They believe that this is the "very best reason for reducing [an] organization's environmental impact because it will result in the best long-term results" (1999: 15). While they believe that personal commitment is necessary throughout the organisation, they stress that it is essential in senior managers, and that its absence will make an environmental management system (EMS) only "minimally effective over the long haul" (1999: 15).

Harrington and Knight (1999: 144) believe that it is necessary to undertake a "gap analysis" in order to gain commitment from senior management. They believe that the analysis should be performed in order to determine whether an existing system is sufficient to meet the "performance expectations of top management", as well as an "acceptable business standard"

---

[3] According to Ledgerwood *et al.* (1992: 123, 124) a *marketing audit* involves a survey of senior managers and aims to gain insight into their priorities and their relationships to environmental issues.

[4] The *SWOT analysis* involves identification of the strengths, weaknesses, opportunities and threats associated with the environmental programme (Ledgerwood *et al*, 1992: 124, 125).

[5] The *marketing plan* includes development of a "unique selling proposition" (Ledgerwood *et al*, 1992: 126).

(e.g. ISO14001 or any more rigorous standard) (1999: 142-143). Similarly to Ledgerwood *et al.*, their approach involves assessing the risks of not acting and comparing them to the benefits that could result from action (1999: 144).

Both Ledgerwood *et al.*'s and Harrington and Knight's approaches appear to be heavily dependent on the existence of external drivers, as well as the ability of the environmental manager to make them relevant to the organisation in question.

Environmental managers are suggested by both Ledgerwood *et al.* (1992: 123) and Harrington and Knight (1999: 142) as the most appropriate people to gain the commitment of senior managers. A number of difficulties arise from this suggestion. Firstly, environmental managers tend to have technical backgrounds (e.g. in science, planning or engineering) (Ledgerwood *et al.*, 1992: 126; Harrington and Knight, 1999). If gaining commitment is primarily a marketing exercise, as suggested by these authors, it is unlikely for most environmental managers to have the necessary skills to undertake it. Secondly, the majority of organisations don't appear to have environmental managers, as such. Only 4 of the 44 respondents surveyed for the TZ project evaluation (the demonstration group, as well as the randomly selected control group) appear to have identified environmental management as their primary responsibility (see Fig. 3.5, s3.4.3). More than two thirds of the respondents from the demonstration group were primarily involved in production or operations and, of those, all had technical backgrounds (even those with managerial roles).

Since these people were, in most cases, effectively playing the role of change agent, a lack of marketing expertise may have contributed to their inability to enhance CEO commitment. In addition to the lack of expertise, there is also a "catch-22"[6] situation involved here. If a change agent's senior manager is not committed to the work, how will s/he get the support necessary to carry out the work that s/he will use to gain commitment from that senior manager? The implication is that the change agent will need to carry out the work *without* the support of their senior manager. The question then becomes: when and how is s/he likely to do this, and what are the implications? The situation would be particularly untenable if environmental responsibility were to be allocated at a relatively low level in the organisation.

Given the recognised importance of these environmental managers as change agents, the above seems to be a particularly tenuous base for their work. Another question is: how important is the role of top level managers actually, if subordinates can be expected to be able to carry out this type of work without their support?

Newton and Harte (1997: 75) believe that this kind of over-optimism is prevalent in much of the literature on environmental management in business. They believe that it is misleading to suggest that programme components such as policy, audits and management systems can easily be developed and implemented (1997: 77). They believe that such prescriptions for environmentally-relevant change in organisations rely heavily on the assumption that organisations will *voluntarily* become greener" (1997: 75). The results of the TZ evaluation, particularly the analysis of the progress reports, seem to support this criticism. They show just how difficult it really is for organisations to develop and implement the components.

Newton and Harte (1997) also question the existence of external drivers (upon which rest the success of the marketing exercises mentioned previously), suggesting that they have more to do with "evangelical rhetoric" than reality. There is no evidence to suggest that the changes made by TZ organisations improved their competitive advantage. There was no significant change in the number of respondents who believed that environmental performance improvement enhances competitiveness, although there was an increase in ambivalence. The results suggest that the project neither confirmed nor refuted a link between environmental performance and competitive edge. Indeed, respondents recommended that the project be improved by providing opportunities for increasing market share.

In summary, two features appear to stand out in the coverage of top level commitment and both are paradoxical in nature. On the one hand, top level commitment is considered to be extremely important and essential for the success of a programme, yet on the other hand little advice is given on how to gain it. In the cases where such advice is given, it is characterised by the need for a "change agent" who will undertake a marketing exercise that will "sell" the programme to top level managers. Success is therefore heavily dependent on the existence of external drivers, as well as the commitment and marketing abilities of the "change agent".

---

6 The compact Oxford dictionary describes a *catch-22* as "a circumstance from which there is no escape because of mutually

In addition, if the change agent is internal and subordinate (as is suggested in the above-mentioned literature), it is questionable where s/he would get the authority and support necessary to do the work to gain top level commitment. The efforts of the change agent (whether internal or external) may be seen as an "incursion" into the managers role (as suggested by Fineman, 1996: 480), and may therefore result in the defensive routines identified by Argyris and Schön (1974: 72, 73). Such defensive routines are characterised by an unwillingness to publicly test "theories-in-use", without which old patterns of behaviour will tend to be reinforced and the opportunity for learning new behaviours will be minimised (1974: 76).

The potential for such defensive routines is likely to be heightened in the case of approaches to top level managers about the environmental performance of their organisations. The change agent will not only be questioning the organisation's environmental performance, but also challenging the manager's authority and the contributions that s/he has made to any environmental impacts that the organisation may have had.

Before discussing how organisation theory can help to address these issues, it is useful to consider what exactly commitment means and how it fits within the context of the role that top level managers play within organisations. This is because it would be foolhardy to develop a training programme to gain or enhance top level commitment without a clear understanding of what the outcome is expected to be. In addition, some knowledge of the role already played by the target audience is necessary to determine what sort of approach would be most likely to fit in with their existing work and whether it is feasible for them to be able to respond.

With regard to what commitment means, it is interesting to note that none of the above-mentioned examples of CP/PP and EM literature define top level commitment, only how it may be expressed (e.g. through an environmental policy or the allocation of resources). Similarly, its importance is frequently referred to in the literature on organisation change, but it does not appear to be defined there either.

The most relevant definition provided by the Oxford Compact Dictionary (1996: 195) suggests that commitment is "... an obligation that restricts freedom of action". It could,

---

conflicting or dependent conditions". The term is attributed to J. Heller's 1961 novel with the same title.

therefore, be argued that that commitment by top level managers would equate with them *restricting the activities of their businesses to those that are consistent with sustainability*. There are examples of businesses where some such restrictions are not only evident, but also attributed to CEO commitment (e.g. The Body Shop International and Interface Inc.). However, it seems likely that the majority of CEO's do not restrict business activities in this way. Or, if they do, that the restrictions are only partial.

The results from the TZ evaluation (particularly the relatively superficial nature of the changes in even the better performing businesses, the poorly rated contributions of top level managers and the low incidence of indicators such as the inclusion of environmental performance in staff appraisals) suggest that none of the participating organisations had this level of commitment. (While it is possible that this level of commitment did, indeed, exist but was not being reflected in action, there was no evidence in the TZ results to suggest that this was the case.) It seems reasonable to assume, therefore, that for the majority of TZ organisations, gaining top level commitment to restrict business activities in this way would be a major undertaking.

The prominence given to top level commitment in the CP/PP and EM literature may suggest a top-down approach. This type of approach could be consistent with a rational/mechanistic approach to organisation theory, where the CEO sits at the top of a structure that has been developed using rational principles and is ultimately responsible for maximising the organisation's mechanical efficiency. The emphasis on cost-benefit analysis for marketing and implementation purposes suggests a bias towards rational principles. (Indeed, the whole systematic, goal-driven approach used by CP/PP appears to mechanistic tendencies.) It is not surprising, given this mechanistic bias, that so much emphasis is placed in the CP/PP and EM literature on top level commitment. Neither is it surprising that the only advice given on how to gain or enhance such commitment involves a cost-benefit analysis. Nor is it surprising that proponents have great confidence in the ability of such an analysis to convince top level managers to commit their organisations to CP/PP/EM principles.

However, it is interesting to note that once they have emphasised this issue, most of the best practice CP/PP/EM guides quickly switch to what appears to be more consistent with a combination of rational, humanist and contingency approaches to organisation theory. The

humanist approach is demonstrated by requirements for staff involvement and team work, although it could be argued that the goal oriented way in which these elements are prescribed for CP/PP and EM programmes has more to do with rational than humanist principles. The contingency approach is demonstrated by the contribution that the organisational environment (e.g. regulations, markets) is expected to make to goals and strategies.

These elements of CP/PP and EM programmes are considered in more detail below. However, their existence draws attention to the need for commitment to extend beyond top level managers. Keogh and Polonsky (1998: 36) suggest that it is not clear to what extent the values of individuals affect policy-making and implementation. They believe that *organisational* commitment can only occur if "a critical mass of organisational members" are committed (1998: 36). They define "corporate environmental commitment" as:

> *"The process whereby the corporation and its individual members embrace a concern for the natural environment in such a way that it becomes an integral component of the corporation's core values. This must go beyond minimum legislative prescriptions and involve all levels of the corporate structure. It requires that the corporation seek, through the attitudes and behaviours of its individual members, constantly and progressively to minimise the detrimental environmental impacts of all its activities, while ensuring that the necessary monitoring and funding are in place to enable all objectives, including environmental objectives to be achieved."* (Keogh and Polonsky, 1998: 36-7).

This definition suggests the need for changes to what Schein (1992: 19-21) refers to as "basic underlying assumptions" and Argyris and Schön (1974: 4) refer to as "theories-in-use" (see s2.2.5 and 2.3.3, respectively). While the use of the term "core values" could be taken to suggest "espoused values", rather than basic underlying assumptions, the emphasis that Keogh and Polonsky place on critical mass appears consistent with the social validation that Schein associates with basic underlying assumptions rather than espoused values (see s2.2.6). This is also suggested by the distinction that they make between commitment as defined above and "superficial lip-service" (1998: 37), the latter possibly synonymous with espoused values.

However, their suggestions for gaining or enhancing commitment appear to be limited to:

– the investigation and analysis of the "mental models" of individuals who will be involved in the programme, and

– the use of this knowledge to design communication strategies that will generate "cooperative approaches to the achievement of ... environmental goals" (Keogh and Polonsky, 1998: 43).

Keogh and Polonsky use Meyer and Allen's (1991) three components or dimensions of organisational commitment as a basis for the mental models they believe should be investigated. The three components can be described as "affective" commitment (which is associated with "emotional attachment to, identification with, and involvement in supporting environmental issues"), "continuance" commitment (which is associated with aversion to the economic and social costs associated with environmental effects), and "normative" commitment (which is associated with a sense of obligation) (Keogh and Polonsky, 1998: 37-8).

While Keogh and Polonsky recognise a relationship between commitment and mental models, their consideration of them as a means to achieve an end suggests a mechanistic approach to organisational change. They provide an example of the manipulation that is commonly criticised in humanist approaches (e.g. Reed, 1996: 37) (see s2.2.3). The most telling suggestion of this comes from Keogh and Polonsky's affirmation of Mueller's (1994) assertion that "teamworking can be regarded as a modern attempt to re-align individual motivation with organizational rationality" (Mueller, quoted in Keogh and Polonsky, 1998: 41).

This approach is in strong contrast to Argyris and Schön (1974), Schein (1985) and Senge (1990a) who advocate the need to initiate a learning process that serves to *change* theories-in-use, basic underlying assumptions or mental models (respectively), rather than use them for manipulative (and mechanistic) purposes.

Argyris and Schön (1974: 89) distinguish between "external" and "internal" commitment. The former (consistent with continuance and normative commitment, as described by Keogh and Polonsky) involves an externally-driven reward or penalty, while the latter (consistent with affective commitment) involves the personal satisfaction that comes from a particular choice of action. Internal commitment is one of the governing variables of Model II theory-in-use (see Table 5.2), which Argyris and Schön believe results in double-, rather than single-loop

learning. (They believe that double-loop learning is necessary to bring about changes to theories-in-use, as opposed to actions.)

The governing variables for the two models can be summarised as follows (Argyris and Schön, 1974: 68-9, 87):

MODEL I	MODEL II
Definition and pursuit of goals	*Validity of information*
Maximising winning vs. losing	*Free and informed choice*
Minimising negative feelings	*Internal commitment to and evaluation of choice*
Rationality	

Comparison of the two sets of variables suggests that the methods advocated in the CP/PP/EM literature for enhancing commitment (e.g. the use of cost-benefit analyses) are more consistent with the governing variables identified for Model I theory-in-use (see Table 5.1), than with those identified for Model II (see Table 5.2).

According to Argyris and Schön's models, governing variables provide the basis for "action strategies" that have behavioural, as well as learning consequences. The action strategies that are associated with the two theories-in-use are as follows (Argyris and Schön, 1974: 68-9, 87):

MODEL I	MODEL II
Unilateral design and management of the organisational environment	*Design of the organisational environment to enable discovery and experience*
Unilateral control of tasks	*Joint control of tasks*
Protection of self and others	*Joint self-protection intended to promote growth*
	Bilateral protection of others

Model I results in defensiveness, reinforcement of existing theories and decreased effectiveness, while Model II results in reflection, changes to existing theories and increased "long-run" effectiveness (Argyris and Schön, 1974: 68-9, 87). The value of Model II is that it provides opportunities for uncovering theories-in-use and their consequences, inventing and testing more effective ones, and continually improving the process (Cummings and Worley,

1997: 498-501). The latter differs from continuous improvement advocated in the CP/PP and EM literature (see s5.2.2 below), because it is the *learning process* that is improved, not the ability to achieve CP/PP/EM goals.

This process of "learning how to learn" is described by Cummings and Worley (1997: 501) as "deutero-learning". In terms of organisations, deutero-learning, is not just learning how to learn, but learning how to learn *together*. An important feature of deutero-learning is the motivation that comes from internal commitment (as referred to by Argyris and Schön) and what Senge refers to as "personal mastery". As mentioned in s2.3.3, Senge describes personal mastery as a commitment to learning through a continual process of clarification, focus, patience and objectivity (1990a: 8-9).

Senge (1990: 171) quotes O'Brien (no date given) when he suggests that "genuine commitment" can only be achieved if it is to "something larger than ourselves", i.e. beyond self-interest. It seems reasonable to assume that such commitment is unlikely to be gained by what Keogh and Polonsky (1998: 37) refer to as "traditionalist, directive approaches of management" nor a standard marketing exercise that is based on the use of externally driven costs and benefits, and the equally rational conversion of weaknesses and threats to strengths and opportunities as a basis for decision-making.

It follows that corporate (or organisational) commitment will only be gained if people in organisations learn to learn together. In terms of environmental sustainability, they will need to learn to identify and reflect on existing theories-in-use that prevent them from committing their organisations to sustainability, to develop and test new ones and use what they have learnt to continue the learning process.

This approach was absent in the TZ project and the approaches which are advocated by the mainstream CP/PP and EM literature. The following section discusses, in greater depth, the differences between organisational learning and CP/PP/EM approaches.

Table 5.1. The governing variables, action strategies, consequences and effectiveness of Model I "theory-in-use" as described by Argyris and Schön (1974: 67-8)

Governing variables	Action strategies	Consequences for behavioural world	Consequences for learning	Effectiveness
Define goals and try to achieve them	Design and manage the environment unilaterally (be persuasive, appeal to larger goals)	Actor seen as defensive, inconsistent, incongruent, competitive, controlling, fearful of being vulnerable, manipulative, withholding of feelings, overly concerned about self and others or under-concerned about others	Self-sealing	Decreased effectiveness
Maximise winning and minimise losing	Own and control the task (claim ownership of the task, be guardian of definition and execution of task)	Defensive interpersonal and group relationship (dependence upon actor, little additivity, little helping others)	Single-loop learning	
Minimise generating or expressing negative feelings	Unilaterally protect yourself (speak with inferred categories accompanied by little or no directly observable behaviour, be blind to impact on others and to the incongruity between rhetoric and behaviour, reduce incongruity by defensive actions such as blaming, stereotyping, suppressing feelings, intellectualising)	Defensive norms (mistrust, lack of risk taking, conformity, external commitments, emphasis on diplomacy, power-centred competition, and rivalry)	Little testing of theories publicly. Much testing of theories privately.	
Be rational	Unilaterally protect others from being hurt (withhold information, create rules to censor information and behaviour, hold private meetings)	Low freedom of choice, internal commitment, and risk taking		

Table 5.2. The governing variables, action strategies, consequences and effectiveness of Model II "theory-in-use" as described by Argyris and Schön (1974: 87)

Governing variables	Action strategies	Consequences for behavioural world	Consequences for learning	Consequences for quality of life	Effectiveness
Valid information	Design situations or environments where participants can be origins and can experience high personal causation (psychological success, confirmation, essentiality)	Actor experienced as minimally defensive (facilitator, collaborator, choice creator)	Disconfirmable processes	Quality of life will be more positive than negative (high authenticity and high freedom of choice)	
Free and informed choice	Tasks are controlled jointly	Minimally defensive interpersonal relations and group dynamics	Double-loop learning	Effectiveness of problem solving and decision making will be great, especially for difficult problems	Increased long-run effectiveness
Internal commitment to choice and constant monitoring of its implementation	Protection of self is a joint enterprise and oriented toward growth (speak in directly observable categories, seek to reduce blindness about own consistency and incongruity) Bilateral protection of others	Learning-oriented norms (trust, individuality, open confrontation on difficult issues)	Public testing of theories.		

5.2.2   *Continuous improvement*

The TZ project appears to have been successful in bringing about improvements in specific environmental performance indicators (e.g. raw materials, water and energy use - see Brown, 2000). These changes are consistent with, and occurred as a result of, the application of standard CP/PP methods and tools (see Ch. 3), specifically a waste minimisation audit/assessment that included an input/output analysis, and identification and evaluation of cleaner production options. However, the results suggest that the use of these methods/tools was unlikely to be repeated and continuous improvement was unlikely to occur in most organisations. It follows that the training was deficient in its ability to bring about continuous improvement.

As mentioned earlier, the importance of continuous improvement is stressed in the literature on cleaner production/pollution prevention and environmental management best practice. The NOTA manual (de Hoo *et al.*, 1991: 69), for example, stresses that "a waste and emission prevention programme is an ongoing, not a one-off effort". It advocates applying the assessment process to "highest priority waste streams and emissions and company locations" first and, once options for improvement have been identified, evaluated and implemented, that the process then be applied to lower order priorities (1991: 70). The suggestion is that the process should be repeated as often as necessary to "reduce the generation of wastes and emissions to the greatest degree possible" (1991: 70).

The guide provides advice on the frequency and timing of assessments, suggesting that they should depend on the project budget, the organisation's "budgeting cycle" and any special needs that may arise (e.g. changes in raw materials, products, costs, regulations and technology, or the occurrence of accidents) (1991: 70-71). The guide also draws attention to the need to integrate waste and emissions prevention into the "philosophy" and strategy of the organisation (1991: 71). It provides examples of the ways in which it can also be incorporated into the marketing, production, financial and administrative components of the organisation's "business plan" (1991: 71). However, no further detail is provided on how to ensure that continuous improvement *does* actually occur.

The USEPA (1992: 50-57) manual appears to provide more insight in this regard. It suggests

that "the task of maintaining a viable pollution prevention program will be made easier by the establishment of a pollution prevention awareness program" (1992: 50). This is suggested as a means to promote employee involvement, and the manual recommends that the programme be designed to include activities that raise awareness, train, inform and encourage all employees, and that recognise their efforts and publicise "success stories" (1992: 50).

In addition to providing advice on how to achieve the above, the manual suggests that pollution prevention be integrated into "corporate planning" (1992: 51). The advice that is provided in this regard differs from the NOTA guide, in that it focuses not on the different components of a business plan, but rather on the importance of ensuring responsibility for wastes (e.g. through cost accountability), "tracking and reporting" results, and annual review (1992: 50-52). Despite the reference to "corporate planning", no further advice is provided on *how* the programme would actually be integrated into the organisation's strategic planning process.

The manual also advocates the need for internal communication as a means for "maintaining" the programme (1992: 51). The advice focuses on the need for "two-way" communication between employees and management, soliciting input from employees and following-up on their suggestions (1992: 51). The manual suggests that the purpose of communication will be to "keep employees motivated" and that this is best done by ensuring that they "identify with and 'buy-in' to goals and objectives", and have continuous "opportunities to contribute" to success (1992: 55).

The resource materials used for the TZ project (ECNZ, 1996; Stone, 1996) take a similar approach to continuous improvement. They focus on describing the process as cyclical monitoring progress towards goals and reviewing the programme in accordance with the results. Monitoring and review are again covered last in a sequence of phases (see Fig. 5.1).

While the advice in both source manuals and the TZ resource materials appears to be useful, a number of observations are possible in light of the results of the TZ evaluation (particularly the progress reports - s4.4). Very little detail is provided on exactly what needs to be done to ensure that continuous improvement will occur. Both guides appear to rely heavily on the inclusion of a monitoring/review phase and participants' willingness to repeat the cycle.

Neither guide provides advice on *how* to ensure that this willingness exists. Both are top-down and mechanistic in their approach, apparently relying on the ability of an "executive level decision" (USEPA, 1992: 12), the expression of commitment through policy (USEPA, 14; de Hoo, *et al.*, 14), and the existence of an agreed to set of goals to motivate everyone to play their role in achieving continuous improvement.

Neither of the guides provides more than perfunctory advice on barriers or obstacles that may prevent or hinder continuous improvement. While obstacles/barriers that may be encountered during the course of the programme are identified, the responses to them are simplistic. They appear to rely not only on the *willingness* of participants to overcome them, but also on their *ability* to do so. There appears to be strong reliance on the assumption that they will work it out for the sake of achieving a set of pre-determined goals, and that they will know how to do so.

The perfunctory coverage of obstacles/barriers, and the presumed ease with which they are expected to be overcome, is in strong contrast to experience with the TZ project. The majority of organisations encountered obstacles during the project period that were complex, difficult to overcome, prevented or delayed progress, and served to frustrate and de-motivate staff. Nowhere did the existence of an environmental policy and set of goals appear to alleviate to any significant extent the difficulties encountered in overcoming obstacles.

Another obvious characteristic of the CP/PP guides/manuals identified above is that they emphasise right at the beginning the need for continuous improvement, but they provide advice on how to achieve it last. For the USEPA manual this phase even falls outside the repeat cycle suggested for the assessment (see Fig. 5.1). Since the phases in both manuals are sequential and adherence to this sequence is implied (if not obligatory), it is possible that consideration of the need for continuous improvement would occur only at the "end" of the other phases (i.e. *after* planning, organisation, assessment, and evaluation and implementation of options for improvement). A considerable amount of effort may therefore have gone into the programme before the mechanisms for ensuring continuous improvement are considered.

Commitment

↓

Planning & organisation ←

↓

Assessment

↓

Evaluation of options for improvement

↓

Implementation

↓

Monitoring and review
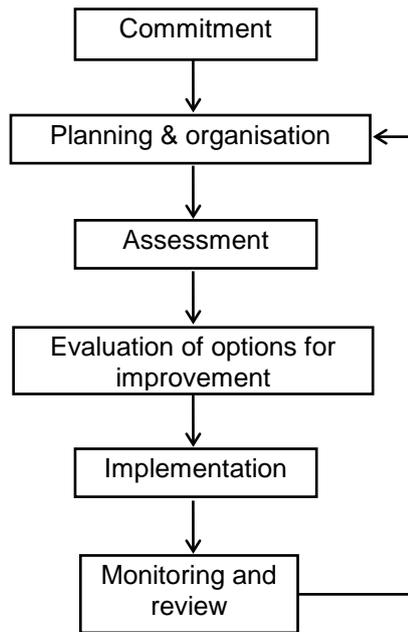
Figure 5.1. The stages in a generic CP/PP/EM change model, developed using de Hoo *et al.*, 1991 and USEPA, 1988, 1992.

The significance that most CP/PP and EM programmes place on incremental progress towards sustainability, and the apparent failure of the TZ project in this regard, suggest that methods for continuous improvement need to be given more prominence at the start of the programme so that they can be incorporated into its design.

In addition, the results of the evaluation of the TZ project certainly appear to have made it clear that people, not policies and goals, are what bring about change in organisations. If staff are inadequately equipped (particularly in terms of motivation, knowledge, skills and experience) and do not have the resources (particularly in terms of authority and support), they are likely to be unprepared for the difficulties they will encounter during the course of what is likely to be a significant change programme. This is confirmed to some extent by the relative ease with which technical problems were able to be overcome (most participants had technical backgrounds), in contrast to the difficulties encountered in overcoming non-technical problems. While consultants with an appreciation of the latter were sometimes able to assist in this regard, the extent depended on their own abilities, as well as the receptivity of the team, and the political and cultural characteristics of the organisation.

Moxen and Strachan (1998: 147, 148) are critical of the way in which the processes advocated in the above-mentioned types of guides/manuals tend to result in "technical adjustments to production processes and reductions in wastes and emissions". While they believe that these strategies "have, without question, improved the environmental performance of industry", they suggest that they have also lead businesses to "misconstrue" the scale and complexity of the social changes that are necessary, and to ignore the role that non-technical forces play in the process (1998: 147, 148).

This is consistent with developments in organisation theory that represent a progression away from mechanistic, efficiency-driven approaches, towards humanist approaches that recognise the roles that people play in bringing about change. Higgins (1995) provides an example of attempts to recognise some of the social elements of CP/PP implementation. His "Pollution Prevention Handbook" (1995) suggests programme components that are similar to those advocated in the NOTA (de Hoo, *et al*., 1991) and USEPA manuals. However, his approach appears less prescriptive, and gives prominence to "motivating" elements such as "rewards and recognition", involving "operating personnel" in planning, and the use of a project "champion". (While these are referred to in the NOTA and USEPA guides, they are not given detailed consideration.)

Higgins' coverage is a little more comprehensive in that he also includes a chapter on the application of "total quality environmental management" (TQEM) for "managing corporate change" (1995: 57-76). The inclusion of this concept is worth further consideration because of its roots in total quality management (TQM). TQM is widely believed to represent a less mechanistic, more humanist and cultural approach to change management in organisations (see s2.2.6).

In Higgins' handbook, Futornick (1995: 60) advocates the use of TQEM principles to assist organisations to progress from compliance-driven to sustainable phases in environmental management. She identifies the need for "flexibility and continuous improvement" and suggests that the key to success is to change environmental management from being viewed as a "cost centre" to a "profit centre" (1995: 60). Drawing from the criteria used for a US national quality award, she advocates the application of seven key areas of "organizational excellence": "leadership, human resources utilization, information and analysis, strategic

quality planning, quality assurance, quality results, and customer satisfaction" (1995: 59, 60).

While Futornick's recommendations suggest greater recognition of the human side of organisational change, her cost-benefit focus suggests that they are still primarily mechanistic. As with previously mentioned guides, the importance of senior management commitment is stressed, but then taken as a given. In addition, there appears to be heavy reliance on the assumption that everyone involved will simply "pull together for a common [environmental] purpose" (Futornick, 1995: 61). It is inferred that the challenge of environmental sustainability, together with the heroism of industry will be enough for the transition to occur (1995: 74). This, together with the simplistic coverage of the seven key areas of organisational excellence, serves to emphasise, rather than provide a counter to a mechanistic approach.

Inkson and Kolb (1998: 112) suggest that what total quality management (TQM), from which the concept of TQEM was derived, actually achieves is less than what the rhetoric would suggest. While it is believed to incorporate important aspects of all the key developments in organisation theory, they suggest that "the drive to 'continuous improvement' is hard to sustain once the larger problems have been dealt with" (Dawson and Palmer, 1995, quoted in Inkson and Kolb, 1998: 112).

Continual improvement[7] is a cornerstone of what Moxen and Strachan (1998: 148) refer to as "managerial strategies" (e.g. ISO14001 and the EU's EMAS). They believe that these strategies tend to be mechanistic, aiming to provide organisations with the ability to set environmental standards, monitor progress and take corrective action. They believe that they improve on purely "scientific and technical strategies", because they attempt to create a climate of "reflection, constructive criticism and innovative thinking" (1998: 148).

However, Moxen and Strachan (1998: 155) also believe that managerial strategies are "self-defeating" because the methods they advocate for managing and organising people are

---

[7] Harrington and Knight (1999) distinguish between continual and continuous improvement. They consider the former to be part of a "step-by-step" process (which can therefore be interrupted), while the latter occurs without interruption (1999: 110). Their handbook is concerned with continual improvement (as it applies to the ISO14000 series of standards) and which is defined as "the process of enhancing the EMS to achieve improvements in overall environmental policy" (1999: 8). Continual, rather than continuous improvement will be used in reference to these standards.

"wholly unsuited to the tasks envisaged for them" (p. 155). They explain that this is because they are "closely associated with formal structures and organisation cultures that tend to inhibit, rather than promote, change and innovation" (Moxen and Strachan, 1998: 155, 156). They believe that the mechanistic, managerially driven systems that are set up in response to ISO14001 and EMAS are likely to create cultures wherein traditions are maintained, and precedents, formal rules and procedures followed (Moxen and Strachan, 1998: 156). They believe that the "confusion, puzzlement and ... bewilderment" that is felt within organisations pursuing accreditation for these standards is due, in part, to the way in which they contradict trends towards participatory management and organisation (Moxen and Strachan, 1998: 156).

While some authors dispute whether these trends exist, the TZ results appear to confirm that continuous improvement will not simply occur because it has been ordained as part of a top-down, mechanistic approach. A striking example was provided by one of the more successful TZ organisations (measured on the basis of the economic and environmental benefits achieved during the course of the project). At the end of the two-year facilitated process, the staff member who had been allocated responsibility for the project (and whose enthusiasm, motivation and diligence appear to have contributed significantly to short-term success) was summarily assigned to other, non-related duties. The senior manager who made the decision, apparently did so because s/he believed the project had been completed (Anon, pers. com., 2000). The staff member in question expressed frustration at being unable to continue the work s/he had begun and with which s/he believed s/he had achieved some success.

In a departure from the mechanistic approach characterised by standards such as ISO14001, Harrington and Knight (1999: 133) identify a set of steps that they believe should be used for the purpose of achieving continual improvement. They involve: assessing the organisation's "personality"; establishing "environmental vision statements"; setting objectives and targets for performance improvement; defining "desired behaviour and habit patterns"; developing and implementing improvement plans, and measuring the results (Harrington and Knight, 1999: 133). These steps are interesting because they are consistent with a strategic approach to organisational change.

However, it is also important to note that continual improvement as it is practiced within the context of ISO14001 is limited to improving the EMS. While it is expected that this should

improve the environmental performance of the organisation, it does not necessarily do so. Harrington and Knight (1999: 68) acknowledge this common criticism and respond to it by suggesting that continual improvement of environmental performance, rather than just the EMS, will occur if a commitment to do so is "voluntarily" included in the policy. It is ironic that the ability of such a standardised and prescriptive programme (ISO14001) to deliver sustainability relies so heavily on a voluntary commitment in this regard.

While a strategic management approach is touched on by Harrington and Knight, and Futornick (see above), for example, it receives greater attention from other authors who see it as a means to merge environmental and business strategies and thereby enhance the potential for continuous improvement.

Ledgerwood *et al.* (1992), for example, give prominence to the strategic nature of an environmental management programme. They incorporate strategic considerations into the majority of their twelve principles for "integrating [an] environmental audit into corporate strategy" (1992: 52-60). Consistent amongst the principles is the use of "positive audit" results as the basis for achieving strategic aims that are either "corporate", "business" or "functional" (1992: 53-60). They describe *corporate* strategy as that which involves choices about the nature of the business, while *business* strategy involves choices about making the business profitable within a chosen type of business, and *functional* strategy involves choices about specific functional areas of the business (1992: 61-63). They advocate the use of environmental audit results (such as those achieved using the CP/PP approach) as a basis for making or enhancing choices in these areas. The implication is that strategic choices that are based on environmental factors will lead those factors to become embedded in strategy.

While Ledgerwood *et al.* provide more insight into the incorporation of environmental management into strategy, their principles still only imply, rather than guarantee, continuous improvement. And, while they identify key phases in the strategic management process where environmental strategy can be integrated (1992: 70), they still imply that business leaders *will voluntarily accept the need* for such integration. In addition, the first of their twelve principles identifies the need for an environmental audit to "focus on the corporate learning curve" (1992: 52). They describe this learning curve (measured in environmental programmes/projects as a function of time) as having a slow "take-off" followed by a steep

increase, and a "fall-off" into a "steady and sustainable curve" (1992: 53). While the context within which the curve is discussed suggests that continuous improvement is expected to occur, the potential for environmental programmes and projects to stop as part of the levelling off of the curve, is not considered.

In addition, their focus on "positive results" as a basis for continuous improvement suggests that the approach is consistent with the positivist and rationalist characteristics of Model I, rather than Model II, theories-in-use (see Tables 5.1 and 5.2).

Welford and Gouldson's (1993) approach is also consistent with strategic management. They identify a set of "stakeholder pressures" they believe are driving businesses to "voluntarily" adopt environmental strategies (1993: 8). The sources of these pressures are believed to be customers, trading partners, the community, employees, investors, insurers, media and pressure groups (1993: 8). However, anecdotal evidence suggests that these pressures (and the competitive advantages that were meant to arise due to their alleviation) have simply not eventuated for the majority of NZ businesses.

Nevertheless, they provide a useful set of questions (listed below) that can help businesses to develop sustainable strategies (Welford and Gouldson, 1993: 13-14).

- What are the key aspects of the business?

- Which areas relate most to corporate objectives?

- What are the strengths, weaknesses, opportunities and threats of the business?

- What future scenarios are achievable and consistent with corporate objectives?

- What future scenarios are undesirable?

- What efforts are required to achieve the desirable and avoid the undesirable scenarios?

- What strengths should be built on?

- What weaknesses should be eliminated?

- What investments need to be made?

Such questions are a common feature of strategic management. It is reasonable to assume that the inclusion of environmental considerations in each of them could help to integrate environmental and strategic management. This integration is identified by other authors as a means whereby continuous improvement can be achieved (e.g. Hutchinson and Hutchinson, 1997: 109; Scallon and Sten, 1996: 50; and Maxwell *et al.*, 1997: 118).

However, it is useful to stress that strategic management tends to be driven by the desire to develop or improve competitive advantage (e.g. Maxwell *et al.*, 1997: 119). Its value for achieving continuous improvement towards sustainability may therefore rest on the ability of environmental initiatives to deliver competitive advantage. The results of the TZ evaluation and critical accounts of the EM literature (e.g. Newton and Harte, 1997) suggest that competitive advantage is by no means a guaranteed outcome of environmental initiatives. The reliance that strategic management has on competitive advantage may make it a tenuous base upon which to rest continuous improvement towards sustainability.

In addition, as Maxwell *et al.* (1997: 119) point out: corporate environmental strategy is one thing, but "the real challenge lies in moving from the formalities, generalities, and value statements" to the "reality of implementation at the plant or project level". The questions identified above suggest that the strategic management approach is consistent with Model I, rather than Model II theories-in-use. Therefore, while it may result in operational changes, it is unlikely to result in double-loop learning and the internalisation that appears necessary to bring about continuous improvement.

One of the benefits of the CP/PP approach, as opposed to generic approaches such as EMS and strategic management is that it can provide organisations with the opportunity to undertake a practical exercise that is virtually guaranteed to deliver environmental and economic improvements[8]. In an illustrative study of 24 national and regional CP/PP projects involving more than 1,500 Dutch companies, de Bruijn and Hofman (2000: 218) found that the projects were all successful in increasing the efficiency of the organisations involved (in economic, as well as environmental terms). They also found that the changes implemented were more profound and that there was greater potential for on-going improvement when a

---

[8] The TZ project provides further evidence of this, despite the shortcomings identified in the evaluation (see Table 4.1, above).

thorough audit methodology was used (such as that described in the NOTA manual - de Hoo *et al.*, 1991) (de Bruijn and Hofman, 2000: 221). Participants appear to have benefited from the opportunity that the waste audit provided for learning about the resource flows within their organisations (2000: 221). However, de Bruijn and Hofman also concluded that improvement did occur after the "end" of the projects, but tended to be limited to standard environmental indicators such as water and energy use, hazardous waste generation and so-on (2000: 221). Like TZ and other projects (e.g. those carried out as part of the ECOPROFIT initiative in Austria - see Sage, 2000), the learning process does not appear to have extended beyond technical issues.

De Bruijn and Hofman's study draws attention to an important distinction between continuous improvement and continuous learning. Their study suggests that the audit methodology advocated by NOTA (de Hoo *et al.*, 1991) and USEPA (and applied in the TZ project) can bring about continuous improvement, but that this will not shift from technical to organisational change unless it is accompanied by continuous *learning*. A key feature of the prescriptive approach that is common in CP/PP/EM manuals/guides, is that it minimises the opportunities for double-loop learning. As mentioned above, this type of learning involves an iterative process of critical questioning, testing, practising and reflecting (Argyris and Schön, 1974: 14; Senge, 1990: 11). Without these essential ingredients, the potential for internalising new behaviour is limited (e.g. Andreson *et al.*, 1995: 207; Field, 1995: 157).

Moxen and Strachan (1998: 156) believe that prescriptive approaches to CP/PP/EM are unlikely to result in continuous improvement because they do not bring about the "generative learning"[9] that is necessary for internalisation to occur. They believe that the mechanistic nature of prescriptive approaches results in the creation of "role cultures", which emphasise "maintaining traditions, following precedents and observing formal rules and procedures" (1998: 156). They suggest that these need to be replaced by "task cultures" where "conventional management philosophies" are laid aside and there is innovation, not only in the management of people, but also in the "design and operation of formal structures" (Moxen and Strachan, 1998: 156).

---

[9] *Generative learning* is described by Senge (1990: 206) as learning that "expands [a person's] ability to create".

The deep-seated nature of such changes again suggests the need for organisational learning, as advocated by Argyris and Schön, Schein and Senge and discussed in s 5.2.1 above. Its application in bringing about continuous improvement towards sustainability is further discussed below.

5.3   Secondary areas for improvement

While commitment and continuous improvement are clearly of primary concern for the success of sustainability programmes for business, the results of the TZ evaluation identified three other areas for consideration. They were related to leadership and support, communication and involvement, and the compatibility of the project.

The following sections will discuss how each of these areas of interest is dealt with in the CP/PP and EM literature, as well as the broad trends in organisation theory.

5.3.1   Leadership and support

The NOTA and USEPA CP/PP guides contain little on leadership. The NOTA guide (de Hoo *et al.*, 1991: 15) identifies the need for "project champions" who will "fight for the good cause". No detail is provided on what such a "fight" would involve. The only other comment on the subject is that it is not important who the champions are as long as they have sufficient authority to "execute the programme effectively" (1991: 16).

While it does not refer to it as leadership, as such, the USEPA guide (1992: 16) draws attention to the need for someone to publicise the organisation's commitment to pollution prevention and to encourage staff to participate (e.g. by offering "bonuses or other awards"). The guide suggests that different mechanisms be used, depending on the "size and culture" of the organisation, but does not indicate who should be responsible (1992: 16).

The guide distinguishes between programme leaders and project champions (although they suggest that the two roles may be played by the same person in a small company). It recommends that project leaders be "named from the highest level practical", "have the authority and ... influence necessary to keep the program on track" and the "personal qualities necessary to elicit broad-based support" from staff (1992: 17). In addition to keeping the

programme "on track" and gaining support, their role is to "establish goals that state the long-term direction for the pollution prevention program" and "facilitate the flow of information among all levels in the company" (1992: 17, 18). The guide recommends that team members who are "the most visible within the production areas" and who are "respected and trusted at all levels" should be "designated" as project champions (USEPA, 1998: 17). Their role is to "overcome resistance to proposed changes".

The advice given on how to undertake the role is simplistic and appears to be based on the assumption that staff will "feel committed" if they are encouraged to participate in the programme in various ways (USEPA, 1992: 16). There is again a heavy reliance on the assumption that the individuals involved in the programme will have the necessary personal qualities and skills. There is no consideration of how the programme would proceed if those involved did not have the necessary qualities, nor how they could be gained. The projected role of the programme leader emphasises the mechanistic nature of the process, while that of the project champion demonstrates the perfunctory way in which potential difficulties are dealt with. Little insight is provided on the potential sources of resistance or how they should be overcome. While the programme team is encouraged to "identify potential obstacles" in four broad categories (economic, technical, regulatory and institutional), the advice on how to deal with them is, again, mechanistic. A cost-benefit analysis is recommended for overcoming economic obstacles, accessing technical information is recommended for overcoming technical obstacles, working together with the appropriate authorities is recommended for overcoming regulatory obstacles, and educational and "outreach" programmes are recommended for overcoming institutional obstacles. No consideration appears to be given to the skills necessary to undertake these exercises, nor the possibility of these solutions not working.

The TZ progress reports suggest that the majority of difficulties encountered were "institutional" and that staff were ill-prepared to deal with many of them. They also suggest that leadership was expected to be displayed, not just in a practical sense, but also in a motivational as well as even symbolic sense. The training and resource materials did not provide any further information on how leadership could be shown.

Higgins (1995: 60) suggests that leadership should be expressed in ways that are consistent

with total quality environmental management (TQEM). He quotes Block (1993) when he explains that this approach requires top management to define the "mission, playing field, and vision" and describes environmental policy as a "tangible manifestation" thereof (Higgins, 1995: 60). However, he also subscribes to Block's assertion that top level management should serve as "a caretaker guiding cultural values rather than acting to control and define purpose for others" (Higgins, 1995: 60). This role is more consistent with the concept of leadership as it is used within the context of cultural approaches to organisation theory (see s2.2.6 above). Again, however, no insight is provided on how training programmes can improve leadership or what is involved.

While Ledgerwood *et al.* (1992: 123) suggest a marketing exercise for the purpose of gaining top level commitment and are confident in its ability to deliver, they provide no suggestion on how commitment should be expressed once it is gained (other than via an environmental policy). Neither do Welford and Gouldson (1993). However, Harrington and Knight (1999: 246-247) do identify a leadership role within the context of individual business "processes". They recommend the selection of a "process owner" who is made responsible for the effective and efficient operation of their particular process (1999: 246). They identify four key criteria for selection of a process owner, and "leadership ability" is one of them (the others are "ownership", "the power to act on the process" and "process knowledge") (1999: 247). They suggest that process owners will have leadership ability if they are: "perceived as highly credible; able to lead and direct a group, and keep them on schedule; able to support and encourage employees, and handle poor performers; able to deal with top level management, live up to commitments and see the bigger picture". They also need to be "skilled negotiators" who are "willing to embrace change" and "unafraid to take risks" (1999: 247).

Eisler (1994: 38) suggests that this top-down approach to management is consistent with a predominant social model that entrenches domination, rather than participation. She suggests that movement towards participatory management in the workplace is consistent with broader social moves that challenge domination. She identifies Morgan (1986), Kanter (1989) and Pfeffer (1992) as examples of authors who have challenged the "top-down structures of command" because of its negative effects on productivity (Eisler, 1994: 37). However, she suggests that a change from domination to participatory management will, because of the entrenched nature of the former, require changes to the "entire structure and culture of the

workplace" (Eisler, 1994: 38).

Fineman (1996: 479) undertook a study to determine whether there were links between emotional meanings that managers attribute to "greening" and pro-environmental organisational changes. While he found that there was no direct relationship, he did find that more "greening" occurred when managers had "engineered" commitment of "belonging" to a socially responsible culture (1996: 479). He suggests that there may be a key "expressive role for leaders in shaping an appropriate climate" in organisations, but that this is not necessarily suited to all organisations (1996: 479). However, he also suggests that externally-sourced coercion based on "fear, shame or embarrassment" may be more effective than waiting for volunteers (1996: 479)!

Leadership was not initially considered as a role for managers. The earliest "modern management" writer to analyse the work that managers do and the principles behind it was Henri Fayol (Pugh, 1997: 251). He described managerial work as planning, organisation, coordination and control (Fayol, 1916, 1949) - four words that are still referred to in management texts and are "common currency in management parlance" (Pugh, 1997: 251). However, Fayol's description is consistent with a rational or mechanistic approach to organisations and, consequently, not all authors agree with him.

Mintzberg (1975: 49), for example, believed that Fayol's four words do little to describe what managers actually do. He based this criticism on his own research and a review of the literature on how managers spend their time, finding that very little of managerial time was spent on Fayol's four actions. Instead, he found that their work fitted into three linked categories: interpersonal roles, information roles and decision roles. The interpersonal role was derived from the "formal authority and status" that senior managers have, and all other roles are derived from interpersonal roles. The three categories can be further sub-divided as follows:

  – interpersonal roles: acting as a figurehead, leader and liaising with external contacts;

  – information roles: monitoring and disseminating information, and acting as spokesperson, and

     –   decision roles: acting as a "voluntary initiator of change", acting involuntarily in response to pressures, allocating resources and negotiating (Mintzberg, 1975, in Pugh, 1997: 304-311).

Mintzberg's categories are consistent with humanist approaches to organisation theory (see s2.2.3), he acknowledges that managerial work comes from the formal authority that has been vested in top level managers. As such, it is not surprising that managers are still expected to play a significant role in setting goals (planning), allocating responsibility (organising), and ensuring that the work gets done (controlling) (see Inkson and Kolb, 1998: 10-11). However, humanist, as well as political and cultural approaches appear to recognise "leadership" as a key role.

Support appears to have been closely linked to commitment in the TZ project. The results from feedback from respondents (Part I - s4.2) and the progress reports (Part III - s4.5) both suggest that the support provided for staff was lacking.

The TZ progress reports raised the concerns of staff regarding the absence of clear expressions of support from management, all of which are consistent with the expressions of commitment identified by Pollack. In terms of the allocation of resources, areas that were found to be particularly lacking were the failure to replace staff made redundant during restructuring, the long time it took for approval to be granted (e.g. for finds for monitoring equipment), and failure to provide staff with time for the project in the face of existing projects or other competing demands (e.g. plant expansion, equipment replacement).

The guides on cleaner production/pollution prevention are not particularly useful regarding the nature of support that needs to be provided for staff who are involved in such projects. Neither USEPA (1992) nor NOTA (de Hoo, 1991) provide any suggestion that lack of support may be an issue. Both publications provide recommendations on setting up project teams, who should be included and the tasks necessary to undertake a cleaner production/pollution prevention assessment (USEPA, 1992: 16-18; de Hoo, 1991: 16-18), but neither indicates how they should be supported. USEPA (1992: 22) refers to the need for senior management to issue a statement of support for the outcome (i.e. pollution prevention), but nothing about the need to support the people involved in achieving that outcome. The guides appear to imply that once

an executive decision is made, a team is set up and a work plan is produced, all else will follow.

The emphasis seems to be on *gaining* staff support, not *providing* them with support. De Hoo (1991: 15) identifies "bonuses, rewards and other forms of acknowledgement" as ways to "motivate and stimulate employees to co-operate and participate", and USEPA (1992: 16) adds the suggestion that these be announced in "news bulletins". It implies that motivation is only externally driven.

Despite the significant amount of work that is identified in both guides as being necessary for the achievement of the desired outcomes, there is no mention of where staff will find the time to carry it out. Both guides identify potential "obstacles" or "barriers" that may be encountered (see USEPA, 1992: 23-26; de Hoo, 1991: 19-22), but neither identifies lack of support as one of them. Most of the "institutional" barriers that are identified are related to the attitudes and involvement of staff (e.g. resistance to change) and there is the inference that increased awareness, through the provision of education and information, will overcome them (USEPA, 1992: 25).

Higgins (1995: 44, 60-61) identifies the need for senior managers to support pollution prevention initiatives and suggests that their success depends on "empowerment and reward programmes" for staff, but again, does not make any recommendations on what types of support are necessary or how they should be provided.

The guide used for the training for the TZ project (ECNZ, 1996: s1) suggests that communication will reduce attitudinal barriers. Recommendations are given whereby staff support can be gained, e.g. through a marketing exercise not unlike that suggested by Ledgerwood *et al.* (1992: 123-127) and the use of "seminars, brainstorming, bulletin boards and newsletters" (ECNZ, 1996: s1). The reciprocal nature of support is not mentioned.

In the more detailed resource materials provided for the TZ training workshop, the need for staff to be supported is mentioned briefly. The "allocation of specific responsibilities" and the provision of "time and financial support to carry them out" are mentioned as one of "ten steps" recommended by Huisingh (pers. com., 1992) for the implementation of cleaner

production. In addition, the management of "financial and time-related aspects" are identified as objectives of the organisation and planning phase of a cleaner production assessment (Stone, 1996: 20), although no detail is provided on how they should be achieved.

The literature on environmental management provides varying degrees of information on the need for- and provision of support for staff. The approaches of Ledgerwood *et al.* (1992), Welford and Gouldson (1993) and Harrington and Knight (1999) appear to be consistent with total quality approaches. Ledgerwood *et al.* (1992: 152, 153) believe that all staff need to be involved in the programme and that training and communication are necessary to ensure that a "quality management" approach reaches "into the whole culture" of the organisation. They emphasise the need for "operatives" at all levels of the organisation to be given the "technology, management systems, incentives and skills" that will enable them to contribute to the goals of the programme (1992: 153). Welford and Gouldson (1993: 82) recommend the use of "environment circles", which they describe as "groups of workers doing similar work who meet ... regularly ... to identify and solve work related problems", "recommend solutions to management and implement [them] once they are agreed".

Harrington and Knight (1999: 149) focus on the support necessary to provide staff with the knowledge and skills to contribute to the development and implementation of an EMS. Clause 4.3.4 of ISO14001 requires an organisation to develop and maintain an environmental management programme. Harrington and Knight (1999: 82) recommend the use of "traditional project management principles to ensure that responsibilities and resources are allocated at each relevant function and level of the organisation". They state that it is necessary, for each objective and target, to allocate responsibility, to identify the "human, financial and technical" resources required and to develop a timeline (1999: 82).

Apart from these requirements, they mention support primarily in terms of the impact that any changes to an existing EMS will have on organisational culture and the effort that will be required in support of the proposed changes (1999: 162). They suggest that it is necessary to assess the extent to which change will affect people, processes and technology and to develop a "change management effort" that will provide "an avenue for employees to accept the change without feeling threatened" in terms of their "competence, comfort, confidence and control" (1999: 164). They devote no more than a couple of pages (in a 400-page guide) to the

effort necessary to bring about these changes. Their recommendations for organisations that wish to radically revise an EMS and institute "a more environmentally conscious culture" are essentially limited to engaging a professional consultant who specialises in organisational change management (1999: 165). The implication is that an *acceptable* EMS does not necessarily require a particularly strenuous effort in this regard, nor a particularly environmentally conscious culture.

For all of the above-mentioned authors, the focus appears to be on supporting pre-determined outcomes rather than the people involved, their motivation and empowerment. They say nothing directly about the time, understanding and other resources that will be necessary for staff to carry out the work in advance of the implementation phase. It is easy to get the impression that environmental improvement will occur within an organisational utopia where commitment by senior management is a given and co-operation, communication and training are all that are necessary for employees to happily work towards a pre-determined goal.

While the approaches advocated in practical guides to CP/PP/EM outwardly appear consistent with cultural approaches to organisational theory (see s2.2.6), they also include elements that reflect rational/mechanistic approaches (see s2.2.2).

Moxen and Strachan (1998: 13-4) suggest that the faddish nature of team-working, together with inadequacies in the management of "green teams" and evidence of poor success have raised questions regarding their value. However, their book "Managing Green Teams" provides evidence that such teams can, indeed, be "highly effective vehicle[s] for progressing organisations' environmental agendas" (1998: 13).

5.3.2 Communication and involvement

The results of the TZ evaluation suggest that positive results of the waste audit were not used to gain or enhance top level commitment; there was lack of clarity regarding the roles and responsibilities of those involved in the project; team members were poorly supported, and involvement of other staff was low. While other factors may have contributed to these difficulties (and are discussed elsewhere), all these issues are at least partially symptomatic of the absence or failure of systems for communication.

The literature on CP/PP best practice emphasises the need to communicate top level commitment to staff, but is short on advice on how to do so. The most common suggestion is that an environmental policy be used to do so. USEPA (1992: 14), for example, believes that a formal policy is valuable because it will be regarded by staff as indicative of an "ongoing, company-wide commitment" to environmental performance improvement. De Hoo *et al.* (1991: 14) believe that its value lies in its ability to communicate objectives and demonstrate to staff the involvement of management. Higgins (1995: 48), in his "Pollution Prevention Handbook", identifies the development of a pollution prevention policy, together with the establishment of a waste reduction director, as important first steps in demonstrating the commitment of the board and management to pollution prevention.

Environmental policy is also commonly identified in the literature on environmental management as a means to communicate top level commitment (e.g. Welford and Gouldson, 1993: 51; Oates, 1996: 136; Hutchinson and Hutchinson, 1997: 120). However, Barrett and Murphy (1996: 90), suggest that this may not necessarily be the case and that policy may reflect tokenism or symbolism, rather than commitment. They also suggest that management may only be committed to short-term initiatives (e.g. those with a quick pay-back), rather than development of the "knowledge and expertise necessary to handle both the complexity and uncertainty inherent in moving to environmentally-sustainable practice" (1996: 90).

It is interesting to note that the CP/PP literature tends to view environmental policy as a method for communication, when it really should provide the content of what is communicated. The TZ results suggest that environmental policy did not necessarily work to communicate top level commitment to staff. This may be because the mere existence of policy was expected to be enough to communicate commitment. No provisions were made for a communication programme.

The progress reports suggested that leadership and the provision of support were likely to be far more effective than policy as means for communicating top level commitment. However, the reports also identified a wide range of other means whereby communication occurred. These included the use of meetings and their minutes, memoranda, presentations, corporate magazines, newsletters, information sheets, web pages and displays.

Most best practice guides recommend the use of these types of methods for communicating commitment, goals, progress, results, etc. However, they also acknowledge that the method chosen is likely to depend on the organisation (e.g. USEPA, 1992: 16) and the merits of individual methods will not, therefore, be discussed here. Rather, the discussion will focus on the use of communication as a means for involving staff.

Staff involvement is identified in all the literature on CP/PP and EM as an essential ingredient for success. The means used to involve staff will also tend to vary according to each situation. Before the means can be considered, it is useful to consider why involvement is necessary and what type of involvement is most likely to bring about the changes necessary in pursuit of sustainability.

In the best practice guides on CP/PP, staff involvement tends to be discussed mainly in terms of the planning and organisation phase, i.e. the resourcing of the project. The USEPA guide (1992: 12, 14) identifies the need for "consensus building" amongst staff once an "executive level decision" has been made and an environmental policy has been developed. While examples are given of the way in which these developments can be communicated to staff (1992: 16), it is clear that the purpose is to gain their support for what is essentially a management initiative. A similar approach is taken in the NOTA manual (de Hoo *et al.*, 1991: 14).

The next phase in which staff are required to be involved is the establishment of the "task force" or "project team" (USEPA, 1992: 16-17; de Hoo et al., 1991: 16-18). While this is clearly a means whereby staff can be directly involved in the planning and organisation of the project, this type of involvement will necessarily be limited to only a few people. The types of tasks identified for the team (e.g. de Hoo et al., 1991: 17) suggest the need for participants to have relatively high levels of authority in areas that are of relevance to the project. Examples include production, maintenance, quality control, waste treatment, environment, health and safety, marketing and finances (de Hoo *et al.*, 1991: 17, 25). While it is recognised that the composition of the team should reflect the organisation (particularly its size and structure), USEPA (1992: 16) suggests that team members should have "substantial technical, business, and communication skills" and a "thorough knowledge of the company". Again, the approach is mechanistic, with the focus very much on the team as the means to implement a

management driven programme.

The mechanistic nature of the programmes is further evident in terms of the involvement of staff other than those on the team. As mentioned above, the USEPA guide (1992: 50) suggests that a "pollution prevention awareness program" be established. The purpose of this programme is: to raise awareness amongst employees; to inform, train and encourage them to participate; to recognise their efforts, and to publicise successes (USEPA, 1992: 50). "Two-way communication between employees and management" is identified as one of the means whereby the programme can be maintained and improved.

Apart from this, the only other significant reference to staff involvement that can be found in the USEPA guide is in terms of staff education and training. The guide identifies training as "one of the most important parts" of the programme, but provides only very simple advice on how to educate and/or train staff (USEPA, 1992: 52, 53). The guide infers that making "each employee aware of waste generation, its impact on the site and the environment, and ways waste can be reduced and prevented" (USEPA, 1991: 52) will be sufficient to convince them of the merits of the project and, by implication, be enough to gain their support and involvement.

The TZ results suggest that this was simply not enough. Involvement of staff other than those in the TZ team was poor, despite efforts to inform them in a variety of ways. Little consideration is given in the guides to the complex nature of the social dynamics that occur in organisations or the need to empower individuals. It is quite likely that the reader/user would be oblivious to the wide range of political and cultural factors that hinder change within organisations, and therefore be totally unprepared for them. This certainly appears to have been the case in the TZ project.

Higgins' (1999) approach is typically mechanistic. He talks about the need to gain "employee acceptance" and describes TQEM as a team effort, wherein human resources are all brought together to work towards a common purpose (Higgins, 1999: 61, 99). That common purpose is described as identifying environmental issues, preventing waste and, ultimately, improving the company's profitability (Higgins, 1999: 61).

Ledgerwood et al.'s (1992) approach is similar. They identify the need to communicate achievement of targets and to achieve the "total involvement of all personnel" (Ledgerwood et al., 1992: 58, 152). They suggest that "by contributing to better environmental practices, [staff] can connect their cycle of responsibilities to the company's overall aims" (Ledgerwood et al., 1992: 152). While they recognise that staff vary greatly in their "power and pay", they also suggest that they all have equal responsibilities in environmental programmes, and use this suggestion as to make the case for "team-based flat hierarchies with few middle management levels" (Ledgerwood et al., 1992: 152-153). No consideration appears to be given to the difficulties that political and economic inequity may cause in the implementation of such changes. The following quote from Ledgerwood *et al.* (1992: 153) provides a striking example of the over-confidence that is still evident in the literature on best practice in environmental management. They state:

> "*Training for better environmental performance will be adopted at each level, and appropriate forms of training will be developed for specific areas of responsibility. Senior managers will need to learn how to evaluate change for its environmental impacts, as well as for its logistical and financial attractiveness. Middle managers will need to acquire an understanding of how their daily routines can be evolved to improve environmental performance. Supervisory managers, the sharp end of the organisation, will often have the greatest potential to produce environmental benefits by properly training their teams in good environmental practices. Finally, operatives will be given, directly through their supervisors and in the overall communications of their organisations, the technology, management systems, incentives and skills for looking after energy and waste management practices. Where product delivery is their responsibility the environmental dimension will be seen as a further quality issue on which they can be motivated to deliver.*
>
> "*Good environmental management will also require a comprehensive internal approach to communication and decision-making. Operational groups will need to trust specialist contributions from central staff. Environmental managers, in turn, will be required to wholly rely on the enthusiasm of plant supervisors. The open sharing of environmental goals and problems as they arise, between departments, will be essential if code compliance is to be gained.*
>
> "*Communication for a quality-driven environmental programme will focus both on internal and external audiences. The environmentally-oriented corporation will use newsletters, awards and recognition of good practice in environmental performance programmes, alongside quality objectives in other areas of corporate development. The reporting system is crucial here. If teams are to produce environmental improvements, they must know that their successes will be reported upwards in the structure. Significant improvements will need to be given company-wide recognition in this, as in other areas.*"

And finally,

> *"These corporate environmental training and communication programmes will lead to direct improvements in both managers and management practices. While imposing real costs, the programmes will provide benefits beyond compliance with environmental codes and image building." (Ledgerwood et al., 1992: 153, 154).*

While Ledgerwood *et al.* (1992: xv) proclaim that training and motivation strategies are central to TQEM, they firmly believe that improvements will come from a "patient and long-term inculcation of the environmental message into each activity". No consideration is given to the political and cultural characteristics of the organisation, the groups, or the individuals involved, and the influences that these may have on their receptiveness, willingness, or ability to change. The overall message is that once the directive has been given, the commitment made, the goals and policy written and communicated, the rest will simply fall into place.

The results from the TZ evaluation suggest that this is simply not the case. Obvious examples are: the case of the quality manager who diverted staff from the TZ project so that they could assist her with "more important work"; the supervisor who was obstructive because a team member (who was a subordinate) had to seek approval directly from the supervisor's superior, and the team members who were made redundant when their organisations restructured, despite contributions they had made to cost savings. The list goes on ....

Welford and Gouldson's index provides a telling example of the mechanistic approach that important issues such as internal communication and staff involvement receive in the mainstream environmental management literature. Next to the page number that refers to a single paragraph on communication is written: "*see also* marketing" (Welford and Gouldson, 1993: 205). As Ledgerwood *et al.* (1992: 123) confirm, communication is seen as a marketing problem.

In their more recent publication, Harrington and Knight (1999: 167) distinguish between two types of training: generic and operational training. They recommend that the generic training be designed for different groups (i.e. the executive team, the project team, general management, those preparing procedures or instructions, and other employees), and that the composition of the training sessions vary according to the target audience (1999: 167-8). They

recommend that most sessions include three components: one that focuses on ISO14001, another on organisational change management, and the last on needs specific to the role that each group will be expected to play (1999: 167-168).

While their guide contains many references to training, most are for the purpose of maximising the ability of staff to work with and use system components, e.g. for emergencies (1999: 221), for preparation of documents (1999: 253-256), for use of documents (1999: 134), for creating the environmental manual (1999: 283-284), and for operating procedures (1999: 294-295).

However, the model that they advocate for managing change does have key features that are relevant to communication. They are:

- a "communications analysis" to determine "what should be communicated to whom, when ... and how";

- a "change announcement plan" to describe what will happen, and

- a "change communication plan" to describe how communication of the changes will be managed (1999: 231).

5.3.3   Compatibility and design

The results of the TZ evaluation suggest that project was not always compatible with the culture, needs and/or existing projects of organisations. An example of incompatibility with the culture and needs of an organisation was the historical, antagonistic relationship between factory hands and managers in some plants. In these cases, the TZ project was viewed as a management initiative and met with hostility. It was not until this issue had been resolved that the project could proceed. The project was particularly unsuccessful in one case, where defensive routines prevented the problem from being acknowledged and it was therefore never resolved.

An example of incompatibility with needs was the TZ project that focused on a waste stream that was peripheral to the main activities of the organisation in question. While the waste was intended to be used for a pilot, the results had very little motivational value.

An example of incompatibility with existing projects was an organisation with a large factory upgrade in progress. The staff allocated responsibility for the TZ project had much lower levels of authority than the senior managers who were responsible for the upgrade. As a result, the TZ work was considered by senior managers to be less important than the work necessary for the upgrade, and the time available for TZ work was continually eroded as team members were diverted for the purposes of the upgrade. Another example with unexpectedly similar consequences was a project to gain ISO 14001 accreditation. Responsibility was also allocated at a higher level and, because of the staff member's ignorance regarding the potential for integration, the TZ project was marginalised.

While organisations varied in their response to the situation, and some did find ways of alleviating the difficulties, the greatest successes occurred when culture, needs and/or existing projects were acknowledged and something was done to improve compatibility.

The literature on the application of cleaner production/pollution prevention is characterised by its prescriptive nature. The USEPA and NOTA's guides are both particularly prescriptive in their approach - not only in terms of the need to focus on prevention, rather than control of wastes and emissions, but also in the way that the programme should be carried out (USEPA, 1992: 4-9, 12; de Hoo *et al.*, 1991: 6-7, 10-12). While de Hoo *et al.* (1991: 10, 13) suggest that the programme should be "flexible enough ... to be adapted to unexpected circumstances, they also refer to a "systematic procedure" in which a set of prescribed steps "have to be taken". While USEPA (1992: 12) appears less dogmatic, describing the "elements of [their] pollution prevention program design as those that *might* be addressed" (emphasis added), they do not offer any advice on how to diverge from the programme.

The prescriptive nature of the NOTA programme is illustrated by no less than 38 worksheets that participants are expected to use during its course (de Hoo et al., 1991: Appendix A). These have been reduced to nine in the USEPA guide (1992: 74-82) and, while it is suggested that the user "may decide to modify them to fit [their] particular industry", there is no guidance on how to do so. The worksheet approach takes the user through a systematic, 'tick-the-box' type of process that leaves very little opportunity for creativity and runs the risk of alienating the user if the generic questions are inappropriate.

The training and resource materials for the TZ project were also prescriptive in their approach (see ECNZ, 1996; Stone, 1996). They advocated the use of basic phases that were similar to those suggested in the NOTA and USEPA guides: 1) developing an environmental policy; 2) planning and organisation; 3) conducting a waste assessment; 4) identifying, evaluating and implementing cleaner production options, and 5) monitoring and review (ECNZ, 1996: Overview; Stone, 1996: 7). In order to ensure that the "essential" tasks were undertaken, the consultants assigned to each organisation were required to report on progress achieved on a monthly basis. The tasks requiring reporting included: development of an environmental policy and implementation strategy; undertaking a walk-through of the plant; identifying gaps in existing information; completing a materials and energy balance, and preparing a summary report. It is clear from the progress reports that some consultants found the format too rigid: after a few months they dispensed with the format and provided unformatted reports. The frustration that one consultant appears to have experienced because of the prescriptive nature of the process was demonstrated by her written request for permission to apply a different process which staff of the service organisation with which she was working had decided was more suitable.

Other results suggested that participants responded negatively to information that was not specific to their particular industry sector (e.g. case studies). This was particularly so for participants from the service sector, who felt that the programme was biased towards the manufacturing sector.

While Welford and Gouldson (1991: 89-92) identify "system design and implementation" as one of "four key components" in an environmental management system (the others are environmental review, policy and audit), the design phase is purely mechanistic.

As mentioned earlier, culture change is commonly identified as a means whereby organisations can improve their environmental performance. It seems ironic that the mechanistic and management-driven systems described in the mainstream literature on standardised environmental management systems can, because of their superficial similarity to quality management systems, appear to be "cultural approaches". Fineman (1996: 479) criticises the "verve" with which environmental management literature advocates the "greening" of organizational cultures, while providing little information on how to achieve it.

He suggests that it does nothing to explain why there is so much resistance to "even mildly green measures". He also questions the "manageability" of organisational culture, particularly for environmental purposes (1996: 480).

Dyck (1994: 48) uses Child's (1972) strategic choice theory as a basis for his study of strategic choice within organisations. He suggests that once an organisation has chosen a "particular configuration" of domain, structures and systems, and performance standards, it becomes "very difficult to transform". He provides three "agri-business" examples to illustrate that short-term approaches that do not challenge "conventional anthropocentric" notions of nature and may undermine long-term approaches that do (1994: 51-58). He suggests that this could occur if short-term changes result in a "false sense of security" and reduce the "perception of crisis" that he believes is necessary to "trigger [revolutionary] transformational change" (1994: 60).

5.4   Comparison between a generic CP/PP/EM model and change management models identified in organisation theory

The results of the TZ evaluations, together with the discussions in s5.2.1 and 5.2.2 suggest that the types of approaches advocated in the CP/PP/EM literature for gaining and/or enhancing commitment and bringing about continuous improvement are inadequate. They appear to be predominantly mechanistic and are heavily based on a number of assumptions. These assumptions can be summarised as follows:

1. A subordinate staff member will be sufficiently motivated and skilled to undertake a marketing exercise that will "sell" the need for environmental performance improvement to the CEO;

2. Top level managers will voluntarily commit to environmental performance improvement when presented with the benefits thereof;

3. Staff will become committed when presented with signs of top level commitment (usually in the form of an environmental policy);

4. Staff will easily be trained to work together to apply a generic set of methods/tools to their organisations;

5. Staff will have the skills to overcome any difficulties that arise, including those that are organisational, irrespective of their backgrounds or experience, and

6. A prescriptive, sequential set of phases will, when followed by monitoring and review, be sufficient to result in continuous improvement.

The TZ results and discussion suggest that some or all of these assumptions are likely to be false for the majority of businesses. However, their prevalence, as indicated by coverage of relevant issues in the examples of CP/PP/EM guides/manuals referred to above, suggests that they may have reached the status of what Argyris and Schön (1974) refer to as "theories-in-use", Schein (1985) refers to as "basic underlying assumptions", and Senge (1990) refers to as "mental models" (see s2.2.6 and 2.3.3) (hereafter collectively referred to as theories-in-use). This, in turn, suggests that the practitioners who use these guides/manuals to "train" businesses, themselves need to undergo the iterative, double-loop learning process that is suggested by Argyris and Schön for changing theories-in-use.

It follows that this thesis should stop at this suggestion and not succumb to the temptation to provide a model that can be used by practitioners to "train" businesses to adopt environmentally sustainable practices. Indeed, the concept of practitioners "training" businesses, when the prevalence of the above-mentioned and apparently false assumptions suggests that the practitioners themselves should be the trainees, is oxymoronic.

However, my involvement in the TZ programme as a trainer and then evaluator has given me the opportunity to begin the double-loop learning process myself. I have been able to *reflect* on the theories-in-use upon which I and others have based our training[10] programmes, and I have been able to use the results to *invent*[11] a way to improve environmental components of sustainability programmes for business. I will share my suggestions in this regard, not for

---

[10] The term *training* is usually used in reference to the "flow of information from a supplier (or trainer) to a receiver (or trainee)" (Field, 1995: 158). It is recognised that the term, as defined in this way, does not accurately reflect the broader nature of the processes that are involved in organisational learning. However, for want of a better term, it will be retained and used hereafter in in reference to the processes whereby learning is facilitated. The term *trainer* will be replaced with *facilitator* to better reflect that person's role within the learning process.

[11] While I have used the word "invent", I have done so in order to relate the process back to the steps involved in Argyris and Schön's model for the transition from Model I to Model II theory-in-use. I recognise that the "improvements" I suggest are drawn from the work of these and other authors (see below) and cannot, therefore, be considered to be solely my own.

prescriptive purposes, but rather to document what I plan to *test* in my future work with businesses, and to provide other practitioners with something that they can consider as part of their own critically reflective learning processes.

My thesis is that commitment to sustainability and continuous improvement towards that 'end' are the most important measures of success for sustainability programmes, and that standard CP/PP/EM methodologies/tools fail in this regard because they do not bring about critically reflective learning processes.

Before making suggestions for improving sustainability programmes, I will therefore consider the extent to which the generic elements of a CP/PP/EM programme are likely to provide the opportunity for critically reflective organisational learning. I will then consider the elements within the context of organisational change models and identify programme components that may be necessary to replace (or complement) these generic elements. I will end the discussion by suggesting a sequence in which they could be used for an sustainability programmes programme for business.

Common programme components that are advocated in CP/PP/EM best practice guides/manuals are: policy, planning and organisation, assessment (including identification of options for improvement), evaluation and implementation of options, monitoring and review (see Fig. 5.1). The methodologies and tools suggested for these programme components tend to be based on mechanistic principles. Human relations are considered primarily in terms of the use of teams for conducting the work that is necessary to implement policy. Organisational culture is considered primarily in terms of its ability to be managed or manipulated for the same ends, and cultural unity is expected to be achieved. Political considerations are largely excluded.

The governing variables of the programme components as they are practised appear to be consistent with Model I theory-in-use, i.e. they involve definition and pursuit of goals, maximising winning vs. losing, minimising negative feelings and rational decision-making. Model I theory-in-use results in single-loop learning, which is characterised by changing actions, rather than governing variables (See Fig. 2.7). The significance of the changes that are required of businesses in pursuit of sustainability suggests that double-loop learning, which is

characterised by changes to governing variables, needs to occur.

Since Model II theory-in-use is believed to bring about double-loop learning, it seems useful to begin this section by considering Argyris and Schön's (1974) suggestions for the transition from Model I to Model II theory-in-use. This transition is presented graphically in Fig. 2.8. It is characterised by an iterative learning process that can be summarised as:

– searching for inconsistencies between espoused theories and theories-in-use (critical reflection);

– invention of new theories-in-use;

– testing of behaviour in accordance with new theories-in-use;

– validation of new theories-in-use, and

– internalisation and acceptance of responsibility for new behaviour (Argyris and Schön, 1974: 134).

Some phases in the process may appear similar to those included in the commit-plan-organise-assess-evaluate-implement-monitor-review phases of standard CP/PP/EM programmes. However, they are markedly different because they begin by focusing on the governing variables of theories-in-use, not on specific goals and the actions that are necessary to achieve them.

The learning process identified by Argyris and Schön as necessary in the transition from Model I to Model II theories-in-use is embedded in Schein's (1984: 7) definition of organisational culture (see s2.2.6). Implicit in this definition is the need for theories-in-use to be "invented, discovered or developed", and to go through a validation process before they are taught to new members. Important characteristics of the validation process are shared experiences that are repeatedly found to be successful (Schein, 1984: 19-21).

The processes are also similar to those that occur in what Senge (1990: 9-10) refers to as "team learning" (see s2.3.2). Team learning differs from the "teamwork" described in CP/PP/EM literature because the latter tends to be mechanistic (teams are established to work together towards achieving a set of goals) and low in personal causation (prescribed methods are expected to be used to achieve the goals). In contrast, team learning starts with dialogue,

which is described by Senge (1990: 10) as "learning how to recognise the patterns of interaction in teams that undermine learning". Examples of such patterns of interaction are action strategies that Senge, and Argyris and Schön both refer to as "defensive routines". They prevent double-loop learning because they serve to protect existing theories-in-use, rather than opening them up for scrutiny.

Together, Argyris and Schön, Schein and Senge's theories suggest that shared, iterative, double-loop learning processes enable new theories-in-use to be invented, validated and become embedded in organisational culture. They also suggest that continuous improvement will only be achieved if the reflective learning process associated with Model II theory-in-use is embedded in an organisation's culture. This would represent a major departure from the standard approach to sustainability programmes, which attempts (at best) to embed various concepts and/or approaches (e.g. CP, PP, ISO14001, TQEM) in organisational culture. However, it seems reasonable to assume that embedding reflective learning in an organisation's culture would not necessarily be sufficient to bring about sustainability. Presumably, the application of reflective learning processes would need to be applied in pursuit of some goal of relevance to sustainability.

The need for a goal is problematic because of the limitations that mechanistic, goal-driven processes are believed to place on learning. The concept of a "vision", rather than goal, may therefore be more appropriate. An organisation's vision is described by Kotter (1990: 36) as the essence of what the organisation could become in the (often distant) future. He suggests that it should be "specific enough to provide real guidance", while being "vague enough to encourage initiative and to remain relevant under a variety of conditions" (1990: 36). His pedestrian definition belies the inspirational qualities that he and other authors expect vision to have, and his focus on the validation process (1990: 37) suggests that he is talking about goals, rather than vision. Also, the context within which he discusses vision, i.e. as a means whereby leadership is manifested, suggests a rather mechanistic, top-down approach.

The definition provided in the Oxford Compact English Dictionary is perhaps more appropriate as a basis for motivation and inspiration. It includes vision as "a thing or idea perceived vividly in the imagination", "imaginative insight", and "statesmanlike foresight" (1996: 1165).

The top-down approach suggested by Kotter is in contrast to Senge's (1990: 9) concept of "shared vision", which he describes as "a shared picture of the future we seek to create". He distinguishes between vision that is imposed vs. that which is shared, suggesting that the former will, at best, result in "compliance", while the latter, because it reflects personal vision, will bring about "true commitment". He suggests that shared vision provides the "focus and energy" that is essential for organisational learning to occur. (Senge, 1990: 206)

Whiteley (1995) includes the concept of values in her conceptualisation of vision. She believes that vision represents a "stable, future-looking value system, which dictates appropriate and approved behaviours", and she describes values as "an expression of 'truth' as the person sees it" (1995: 36, 44). While her description of values suggests that they are espoused, and therefore not consistent with theories-in-use, her discussion of the subject suggests otherwise. In it she refers to Whetton and Cameron's (1991: 57) description of values as "among the most stable and enduring characteristics of individuals ... the basis upon which attitudes and personal preferences are formed ... and crucial decisions, life-directions and personal tastes" are made (Whetton and Cameron, 1991: 57). While this appears to focus on individual values, the "value system" that is referred to in Whiteley's definition of vision, is consistent with Schein's definition of organisational culture (1984: 7). Whiteley's concept of values therefore seems more consistent with theories-in-use than it does with espoused values.

Whiteley provides a slightly more pragmatic rationale for the use of a vision than does Senge, suggesting that it helps us to select from the "mass of stimuli which simultaneously bombards our senses" (1995: 30-1). However, her definition also suggests that vision may play a useful role in the validation process that is necessary for learning to occur.

The nature of sustainability suggests that this role is especially important. While it is possible to validate behaviour that is directly related to the organisational learning process (e.g. the behaviour invented as a result of dialogue amongst group members regarding the effectiveness of teamwork), the long timelines and the large scale of most environmental problems make it difficult to validate behaviour invented to improve sustainability. A switch to renewable fuel sources, for example, is unlikely to have any immediately noticeable effects on air quality. The only real way to confirm/disconfirm the validity of such a switch would be to check whether it "fits the picture" (or vision) that the organisation has of itself within the context of

sustainability.

Key elements that appear to be necessary for improving the ability of sustainability programmes to enhance commitment and bring about continuous improvement are the development of a shared vision and iterative, critically reflective learning processes. The following section will consider how examples of change management models may be able to assist in incorporating these elements.

Superficially, the generic CP/PP/EM programme (see Fig. 5.1) appears to be similar to Kolb and Frohman's (1970) adaptation of Lippett *et al.*'s (1958) "planning model" (see Fig. 2.5, s2.3.3). However, closer examination uncovers anomalies. The first phases of "scouting" and "entry" are absent from the generic CP/PP/EM model. These are important phases because they provide the consultant with the opportunity to undertake a reconnaissance of the company and thereby determine the best point of entry and way to proceed. The absence of these components in the generic CP/PP/EM programme draws attention to a significant difference between this and the planning model/s. CP/PP/EM programmes tend to reflect the phases that the business itself will have to undertake, while the planning model/s include those that the consultant or facilitator will undertake. This suggests that the significance of the interface between the consultant/facilitator and the company receives greater recognition in the planning model than it does in the generic CP/PP/EM model. It also provides a starting point that recognises the importance of cultural and political considerations and enables them to be used to optimise the point of entry. The first feedback loop recognises that increased knowledge about the business (gained through "diagnosis" and "planning") may reveal the need to change the entry point. These largely political considerations appear to be absent from the CP/PP/EM programmes studied.

Another component that is found in the planning model, but not the generic CP/PP/EM programme is "termination". This phase recognises that the formal relationship between the consultant/facilitator and the business will end at some point, and the implication is that it will need to be planned for. The absence of this consideration in CP/PP/EM programmes may contribute to the demise of CP/PP/EM programmes once the input from consultants/facilitators ceases.

Another difference worth mentioning is the diagnostic phase, which comes after entry and before planning and action. While the CP/PP programmes studied did suggest that a preliminary assessment or review be carried out, and this is required as part of an ISO certified EMS, the focus in the CP/PP programmes appears to have been on the main assessment which occurs after the planning phase. The lack of attention paid to this component may be the reason for programmes that are poorly targeted and incompatible with the needs of the organisation.

In Schein's (1969) "group problem solving" model (Fig. 2.5, s2.3.3), the diagnosis phase is expanded to the point where it is consistent with the early phases of Eden and Huxham's "action research" model (Fig. 2.4) and Argyris and Schön's transition process (Fig. 2.8). Action planning is only undertaken once the process of reflection, invention and testing has been repeated sufficiently to engender confidence in the actions chosen.

Cummings and Worley's (1997) "action research" model differs in that it includes a "preliminary diagnosis" phase which is conducted by the consultant/facilitator, and followed by "feedback to the client" and a "joint diagnosis" phase. Their model recognises the importance of involving "clients" in the diagnosis phase, while clearly distinguishing between the roles of consultant/facilitator and client. The absence in the TZ project of preliminary diagnoses and the lack of clarity regarding the distinctive roles of consultants and clients may have contributed to the difficulties mentioned earlier.

The second feedback loops in both Kolb and Frohman, and Schein's models are consistent with the loop that is used to signify the cyclical nature of the generic CP/PP/EM process. It is reasonable to assume that actioning these loops could involve difficulties similar to those encountered in the TZ project. Schein's third feedback loop is different because it recognises the need to reformulate the problem in light of- and once outcomes from the actions become evident. If reformulation of the problem is the driver, rather than review of the outcomes, the potential for continuous improvement is likely to increase.

The above-mentioned models provide insight into how the iterative learning process can be included in a CP/PP/EM programme. They also provide some insight into the points at which the needs of a particular business can be assessed and roles of the facilitator and staff can be

distinguished. Worley's (1996: 18) strategic change model (Fig. 2.6, s2.3.3) and Whiteley's (1995: 48) core values model (Fig. 5.2) help in terms of the incorporation of vision.

Both authors stress the importance of vision as a driver for change, although Worley focuses on vision as a driver for strategic change, while Whiteley includes strategy as a means whereby vision is achieved. The mechanistic nature of strategic approaches to sustainability and the uncertainties regarding competitive advantage (as discussed above) suggest that Whiteley's approach (where strategy is a tool, not an end) may be more useful.

Whiteley (1995: 34) describes change as "the negotiation or … re-negotiation of shared meaning about what is to be valued, believed in and aimed for". While this definition clearly reflects her interest in the role of values in change management, her definition of *organisational* change (i.e. "a renewal of parts or even the whole of organisational culture, structures, processes and relationships with the outside environment") strongly suggests that she sees culture as the key to organisational change.

Whiteley's model is useful because it represents a hierarchy of instruments in what she describes as a "culture-building" process, rather than a sequence of phases for managing change. The hierarchy suggests a systemic approach where all components are part of the whole, and have particular contributions to make. Vision has primacy because of the governing role that it has to play in the change process (see above). It is described as an "[imagined], projected future where valued principles are preserved", as well as "a mental model of the way in which the organisation will organise for survival and success" (1995: 47, 48). The "valued principles" to which Whiteley refers appear to be consistent with theories-in-use. Presumably, their visionary nature means that they would be new theories-in-use and could re-define the concepts of "survival and success" in ways that could be of relevance to sustainability.

Figure 5.2. A model for managing change using Whiteley's "core values" approach. Adapted from Whiteley, 1995: 48.
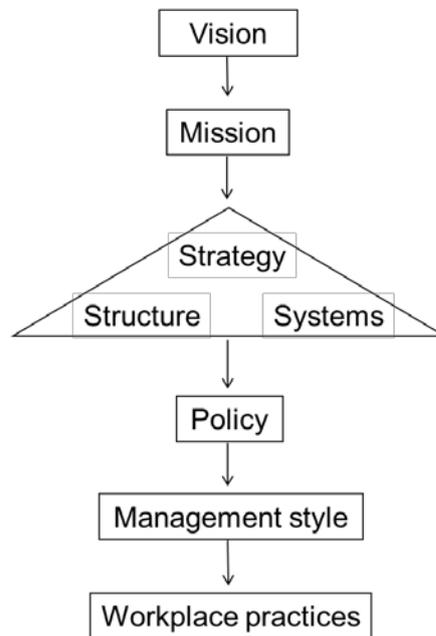
Mission is below vision because it steps back into reality, relating vision to the business itself. It defines the business the business *wants* to be in (Whiteley, 1995: 45). Strategy is next because it "translates ends into means" (Whiteley, 1995: 467-8). It involves the choices that need to be made, the organisation's priorities and the allocation of resources. Policy, which comes next, is identified as a "statement of intent" which "translates strategies into procedures and standing orders" (1995: 47). Below policy is "management style", which is included because of the filtering and interpretation that managers undertake in their position between policy, practices and people (1995: 25, 48).

5.5 A model for incorporating continuous learning into sustainability programmes for business?

I have used the above-mentioned change management models and the discussion as the basis for selecting programme components that I believe have the potential to improve sustainability programmes for business. They have been combined and are graphically presented in Fig. 5.3.

Before explaining the components and the sequence in which they are presented, I will summarise the features of the model that I expect to improve the ability to deliver in the key areas of commitment, continuous improvement, leadership and support, communication and involvement, and compatibility and design (see s 5.2-3 above). These key features are:

1. An initial diagnostic stage that enables the facilitator to customise the programme in response to the needs of a particular organisation;

2. Engaging all staff in a process whereby they develop a shared vision and act as its stewards;

3. The iterative use of the vision as a source of motivation and inspiration for staff and a driver for continuous improvement;

4. Clear distinctions between the roles of the facilitator, top level management, the assessment and audit teams, and other staff, and their integration into the learning process;

5. Joint involvement of the facilitator, management and staff in the design of the programme;

6. The involvement of management at key stages where their leadership can work to enhance commitment, ensure progress and their support can be gained for action, and

7. The inclusion of distinct types of activities (in addition to visioning) that are used strategically to bring about iterative and critically reflective learning processes within the organisation.

The key elements in the model are: diagnosis, design, initiation, visioning, assessment of status, focusing, auditing, action, evaluation and communication (see Fig. 5.3). An important feature is that the model recognises the need for people to play different roles and emphasises this by incorporating them at various stages in the model. assessment of the status of the business in relation to the vision; short, focused audits that address strategically important areas where there is a mismatch between status and vision; actions based on the results of the audits; evaluation of actions in relation to the vision, and communication of results.

It is important to note that the model has been developed to provide a bridge between theory and practice. It is therefore idealistic in nature. It is intended to be used as a basis for reflecting on current practices and inventing new ones. It is anticipated that it would need to be modified to suit the characteristics of individual organisations (and facilitators). It is envisaged that the first few stages in a programme using the model, would be used to design a programme to suit the culture and needs of the particular organisation. Before discussing ways in which the model could be adapted to suit particular needs, it is useful to consider what it is designed to do in an ideal situation. In recognition of the importance of the people involved, it is described below in terms of their roles.

The model differs from other programmes in that it recognises the importance of an external facilitator, and enhances and defines their role. Ideally, the *FACILITATOR* will contribute to the programme by undertaking a scouting exercise whereby s/he will gain preliminary insight into the business, including its activities, staff and their relationships, power sources, culture, attitudes and motivation, resources available, potential limitations. This will enable the facilitator to prepare for the programme by reflecting on the theories-in-use in the business that may need to be changed for sustainability to be achieved. S/he will also use the knowledge gained as a basis for identifying an entry point and establishing a collaborative relationship that will maximise the potential for a successful programme. Formalisation of the relationship will include consideration of the criteria that will be used to determine when and how it will be terminated.

Figure 5.3. The proposed model for improving the effectiveness of sustainability programmes in business.
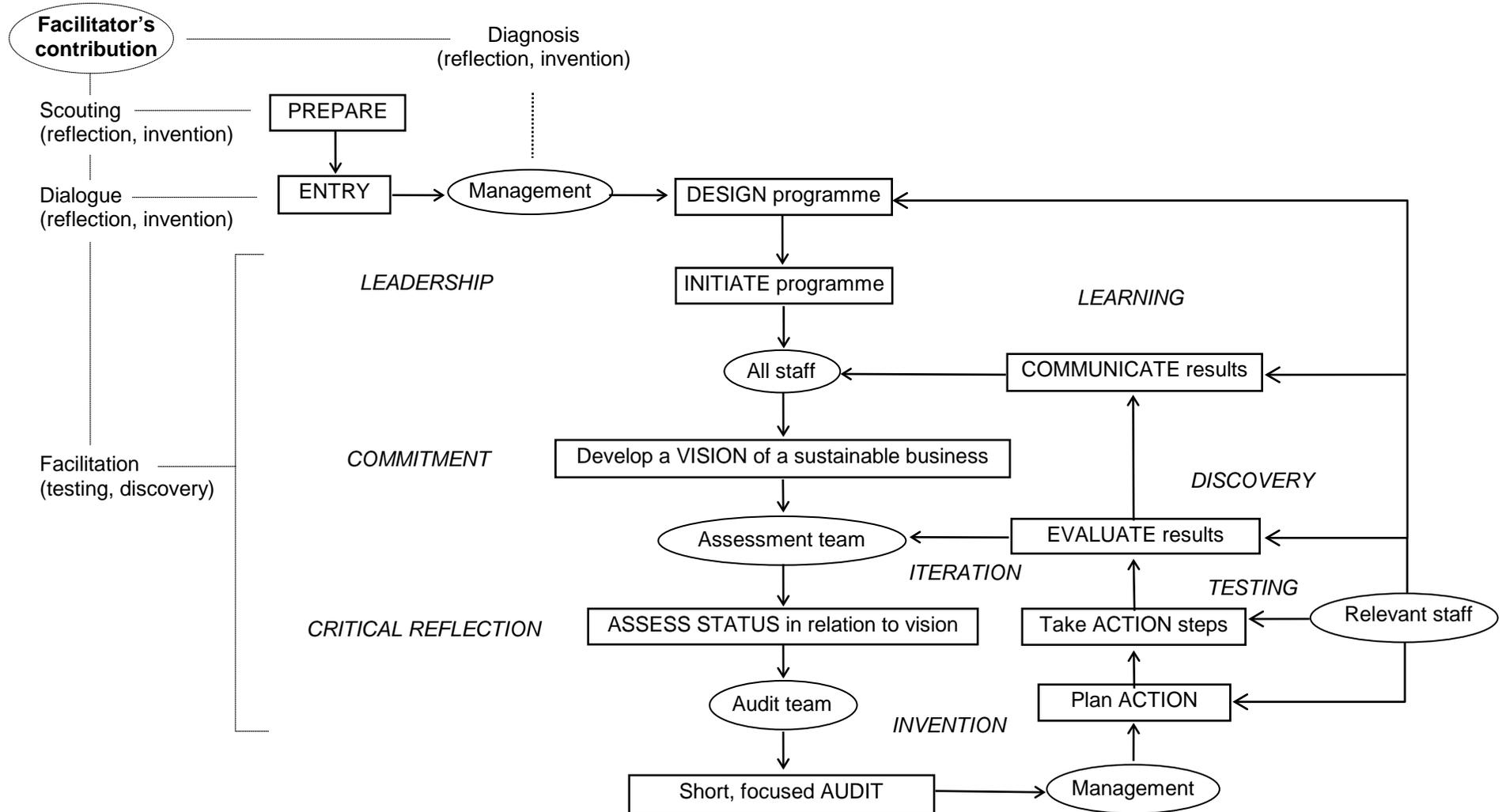
The facilitator will then work with management to design an appropriate programme, recognising that phases subsequent to the visioning process will be subject to the results of previous phases. S/he will then facilitate the visioning process, the establishment of the assessment and audit teams and prepare them for the tasks they choose to undertake. S/he will facilitate communication of the results of the assessment and audits to management, assist management where necessary in the planning, undertaking and evaluation of actions. S/he will also facilitate communication of the action evaluation to all staff and any re-assessment that needs to occur. The facilitator will undertake her/his own iterative, critically reflective learning process during the course of the programme, S/he will reflect on her/his own theories-in-use, invent and test new ones, and adjust the process according to what s/he discovers.

The model differs from others in that it includes components that work to draw in as many staff as possible in a variety of ways. Ideally, *ALL STAFF* will contribute to the programme by participating in the visioning process and accepting responsibility as stewards of the vision. They will reflect on the vision and the extent to which existing theories-in-use and practices do/don't contribute to the vision. They will use this reflection as the basis for identifying theories-in-se where improvements could be made and for selecting members of the preliminary assessment team. They will consider the relevance of the actions (once evaluated) in relation to vision, and reflect on the validity of the theories-in-use that were tested. They will use this information as a basis for identifying new areas for improvement and subsequent assessment teams. They will reflect on their own theories-in-use and the way in which they do or don't contribute to the vision. They will invent and test new ones and apply what they learn in their daily activities. They will be supported in their endeavours by management, and they will provide a supportive environment for others to do the same.

The model differs from others in that it incorporates management at key stages. This serves to ensure that they are well aware of the progress being made and are able to provide leadership and governance. Ideally, *MANAGEMENT* will provide the facilitator with access to the business' facilities and staff for preparatory purposes. Management will work with the facilitator to develop an appropriate programme for the business, will establish a formal collaborative relationship with him/her (including criteria for termination), and will extend

access for the duration of the contract. Management will provide leadership without domination, by developing an appropriate mechanism for informing staff of the project and involving them in the visioning process. Management will undertake their own iterative, critically reflective learning process by reflecting on their own theories-in-use regarding management, staff and the vision. They will use their reflections to invent and test new theories-in-use, and will adjust their actions on the basis of what they discover. They will confirm the responsibilities of staff who have been selected for assessments, audits and action, and they will provide the support necessary for relevant tasks to be undertaken (time and resources). They will reflect on the results of the audits, identify relevant staff and work with them to develop appropriate action plans. They will allocate responsibility and provide support for action steps and evaluation. They will reflect on the outcomes of the evaluations and will use their reflections as the basis for developing and actioning a means whereby they will be communicated to all staff. They will use this communication process to lead staff into the next cycle of assessment, audit and action.

The model differs from others in that it distinguishes between an assessment team that assesses the status of the organisation in relation to the vision and an audit team that conducts the audit. This is because the two may require quite different skills. The former may require in-depth knowledge of the organisation and strategic abilities, while the latter is likely to require technical skills. It would probably be ideal for there to be some overlap between the teams to ensure that their efforts are integrated.

Ideally, the *ASSESSMENT TEAM* will assess the status of the business in relation to vision. They will do so by considering the theories-in-use that will be necessary for the vision to be achieved, and comparing them with existing theories-in-use. They consider the difference between existing vs. envisioned theories-in-use and will identify areas that will be most useful for inventing, testing and discovering new theories-in-use for achieving the vision. They will use this reflection as a basis for identifying members of the audit team. They will select members of the audit team on the basis of their involvement, knowledge and experience in the area of interest, and the skills that they will be able to apply to the task. They will communicate with management over the selection of the team and will gain their support. The assessment team will brief the audit team and interact with and support them during the audit. For subsequent assessments, the assessment team will reflect on how well the actions have

contributed to the attainment of the vision. They will use this reflection as a basis for identifying new areas upon which to focus. Where necessary, they will select new audit team members. Like other groups, members of the assessment team will undertake their own iterative, critically reflective learning process. They will reflect on their own existing theories-in-use, discuss them with other team members, and work together to invent and test new ones, and adjust their behaviour accordingly.

The model differs from others in that the audits are only part of the programme, and are designed to drive the learning process. Their area of focus is chosen strategically so that they maximise the potential for learning to occur (during the audit, and as a result of outcomes). The purpose of the audit is to identify areas where actions can occur and to generate results that can be used to help to motivate and encourage staff and enhance management commitment.

Ideally, the *AUDIT TEAM* will conduct a short, focused audit of an area identified by the assessment team. The purpose of the audit will be to provide specific information that will contribute to the iterative, critically reflective learning process. The audit team will work with the facilitator to reflect on the vision and the area/s of interest identified by the assessment team. They will identify areas upon which they could focus and select one, based on the potential that the area of focus has for contributing to organisational learning. They will consider the CP/PP methods and tools that are available to them for conducting the audit (e.g. a walk-through of the plant, an input/output analysis, materials or process maps). They will select an appropriate method and tools, and plan the audit. They will communicate with management regarding their plan and their needs (in terms of skills, time and other resources). They will conduct the audit and identify options for improvement. They will work with the facilitator to communicate the results of the audit to management. Because of their close involvement with the area in question, the audit process will provide audit team members with the opportunity to use the audit process as a basis for undertaking their own iterative, critically reflective learning process.

The model differs from others in that it recognises that staff other than those involved in the assessment and audits may be necessary for the results of the audit to be turned into action.

Ideally, *RELEVANT STAFF* will be selected by management to work with them to develop, plan, undertake and evaluate actions in response to the results of the audit. If appropriate, relevant staff will include assessment and/or audit team members. The action plan will include requirements such as staff, time, training and other resources. It will also include a timeline, the criteria that will be used for evaluating the actions and the means whereby the monitoring will occur. Once they have carried out and evaluated the actions, the relevant staff will work with the facilitator to communicate the results to management. Again, they will use the opportunity to undertake their own iterative, critically reflective learning process.

As mentioned earlier, the model was developed using the results of the TZ project evaluation combined with relevant developments in organisation theory. The contribution that each element makes in terms of the TZ results and the discussion is presented graphically in Fig. 5.4. The model has been simplified by separating primary responsibilities from programme elements. A red overlay is used to identify elements that were included in response to the conclusions that were drawn from the TZ evaluation and the discussion. A blue overlay is used to show how the elements contribute to a critically reflective, iterative learning process.

The model could be criticised for being too idealistic. The evaluation of the TZ project has shown that considerable difficulties can be associated with the implementation of what could, in hindsight, be considered to be a relatively simple set of tasks. Some of the tasks included in the model make it considerably more complex and challenging than traditional EM/CP/PP programmes. One example is the strengthening of the facilitator's role (e.g. the preparatory phase and the diagnostic requirements). Another is the inclusion of all staff in the visioning process. Implementation of the model would still rely heavily on the motivation of managers and staff. Not least amongst the issues that would need to be addressed would be the gap between the existing and desired needs, skills and expectations of facilitators, as well as managers and staff.
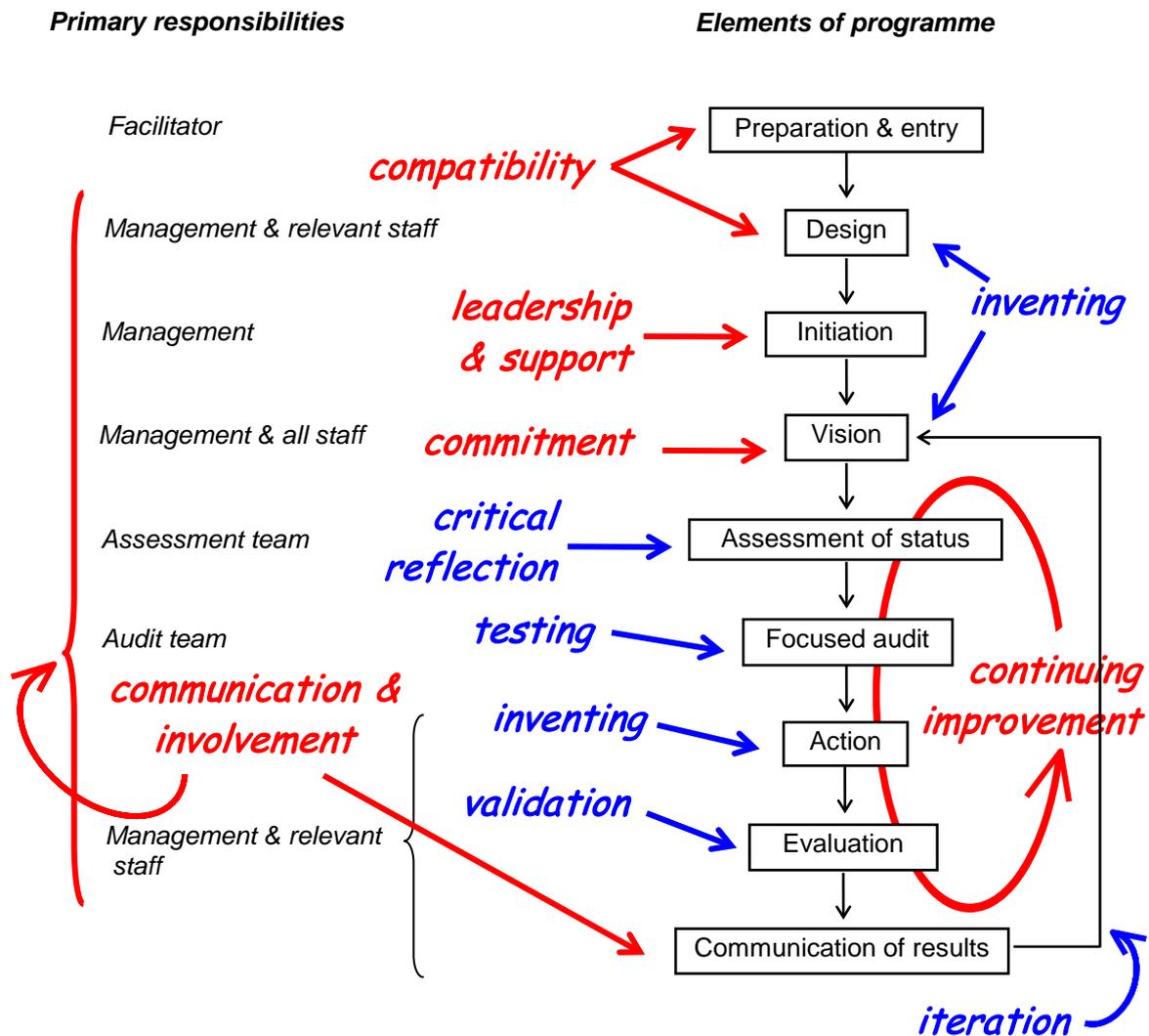
Figure 5.4. A simplified version of the model with responsibilities and programme elements shown separately. The red overlays identify elements that were included in response to the conclusions drawn from the TZ evaluation. The blue overlays identify how the elements contribute to a critically reflective, iterative learning process.

It is important to emphasise that the model is intended to be used as a basis for improving programmes. It is not intended as a one-size-fits-all panacea that will work as it is in all organisations. It is intended to assist practitioners to critically reflect on the programmes they use and consider a broader range of elements than those that they currently use.

The customisation of the model will depend to a large extent on the work that is done by the facilitator in the preparatory phases. It is intended that this will determine whether, when and

how different elements of the model are applied. The "entry" phase provides an example of how programmes based on the model could differ. Experience suggests that it will not be possible to gain entry at a senior management level for all organisations. The facilitator needs to use his/her knowledge of the organisation to make a strategic decision on where best to gain entry. The choice of entry level could depend on the level at which support for the project occurs. For example, a relatively high level of support from an operations manager, but only nominal support at higher levels, may make it appropriate to enter at the operations level. An iterative cycle of short, focused audits could be used strategically to notch up support to the point where the visioning phase could become possible. While the audit-based approach may appear similar to the approach used in the TZ project, it is quite different. The main difference is the strategic approach to the audit and the choice of an area of focus that would have the greatest strategic value.

A glaring issue in all this is, of course, the competence of the facilitator. In order to facilitate the implementation of the model, practitioners need to be educated on the importance of organisational factors and they need to develop the skills necessary to facilitate change and learning. Or they need to begin to work with others who have these types of knowledge and skills. A useful next step after this thesis may be the development of a set of diagnostic tools that can be used by facilitators to help them in the preparatory phase.

It is clear that much still needs to be done before we can have confidence that sustainability programmes for business are working. The model presented above has resulted from the learning process that I have undergone during the course of this thesis. It is not intended to be prescriptive, but rather to be used as a basis for critical reflection of current practice. I am confident that, when used as such it will contribute to the knowledge and practice of sustainability in businesses.

5.6   Conclusions

In this thesis, I have sought to critically examine sustainability programmes for business. I have done so by considering their place and practice within the context of historical developments in organisation theory. My thesis was that this would provide insight that could be used to improve not only the uptake, but also the effectiveness and durability of the

changes undertaken as a result of such programmes.

I tested my thesis by: 1) considering developments in organisation theory that are of relevance to organisational change; 2) evaluating the effectiveness of an example of a sustainability programme for business, and 3) discussing the results of the evaluation within the context of relevant theoretical developments. I used the theory, results and discussion to develop a model that can be used as the basis for improving the effectiveness of environmental sustainability programmes for business.

The thesis began with the assertion that the social context within which businesses operate is important because it drives as well as constrains change. It seems appropriate therefore to end it by considering the application of the model within the social context within which businesses operate.

Key features of this social context are:

– the traditional, but still pervasive focus on short-term profits and shareholder wealth as primary drivers for business, and

– the paradoxical nature of the business/environment relationship whereby environment is considered to be peripheral to business activity.

It would be naïve to think that the model could work in isolation to overcome the enormous challenges that practitioners face in trying to bring about changes within this context. However, the model (and the thesis itself) provides an example of a critically reflective approach to a particular part of the sustainability puzzle. In concurrence with that approach it will now need to be further developed and tested, so that myself and others can reflect on its validity and the learning process can continue.

The best we can hope for in pursuit of sustainability is for all our endeavours in this regard to be subjected to an iterative, critically reflective learning process. We need to continually challenge the assumptions we have about the approaches we take and the methods we use. And we need to keep inventing, testing and discovering new ones. Only then, will sustainability become a reality.

References

Allen, W. and M. Kilvington. 2000. Effective teams in Target Zero waste reduction programmes. Contract Report, Landcare Research, Lincoln.

Alvesson, M. 1993. "Cultural perspectives on organizations." Cambridge University Press, Cambridge.

Alvesson, M. and S. Deetz. 1996: Critical theory and post-modernism approaches to orgganizational studies. In: S. R. Clegg, C. Hardy and W. R. Nord (Eds.), "Handbook of Organization Studies", Sage, London. pp191-217

Anderson, J. C., M. Rungtusanatham and R. G. Schroeder. 1994. A theoretical model of total quality management. *Academy of Management Review* 19 (3): 472-509.

Anderson, R. C. 1998. "Mid-Course Correction: Toward a sustainable enterprise: The Interface model." Chelsea Green, White River Junction, VT.

Anderson, W. T. 1995. "The Truth about Truth: De-confusing and Reconstructing the Postmodern World." Putnam, New York.

Andreson, L., D. Boud and R. Cohen. 1995. Experience-based learning. In: G. Foley (Ed.), "Understanding Adult Education and Training", Allen and Unwin, St. Leonards, NSW. pp207-219

Anon. 1996. Inequality: Still on the Rise. US News Online, http://www.usnews.com/usnews/issue/1weal.htm

Argyris, C. and D. A. Schön. 1974. "Theory in Practice: Increasing Professional

Effectiveness." Jossey-Bass, San Francisco.

Argyris, C. 1999. "On Organizational Learning." (2nd Ed.) Blackwell, Malden, Mass.

Argyris, C. and D. A. Schön. 1996. "Organizational Learning II: Theory, Method and Practice." Addison-Wesley, Reading, Mass.

Astley, W. G. and P. S. Sachdeva. 1984. Structural Sources of Intra-organizational power: A Theoretical Synthesis. *Academy of Management Review* January: 104-113.

Averill, J. R. 1987. The role of emotion and psychological defense in self-protective behaviour. In: N. D. Weinstein (Ed.) "Taking Care: Understanding and encouraging self-protective behaviour." Cambridge University Press, Cambridge.

Ayres, E. 1998. Note from a Worldwatcher: Bigness and Disconnection. *World Watch* March /April.

Baas, L. W., M. van den Belt, D. Huisingh and F. Neumann. 1992. Cleaner Production: what some governments are doing and what all governments can do to promote sustainability. *Eur. Water Pollution Control* 2(1): 10-25.

Bacharach, S. B. and E. J. Lawler. 1980. "Power and politics in organizations." Jossey-Bass, San Francisco.

Bandura, A. 1969. "Principals of Behaviour Modification." Holt, Rheinholt and Winston, New York.

Bandura, A. 1977. "Social Learning Theory." Prentice Hall, New Jersey.

Barnard, C. 1938. "The Functions of the   Executive." Harvard University Press,

Cambridge.

Barrett, G. 1993. International trade and the environment. In: B. Jolly and I. Holland (Eds.), "Proceedings of the Ecopolitics Conference", Griffith University, Brisbane. pp 37-49

Barrett, S. M. and D. F. Murphy. 1996. Managing corporate environmental policy: A process of complex change. In: W. Wehrmeyer (Ed.), "Greening People", Greenleaf, Broom Hall, UK. pp75-98

Baum, J. A. C. 1996. Organizational Ecology. In: S. R. Clegg, C. Hardy and W. R. Nord (Eds.), "Handbook of Organization Studies", Sage, London.

BCSD. 1992. "Changing Course: A Global Business Perspective on Environment and Development." MIT Press, Cambridge, Massachusetts.

Beckhard, R. 1969. "Organization Development: Strategies and models." Addison-Wesley, Reading, Mass.

Beckhard, R. and R. T. Harris. 1977. "Organizational Transitions: Managing complex change." Addison-Wesley, Reading, Mass.

Beckhard, R. and W. Pritchard. 1992. "Changing the Essence." Jossey-Bass, San Francisco.

Beder, S. 1997. "Global Spin: The corporate assault on environmentalism." Scribe, Melbourne.

Bennis, W. G. 1966. The coming death of bureaucracy. *Think* Nov/Dec: 30-35.

Bird, A. 1996. Training for environmental improvement. In: W. Wehrmeyer (Ed.),

"Greening People", Greenleaf, Broom Hall, UK. pp 227-246.

Block, P. 1993. "Stewardship: Choosing service over self interest." Berrett-Koehler, San Francisco.

Boons, F. and D. Huisingh. 1992. Cleaner Production: the roles of non-governmental organizations and individuals in stimulating its implementation within corporations. *Eur. Water Pollution Control* 2(6): 40-48.

Bower, M. 1966. "The Will to Manage." McGraw-Hill, New York.

Bower, J. L. 1970. "Managing the Resource Allocation Process." Harvard University Press, Harvard.

Brown, G. 2000. "You too can profit from cleaner production and waste minimisation" and "Coordinating cleaner production programmes: Lessons from Target Zero." Brochures reporting the results of the Target Zero project, produced by Ecosense with funding from NZ Ministry for the Environment and Meridian Energy, Wellington.

Bryman, A. 1996. Leadership in Organizations. In: S. R. Clegg, C. Hardy and W. R. Nord (Eds.), "Handbook of Organization Studies", Sage, London. pp276-292

Burgoyne, J. and M. Reynolds (Eds.). 1997. "Management Learning: Integrating Perspectives in Theory and Practice." Sage, London.

Burns, T. 1963. Industry in a new age. *New Society* January; 17-20.

Burns, T. and G. M. Stalker. 1961. "The Management of Innovation." Tavistock, London.

Burrell, G. and G. Morgan. 1979. "Sociological Paradigms and Organizational Analysis."

Heinemann, London.

CAE. 1992. "Our Waste, Our Responsibility: Towards sustainable waste management in New Zealand." Project Report, Centre for Advanced Engineering, University of Canterbury, Christchurch, NZ.

Calás, M. and L. Smircich. 1991. Voicing seduction to silence leadership. *Organizational Studies* 12: 567-601.

Campbell, M. E. and W. M. Glenn. 1982. "Profit from Pollution Prevention: A guide to Industrial Waste Reduction and Recycling." Pollution Probe Foundation, Toronto, Canada.

Carey, A. 1982. The Hawthorne Studies: A radical criticism. *American Sociological Review* June: 403-416.

CEST. 1995. Waste Minimisation and Cleaner Technology: An assessment of motivation in the Aire and Calder experience." Centre for Exploitation of Science and Technology, London.

Chadwick, B. A., H. M. Bahr and S. M. Albrecht. "Social science research methods." Prentice Hall, NJ.

Chandler, A. D. 1962. "Strategy and Structure." MIT Press, Cambridge, Mass.

Chandak, R. P. 1994. Demonstrating Cleaner Production in SMES in India: UNIDO-NPC experience of project "DESIRE (Demonstration in Small Industries for Reducing Waste)". In: Proceedings of the Third High Level Advisory Seminar on Cleaner Production, UNEP-IE, 12-14 October, Warsaw.

Child, J. 1972. Organization structure, environment and performance: The role of strategic

choice. *Sociology* Jan.: 1-22.

Clegg, S. 1989. "Frameworks of Power." Sage, London.

Clegg, S. R., C. Hardy and W. R. Nord (Eds.). 1996. "Handbook of Organization Studies", Sage, London.

Clegg, S. R. and C. Hardy. 1996. Organizations, Organization and Organizing. In: S. R. Clegg, C. Hardy and W. R. Nord (Eds.), "Handbook of Organization Studies", Sage, London.

Coch, L. and J. French. 1948. Overcoming resistance to change. *Human Relations* 1: 512-532.

Colborn, T., D. Dumanoski and J. P. Myers. 1996. "Our Stolen Future." Abacus, London.

Conger, J. A. 1992. "Learning to lead: The art of transforming managers into leaders." Jossey-Bass, San Francisco.

Connett, P. 1998. Presentation as part of the Seminar Series of the School of Environmental and Marine Sciences, University of Auckland.

Cook, T. D. and D. T. Campbell. 1979. "Quasi-experimentation: Design and analysis issues for field settings." Rand McNally, Chicago.

Cooper, R. 1992. Formal organization as representation: Remote control, displacement and abbreviation. In: " M. Reed and M. Hughes, "Rethinking Organization: New Directions in Organizational Theory and Analysis", Sage, London. pp254-72.

Coopers and Lybrand. 1993. "Environmental Management Practice: A survey of major

New Zealand organisations." Coopers and Lybrand Consultants, Auckland.

Cray, D. and G. R. Mallory. 1998. "Making Sense of Managing Culture." International Thomson Business Press, London.

CSS. 2000. Publications: Research definitions. Centre for Sustainable Systems, University of Michigan, Ann Arbor. Website http://www.umich.edu/~nppcpub/research/defn.html

Cummings, T. G. and C. G. Worley. 1997. "Organization Development and Change." (6th Ed.). South Western College Publishing, Cincinnati, Ohio.

Cushman, D. P. and S. S. King. 1995. Communicating Organizational Change. In: "Communicating Organizational Change: A Management Perspective", State University of New York Press, Albany, New York.

Davis, K. and R. L. Blomstrom. 1971. "Business, Society, and Environment." 2nd ed. McGraw-Hill, New York.

Dawson, P. and G. Palmer. 1995. "Quality Management: The theory and practice of implementing change." Longman, Sydney.

Deal, T. E. and A. A. Kennedy. 1982. "Corporate Cultures: The Rites and Rituals of Corporate Life." Addison-Wesley, Reading, Mass.

de Bruijn, T. J. N. M. and P. S. Hofman. 2000. Pollution prevention and industrial transformation: Evoking structural changes within companies. *Journal of Cleaner Production* 8: 215-223.

Deci, E. L. and R. M. Ryan. 1985. Intrinsic motivation and self-determination in human behaviour. Plenum, New York.

Deeks, J. 1993. "Business and the Culture of the Enterprise Society." Quorum, Westport, Connecticut.

Deeks, J. and N. Perry (Eds.). 1992. "Controlling interests: Business, the state and society." Auckland University Press, Auckland.

de Hoo, S., H. Brezet, M. Crul and H. Dieleman (Eds.). 1991. "Manual for the Prevention of Wastes and Emissions." Netherlands Ministry of Economic Affairs, The Hague.

Deming, W. E. 1951. Elementary Principles on the Statistical Control of Quality. Nippon Nagaku Gijutsu Remmei, Tokyo.

Deming, W. E. 1986. "Out of the Crisis." MIT Centre for Advanced Engineering Study, Cambridge, Mass.

Deming, W. E. 1993. 'The New Economics for Industry, Government, Education." MIT Centre for Advanced Engineering, Cambridge, Mass.

Denzin, N. K. 1989. "The Research Act: A theoretical introduction to sociological methods." (3rd ed.) Prentice-Hall, Englewood Cliffs, NJ.

De Vaus, D. A. 1991. "Surveys in social research." 3rd ed. Allen and Unwin, London.

Dewey, J. 1933. "How we think." D. C. Heath and Co., Boston.

Dieleman, H. and S. de Hoo. 1991. PRISMA: The development of a preventative, multimedia strategy for government and industry. Erasmus Centre for Env. Studies, Erasmus University, Rotterdam, and The Netherlands Organisation for Technology Assessment, The Hague.

DiMaggio, P. J. and W. W. Powell. 1983. The iron cage revisited: Institutional isomorphism and collective rationality in organizational fields. *American Sociological Review* 48: 147-60.

Dobers, P. and R. Wolff. 1996. Managing the learning of ecological competence. In: W. Wehrmeyer (Ed.), "Greening People", Greenleaf, Broom Hall, UK. pp271-288

Dyck, B. 1994. Build in sustainable development and they will come: A vegetable field of dreams. *Journal of Organizational Change* 7(4): 47-63.

Donaldson, L. 1996. The Normal Science of Structural Contingency Theory. In: S. R. Clegg, C. Hardy and W. R. Nord (Eds.), "Handbook of Organization Studies", Sage, London. pp 57-76

Durkheim, E. 1947. "The Division of Labor in Society". Translated by G. Simpson. Free Press, Glencoe, Ill.

Durning, A. 1995. "How much is enough? The consumer society and the future of the earth." Worldwatch Institute, Washington D.C.

ECNZ. 1996. "Waste Minimisation Programme: How to improve profits and help sustain the environment by reducing waste." Electricity Corporation of NZ, Wellington.

Eden, C. and C. Huxham. 1996. Action research for the study of organizations. In: S. R. Clegg, C. Hardy and W. R. Nord (Eds.), "Handbook of Organization Studies", Sage, London. pp 526-542

Eisler, R. 1994. From domination to partnership: The hidden subtext for sustainable change. *Journal of Organizational Change* 7(4): 32-46.

Ellis, L. 1994. "Research methods for the social sciences." Mc-Graw-Hill, New York.

Fayol, H. 1949. "Industrial and general administration." Pitman, London.

Field, L. 1995. Organisational learning: Basic concepts. In: G. Foley (Ed.), "Understanding Adult Education and Training", Allen and Unwin, St. Leonards, NSW. pp151-164.

Fineman, S. 1996. Emotional subtexts in corporate greening. *Organization Studies* 17(3): 479-500.

Fisher, R. A. 1935. The logic of inductive inference. *Journal of the Royal Statistical Society* Series A, 98: 39-54.

Flavin, C. and J. E. Young. 1993. Shaping the next industrial revolution. In: L. R. Brown *et al*, "State of the World, 1993." W. W. Norton & Co., New York.

Foley, G. 1995. A framework for understanding adult learning and education. In: G. Foley (Ed.), "Understanding adult education and training." Allen & Unwin, St. Leonards, N.S.W., Australia.

Follett, M. 1918. "The new state." Longman, Green and Co., London.

Foucault, M. 1980. "Power/Knowledge." Pantheon, New York.

Frankfort-Nachmias, C. and D. Nachmias.1996. "Research methods in the social sciences." (5th ed.). Arnold, London.

Frederick, W. C., K. Davis and J. E. Post. 1988. "Business and Society: Corporate Strategy, Public Policy. Ethics." (6th ed.). McGraw-Hill, New York.

French, J. R. P. and B. H. Raven. 1959. The Bases of Social Power. In: D. Cartwright (Ed.), "Studies in Social Power", Institute for Social Science Research, University of Michigan, Ann Arbor, Michigan.

French, W. L. and C. H. Bell. 1984. A history of organization development. Reprinted in: French, W. L., C. H. Bell, Jr. and R. A. Zawacki (Eds.). 1994. "Organization Development and Transformation: Managing Effective Change" (4th ed.). Irwin/McGraw-Hill, New York. pp 25-40.

French, W. L., C. H. Bell, Jr. and R. A. Zawacki (Eds.). 1994. "Organization Development and Transformation: Managing Effective Change" (4th ed.). Irwin/McGraw-Hill, New York.

French, W. L. and C. H. Bell, Jr. 1995. " Organization Development: Behavioural Science Interventions for Organization Improvement." Prentice Hall, Englewood Cliffs, NJ.

 Frosch, R. A. and N. E. Gallopoulos. 1989. "Strategies for Manufacturing." *Scientific American* September: 144-152.

Futornick, K. 1995. Total quality environmental management: Managing corporate change. In: T. E. Higgins (Ed.), "Pollution Prevention Handbook", Lewis, Boca Raton, Fla.

Galbraith, J. 1973. "Designing Complex Organizations." Addison Wesley, Reading, Mass.

GEMI. 1992. "Environmental Self-Assessment Program." Global Environmental Management Initiative, Washington D. C.

Goffman, E. 1967. "Interaction Ritual: Essays on Face-to-Face Behaviour." Penguin, Harmondsworth, Middlesex.

Gore, A. 1992. Environmentalism of the Spirit. In: "Earth in the Balance: Forging a New Common Purpose." Earthscan Publications Ltd., London.

Greenpeace. 1992. "Greenwash." Greenpeace International, Amsterdam.

GRI. 2000. "Sustainability Reporting Guidelines on Economic, Environmental, and Social Performance." Global Reporting Initiative, Boston, Mass. Website http://www.globalreporting.org

Grint, K. 1991. "The Sociology of Work: An introduction." Polity Press, Cambridge, UK

Hampden-Turner, C. 1990. "Charting the corporate mind." Free Press, New York.

Hampden-Turner, C. and F. Trompenaars. 1993. "The Seven Cultures of Capitalism: Value systems for creating wealth in the United States, Britain, Japan, Germany, France, Sweden and the Netherlands." Piatkus, London.

Harper, C. L. 1996. "Environment and Society: Human Perspectives on Environmental Issues." Prentice Hall, Upper Saddle River, New Jersey.

Harrington, H. J. and A. Knight. 1999. ISO14000 Implementation: Upgrading your EMS effectively." McGraw-Hill, New York.

Hawken, P. 1993. "The Ecology of Commerce: A Declaration of Sustainability." Phoenix, London.

Hechter, M. 1990. "Social Institutions: their Emergence, Maintenance, and Effects." Aldine de Gruyter, New York.

Hewison, G. 1995. "Reconciling trade and the environment: Issues for New Zealand."

Institute of Policy Studies, Victoria University of Wellington, NZ.

Higgins, T. E. (Ed.). 1995. "Pollution Prevention Handbook". Lewis, Boca Raton, Fla.

Hillary, R. 1999. "Evaluation of study reports on the barriers, opportunities and drivers for small and medium sized enterprises in the adoption of environmental management systems. Report submitted to the Environment Directorate, UK Dept. of Trade and Industry, London.

Hirschhorn, J. S. and K. U. Oldenburg. 1991. "Prosperity without Pollution: The prevention strategy for industry and consumers." Van Nostrand Reinhold, New York.

Hofstede, G. 1980. Motivation, leadership and organisations: Do American theories apply abroad? *Organizational Dynamics* Summer: 42-43.

Homans, G. C. 1951. "The Human Group." Routledge and Kegan Paul, London.

Huisingh, D. 1989. Cleaner technologies through process modifications, material substitutions and ecologically based ethical values. *UNEP Industry and Environment* 12(1): 5-8

Huisingh, D. and V. Bailey (Eds.). 1982. "Making Pollution Prevention Pay: Ecology with Economy as Policy." Pergamon Press, New York.

Huisingh, D. and L. W. Baas. 1991. Cleaner production: The most effective approach to achieving improved water quality. *European Water Pollution Control* 1(1): 24-30.

Huisingh, D., L. Martin, H. Hilger and N. Seldman. 1986. "Proven Profits from Pollution Prevention: Case Studies in Resource Conservation and Waste Reduction." Institute for local Self-Reliance, Washington D. C.

Hurst, D. K. 1995. "Crisis and Renewal: Meeting the challenge of organizational change." Harvard Business School Press, Boston.

Hutchinson, A. and F. 1996. "Environmental Business Management: Sustainable Development in the New Millennium." McGraw-Hill, London.

ICC. 1991. Business Charter for Sustainable Development: Principles for Environmental Management. International Chamber of Commerce, Paris. Website http://www.iccwbo.org/sdcharter/charter/principles/principles.asp

INEM. 2000. "Case Studies in Environmental Management." International Network for Environmental Management, website: http://www.inem.org/htdocs/inem_casestudies.html

IPS/UFE. 1999. "A Decade of Executive Excess: The 1990s Sixth Annual Executive Compensation Survey." Institute for Policy Studies, Washington D. C. and United for a Fair Economy, Boston, MA. Website http://www.ufenet.org/press/decade_of_executive_excess.html

Inkson, K. and D. Kolb. 1998. "Management: Perspectives for New Zealand." Second ed. Addison Wesley Longman, Auckland.

IPS/UFE. 1999. "A Decade of Executive Excess: The 1990's." Institute for Policy Studies and United for a Fair Economy, Washington D.C.

Jackson, T. (Ed.) 1993. "Clean Production Strategies: Developing preventive environmental management in the industrial economy." Lewis Publishers, Boca Raton, Florida.

Jackson, T. 1996. "Material Concerns: Pollution, profit and quality of life." Routledge, London.

James, P. and S. Stewart. 1996. The European environmental executive: Technical specialist or corporate change agent? In: W. Wehrmeyer (Ed.), "Greening People", Greenleaf, Broom Hall, UK. pp143-161

Jarvis, P. 1995. "Adult and Continuing Education: Theory and practice." (2nd ed.). Routledge, London.

Jencks, C. 1986. "What is Post-Modernism?" St. Martin's Press, New York.

Joseph, M. 1989. "Sociology for Business." Polity Press, Cambridge, U. K.

Kalundborg Centre for Industrial Symbiosis. 1996. "Industrial Symbiosis: Exchange of Resources." Kalundborg Centre for Industrial Symbiosis, Denmark.

Juran, J. M. (Ed. in Chief) and F. M. Gryna (Assoc. Ed.). 1988. "Juran's Quality Control Handbook." (4th ed.) 1st ed. published in 1951, entitled "Quality Control Handbook", McGraw-Hill, New York.

Kanter, R. M. 1979. Power Failure in Management Circuits. *Harvard Business Review* Jul/Aug: 65-75.

Katz, D. and R. L. Kahn. 1966. "The Social Psychology of Organizations." John Wiley, New York.

Keogh, P. D. and M. J. Polonsky. 1998. Corporate commitment to the natural environment: Issues in a team approach. In: J. Moxen and and P. A. Strachan (Eds.), "Managing Green Teams: Environmental change in organisations and networks". Greenleaf, Broom Hall, Sheffield.

Kernot, C. 1993. Greening the GATT – A paper on trade and environment issues. In: B.

Jolly and I. Holland (Eds.), "Proceedings of the Ecopolitics Conference", Griffith University, Brisbane. pp27-36

Klinkers, L. and N. Nelissen. 1996. Employees give business its green edge. In: W. Wehrmeyer (Ed.), "Greening People", Greenleaf, Broom Hall, UK. pp213-224

Kolb, D. A. and A. L. Frohman. 1970. An organization development approach to consulting. *Sloan Management Review* 12: 51-65.

Kotter, J. P. 1990. "A Force for Change: How leadership differs from management." Free Press, New York.

Kotter, J. P. and L. A. Schlesinger. 1979. Choosing strategies for change. *Harvard Business Review* 57(2): 111.

Lawrence, P. R. and J. W. Lorsch. 1967. "Organization and Environment: Managing differentiation and integration." Harvard University Press, Boston.

Lawrence, P. R. and J. W. Lorsch. 1969. "Developing Organizations: Diagnosis and action." Addison-Wesley, Reading, Mass.

Leavitt, H. J. 1964. Applied organization change in industry. In: W. W. Cooper, H. J. Leavitt and M. W. Shelly II (Eds.), "New Perspective in Organization Research", Wiley, New York.

Ledgerwood, G., E. Street and R. Therivel. 1992. "The Environmental Audit and Business Strategy: A Total Quality Approach." Pitman, London.

Lewin, K. 1947. Frontiers in group dynamics: concept, method and reality in social science. *Human Relations* 1(1): 5-41.

Lewin, K. 1952. "Field theory in social science: selected theoretical papers." Published post-humously, D. Cartwright (Ed.), Tavistock, London.

Lickert, R. 1967. "The Human Organization: its management and value." McGraw-Hill, New York.

Lindsay, W. M. and J. A. Petrick. 1997. "Total Quality and Organization Development." St. Lucie Press, Delray Beach, Fla.

Lippett, R., J. Watson and B. Westley. 1958. "The Dynamics of Planned Change." Harcourt, Brace and World, New York.

Lukes, S. 1974. "Power: a Radical View." Macmillan, London.

3M Corporation. 1998. "3M Company Profile: Environment - Pollution Prevention Pays, The 3P Program." http://www.3m.com/profile/envt/3p.html

Machiavelli, N. 1513. "The Prince". Reprinted by Quality Paperbacks, New York.

MacKenzie, G. 1995. "Power and the Learning Organisation: Implications for Construction." Unpubl. Master's thesis, University of Auckland, Auckland.

Manfed/MfE. 1992. "The Environment and Manufacturing in New Zealand." NZ Manufacturers Federation, Ministry for the Environment, Wellington.

Manfed/MfE. 1993. "Environmental Management Handbook for Small Industry." NZ Manufacturers Federation, Ministry for the Environment, Wellington.

Mann, F. 1962. Studying and creating change. In: W. Bennis, K. Benne and R. Chin (Eds.), "The Planning of Change: Readings in Applied Behavioural Sciences", Rinehart and

Winston, New York. pp 605-615

March, J. G. and H. Simon. 1958. "Organizations." John Wiley, New York.

Martin, J. and P. Frost. 1996. The organizational culture war games: A struggle for intellectual dominance. In: S. R. Clegg, C. Hardy and W. R. Nord (Eds.), "Handbook of Organization Studies", Sage, London. pp599-621

Martin, L. 1989. "Proven profits from pollution prevention." Vol. II. Institute for Local Self-Reliance, Washington D. C.

Maslow, A. 1954. "Motivation and Personality." Harper and Row, New York.

Maxwell, J., S. Rothenberg, F. Briscoe and A. Marcus. 1997. Green schemes: Corporate environmental strategies and their implementation. *Califormia Management Review* 39(3): 118-134.

Mayo, E. 1933. "The human problems of an industrial civilisation." Macmillan, New York.

Mayo, E. 1945. "The Social Problems of an Industrial Civilization", Graduate School of Business Administration, Harvard University, Boston, Mass.

McAlister, A. 1987. Social learning theory and preventive behaviour. In: N. D. Weinstein (Ed.) "Taking Care: Understanding and encouraging self-protective behavior." Cambridge University Press, Cambridge.

McClelland, D.C. The Two Faces of Power. *Jnl. of International Affairs* 24(1): 29-47.

McGalliard, T., B. Clemes, M. Gresalfi, B. Fabens and E. Cohen-Rosenthal. 1997. Eco-industrial development and re-industrialization in Oak Ridge. Cornell University's Work

and Environment Initiative/James Madison University and Oak Ridge National Laboratory. Website http://www.cfe.cornell.edu/wei/BR97_FIN.HTM

McGregor, D. 1960. "The Human Side of Enterprise." McGraw-Hill, New York.

McGregor, D. 1967. "The Professional Manager", McGraw-Hill, New York.

McMichael, A. J. 1993. "Planetary Overload: Global environmental change and the health of the human species." Cambridge University Press, Cambridge.

Meadows, D. H., D. L. Meadows, J. F. Forrester and J. Randers. 1972. The Limits to Growth: A Report for the Club of Rome's Project on the Predicament of Mankind." Universe Books, New York.

Meadows, D. H., D. L. Meadows and J. Randers. 1992. "Beyond the Limits: Global Collapse or a Sustainable Future." Earthscan, London.

Merton, R. 1948. Manifest and latent functions. In: R. Merton (Ed), "Social Theory and Social Structure." Free Press, Glencoe, Illinois. pp. 37-59.

Meyer, J. and N. Allen. 1991. A three component conceptualisation of organizational commitment. *Human Resource Management Review* 1(1): 60-89.

Meyerson, D. and J. Martin. 1987: Cultural change: An integration of three different views. *Journal of Management Studies* 24: 623-48

MfE. 1994. "Cleaner Production Guidelines." NZ Ministry for the Environment, Wellington.

MfE. 1997a. "The State of New Zealand's Environment 1997." NZ Ministry for the

Environment, Wellington.

MfE. 1997b. National Waste Data report. NZ Ministry for the Environment, Wellington.

Miles, R. E. 1974. Organization development. In: G. Strauss, R. E. Miles, C. C. Snow and A. S. Tannenbaum (Eds.), "Organizational Behaviour: Research and Issues", Industrial Relations Research Association, Belmont, Calif.

Miles, R. E. and C. C. Snow. 1984. Fit, failure and the hall of fame. *California Management Review* 26(3): 10-28.

Milbrath, L. 1989. "Envisioning a sustainable society: Learning our way out." State University of New York Press, Albany, New York.

Miller, S. J., D. J. Hickson and D. C. Wilson. 1996. Decision-Making in Organizations. In: S. R. Clegg, C. Hardy and W. R. Nord (Eds.), "Handbook of Organization Studies", Sage, London. pp293-312.

Miner, J. B. 1992. "Industrial-Organisational Psychology." (2nd ed.). Mc-Graw-Hill, New York.

Mintzberg, H. 1975. The Manager's Job: Folklore and Fact. *Harvard Business Review* Jul/Aug: 41-61.

Morris, B. S. 2000. Corporate participation in a cleaner production voluntary initiative. MMgtStuds thesis, University of Waikato, Hamilton, NZ. unpubl.

Moxen, J. and P. A. Strachan (Eds.). 1998. "Managing Green Teams: Environmental change in organisations and networks." Greenleaf, Broom Hall, Sheffield.

Mueller, F. 1994. Teams between hierarchy and commitment: Change strategies and the 'internal environment'. *Journal of Management Studies* 3(5) [CHECK # & pages])

Newton, T. and G. Harte. 1997. Green business: Technicist kitsch? *Journal of Management Studies* 34(1): 75-98.

Nolan, R. L. and D. C. Croson. 1995. "Creative Destruction: A six stage process for transforming the organisation." Harvard Business School Press, Boston.

Nord, W. R. and S. Fox. 1996. The Individual in Organizational Studies: the great Disapppearing Act? In: S. R. Clegg, C. Hardy and W. R. Nord (Eds.), "Handbook of Organization Studies", Sage, London. pp148 -190

Normann, R. 1985. Developing capabilities for organizational learning. In: J. M. Pennings (Ed.), "Organizational Strategy and Change", Jossey-Bass, San Francisco. pp 217-248

North, K. and S. Daig. 1996. Environmental training in UK and German companies. In: W. Wehrmeyer. W. (Ed.). 1996. "Greening People", Greenleaf, Broom Hall, UK.

NUTEK. 1999. Design for environment in SME's: A Swedish national programme to promote design for the environment in Swedish SME's. In: Proceedings of the 6th European Roundtable on Cleaner Production, 29 Sept. 1 Oct., Budapest.

Oates, A. 1996. Industrial relations and environment in the UK. In: W. Wehrmeyer (Ed.), "Greening People", Greenleaf, Broom Hall, UK. pp117-140

Overcash, M. R. 1986. "Techniques for Industrial Pollution Prevention: A compendium for hazardous and non-hazardous waste minimization." Lewis, Chelsea, MI.

Ouchi, W. 1981. "Theory Z: How American business can meet the Japanese challenge."

Addison Wesley, Reading, Mass.

Palmer J. and P. Neal. 1994. "The Handbook of Environmental Education." Routledge, London.

Parrow, C. 1967. A framework for the Comparative Analysis of Organizations. *American Sociological Review* April: 194-208.

Parsons, T. 1956. Suggestions for a sociological approach to the theory of organisations, I. *Administrative Science Quarterly* 1: 63-85.

Pascale, R. T. and A. G. Athos. 1981. "The Art of Japanese Management." Simon and Schuster, New York.

Passmore, J. 1980. Man as Despot. In: "Man's Responsibility for Nature." Duckworth and Co. Ltd., London. pp 3-27.

Patchett, B.R. 1994. "Responding to Corporate Environmental Liability: The role of environmental auditing in the natural Gas Corporation as it develops an environmental management system." M.A. (Applied) thesis, Victoria University of Wellington, NZ. unpubl.

Peters, T. J. and R. H. Waterman (Jnr.). 1982. "In Search of Excellence: Lessons from America's Best-Run Companies." Warner/Harper and Row, New York.

Pettigrew, A. M. 1987. Context and Action in the Transformation of the Firm. *Journal of Management Studies* 24: 649-70.

Pfeffer, J. 1981. "Power in Organizations." Pitman, Marshfield, Mass.

Pfeffer, J. and G. R. Salancik. 1978. "The External Control of Organizations: A Resource Dependence Perspective." Harper and Row, New York.

Peters, T. and R. H. Waterman. 1982. "In search of excellence: Lessons from America's best run companies." Sage, Beverly Hills, Calif.

Piagen, B. 1982. Controversy at Love Canal. *The Hastings Center Report* June: 29-37.

Plant, J. 1987. "Managing Change and Making it Stick." Fontana, London.

Pollack, S. 1996. Learning to change: Implementing corporate environmental policy in the Rover Group. In: W. Wehrmeyer (Ed.), "Greening People", Greenleaf, Broom Hall, UK. pp317-337

Porter, M. E. 1980. "Competitive Strategy: Techniques for analyzing industries and competitors ", Free Press, New York.

Ponting, C. 1991. The Shadow of the Past. In: "A Green History of the World." Sinclair-Stevenson Ltd., London. 432 pp. (pp 393-407). ISBN 1 85619 050 1.

Posavac, E. J. and R. J. Carey. 1997. "Program Evaluation: Methods and case studies." 5th ed. Prentice Hall, Upper Saddle river, NJ.

Postel, S. 1992. Denial in the decisive decade. In: L. R. Brown *et al* "State of the World, 1992." Earthscan, London.

Pugh, D. S. (Ed.) 1997. "Organisation Theory: Selected readings" (4th ed.). Penguin Books, London.

Punter, R. 1990. Meeting between NZ Dairy Corporation, Greenpeace NZ, NZ Royal

Forest & Bird Society and Friends of the Earth, NZ re. replacement of glass milk bottles in Auckland.

Purser, R. E. and W. A. Pasmore. 1992. Organizing for learning. In: W. A. Pasmore and R. W. Woodman (Eds.), "Research in Organizational Change and Development", Vol. 6: 37-114.

Rasmussen, E. and F. Lamm. 1999. "An Introduction to Employment Relations in New Zealand." Addison Wesley Longman, Auckland.

Reed, M. 1996. Organizational Theorizing: a Historically Contested Terrain. In: S. R. Clegg, C. Hardy and W. R. Nord (Eds.), "Handbook of Organization Studies", Sage, London. pp 31-56.

Rees, S. 1996. Action through ownership: Learning the way at Kent County Council. In: W. Wehrmeyer (Ed.), "Greening People", Greenleaf, Broom Hall, UK. pp 357-375

Reid, G. C. 1987. "Theories of industrial organization." B. Blackwell, New York.

Renner, M. 1992. Creating sustainable jobs in industrial countries. In: "State of the World Report 1992", Earthscan, London. pp138-154

Resource Management Act. 1991. NZ Government Printer, Wellington.

Robbins, S. P. and N. Barnwell. 1998. "Organisation Theory: concepts and cases" (3rd ed.). Prentice Hall, Sydney.

Robèrt, K-L. 1994. "Simplicity without Reduction." The Natural Step Environmental Institute, Stockholm.

Robson, C. 1993. "Real World Research: A resource for social scientists and practitioner researchers." Blackwell, Oxford.

Rouse, W. B. 1993. "Catalysts for Change: Concepts and principles for enabling innovation." Wiley Interscience, New York.

Rowan, J. and P. Reason. 1981. On making sense. In: P. Reason and J. Rowan (Eds.), "Human Inquiry: A Sourcebook of New Paradigm Research", Wiley, Chichester. pp 113-140

Runyan, C. 1998. Editor's introduction to the article "The Story of a Shoe.". *World Watch* March/April

Rylatt, A. 1994. "Learning Unlimited." Business and Professional Publishing, Sydney.

Sage, J. 2000. Continuous learning and improvement in a regional cleaner production network. *Journal of Cleaner Production* 8: 381-389.

Saul, J. R. 1992. "Voltaire's Bastards: The Dictatorship of Reason in the West." Penguin Books, Toronto.

Scallon, M. and M. J. Sten. 1996. Environmental positioning for the future: A review of 36 leading companies in the Pacific Northwest Region of the USA. *Greener Management International* 13: 49-65.

Schaefer, G. 1980. Environmental education - A new word or a philosophy of teaching? In: T. S. Bakshi and Z. Naveh (Eds.), "Environmental Education: Principles, methods, and applications." Plenum Press, New York. p3.

Schein, E. 1969. "Process Consultation: Its role in organization development." Addison-

Wesley, Reading, Mass.

Schein, E. H. 1984. Coming to a new awareness of organizational culture. *Sloan Management Review* Winter: 7.

Schein. E. H. 1992. "Organisational culture and leadership." (2nd Ed.) Jossey-Bass, San Francisco.

Schein, E. H. 1999. "Process Consultation Revisited: Building the helping relationship." Addison-Wesley, Reading, Mass.

Schley, S. and Laur, J. 1998. "Creating Sustainable Organisations: The Natural Step in Business." Materials presented to The Natural Step Two Day Initial Training Workshop, Auckland, 9-10 June.

Schön, D. 1983. "The Reflective Practitioner: How professionals think in action." Basic Books, New York.

Scott, W. R. 1978. Theoretical perspectives. In: M. W. Meyer (Ed.), "Environments and Organizations", Jossey-Bass, San Francisco.

Senge, P. M. 1990a. "The Fifth Discipline: The Art and Practice of the Learning Organization." Random House, Sydney.

Senge, P. M. 1990b. The leaders new work: Building learning organizations. *Sloan Management Review* Fall: 7-23.

Sessions, G. 1995. Eco-centrism and the anthropocentric detour. G. Sessions (Ed.) "Deep Ecology for the Twenty-First Century." Shamballa Publications, Boston. pp 156-183.

Shadish, W. R. 1993. Critical multiplism: A research strategy and its attendant tactics. In: L. Sechrest (Ed.), "Programme Evaluation: A pluralistic enterprise", New Directions for Program Evaluation, no. 60, Jossey-Bass, San Francisco.

Shrivastava, P. and S. Hart. 1995. Creating sustainable corporations. *Business Strategy and the Environment* 4: 154-165.

Simmons, I. G. 1996."Changing the Face of the Earth." (2nd ed.). Blackwell Publishers, London.

Simon, H. A. 1947. "Administrative Behavior: A Study of Decision-Making Processes in Administrative Organizations." (3rd ed.) Macmillan, New York.

Simon, H. A. 1957a. "Models of Man: Social and Rational." Wiley, New York.

Simon, H. A. 1957b. "The New Science of Management Decision." Harper, New York.

Simon, H. A. 1969. "The Sciences of the Artificial." Massachusetts Institute of Technology Press, Cambridge, Massachusetts.

Slovic, P., B. Fischhoff and S. Lichtenstein. 1987. Behavioural decision theory perspectives on protective behaviour. In: N. D. Weinstein (Ed.) "Taking Care: Understanding and encouraging self-protective behavior." Cambridge University Press, Cambridge.

Socolow, R., C. Andrews, F. Berkhout and V. Thomas (Eds.) 1994. "Industrial Ecology and Global Change." Cambridge University Press, Cambridge.

Solomon, R.C. 1994. "Above the Bottom Line: An introduction to business ethics." Harcourt Brace, Forth Worth, Tx.

Sonnenfeld, J. A. 1985. Shedding light on the Hawthorne studies. *Jnl. Occupational Behaviour* April: 111-130.

Standards Australia. 1998. International Standards on Environmental Management. Environmental Standards Update 7: p4.

Spender, J. -C. 1998. Dynamics of individual and organizational knowledge. In: C. Eden and J. -C. Spender (eds.), "Managerial and Organizational Cognition: Theory, Methods and Research", Sage, Thousand Oaks, Ca. pp13-39.

Statistics NZ. 1997. "Business Activity '96." NZ Department of Statistics, Wellington.

Stone, L. J. 1993. Tools for encouraging community-wide implementation of cleaner production. In: Proceedings of the Fifth Annual Conference of the Waste Management Institute NZ, Wanganui, NZ.

Stone, L.J. 1994. Progress towards Cleaner Production, and the Role of Life Cycle Analysis in Waste Management. In: Proceedings of Seminar "Our Waste: Meeting Our Responsibilities", Centre for Advanced Engineering, University of Canterbury, Christchurch.

Stone. 1996. Cleaner production in practice - Workshop resource materials. In the resource materials provided for the Target Zero training workshops, August, 1997 Christchurch and Hastings, NZ.

Stone, L. J. 1997. Improving the Effectiveness of Cleaner Production Education for Business. In: Proceedings of the European Roundtable on Cleaner Production, Oslo, November 1997.

Stone, L. J. 2000. Target Zero: An evaluation of the project and the dynamics of change

within participating organisations. Report to the NZ Ministry for the Environment, Wellington.

Stoner, J. A. and R. E. Freeman. 1989. "Management." (4th ed.) Prentice-Hall, Englewood Cliffs, NJ.

Sweezy, P. 1972. Modern Capitalism and Other Essays. Monthly Review Press, New York.

Taylor, F. W. 1911. "The Principles of Scientific Management." Harper and Row, New York.

Taylor, F. W. 1947. "Scientific Management." Harper and Row, New York.

Taylor, B., C. Hutchinson, S. Pollack and R. Tapper. 1994. "The Environmental Management Handbook." Longman, London.

The Body Shop International. 1998. "The Body Shop approach to ethical auditing." The Body Shop International, London. Website http://www.the-body-shop.com/usa/aboutus/methodology.pdf

Thompson, J. D. 1967. "Organizations in Action." McGraw-Hill, New York.

Tolbert, P. S. and L. G. Zucker. 1996. The Institutionalization of Institutional Theory. In: S. R. Clegg, C. Hardy and W. R. Nord (Eds.), "Handbook of Organization Studies", Sage, London. Pp. 175 - 190.

Tradenz. 1995. "Environmental Integrity Programme." NZ Trade Development Board, Wellington.

Trainer, T. 1990. A Rejection of the Brundtland Report. In: "Environmental Sociology

Reader, 1992", Erasmus University, Rotterdam, The Netherlands. pp. 13-20.

TNS Canada. 1997. "Introduction to The Natural Step." INCLUDE website address.

TNSEFANZ. 2000. "The Natural Step." Brochure produced by The Natural Step Environment Foundation Aotearoa NZ, Christchurch.

Treacy, M. and F. Wiersema. 1995. "The Discipline of Market Leaders: Choose your customers, narrow your focus, dominate your market." Addison-Wesley, Reading, Mass.

Ulhøi, J. P. and H. Madsen (1996). The Greening of European Management Education. In: W. Wehrmeyer (Ed.), "Greening People." Greenleaf, Broomhall, Sheffield, England.

UNEP/IE.1993. "Cleaner Production Worldwide." United Nations Environment Programme, Industry & Environment Programme Activity Centre, Paris.

UNEP/IE.1994. "Cleaner Production in the Asia Pacific Economic Cooperation Region." United Nations Environment Programme, Industry & Environment Programme Activity Centre, Paris.

UNEP/IE.1995. "Cleaner Production Worldwide. Volume II" United Nations Environment Programme, Industry & Environment Programme Activity Centre, Paris.

UNEP. 2000. "International Cleaner Production Information Centre: Technical Case Studies." UNEP Division of Technology, Industry and Economics, website: http://www.emcentre.com/unepweb/tec_case/index.htm

USEPA. 1988. "Waste Minimization Opportunity Assessment Manual." Hazardous Waste Engineering Research Laboratory, US Environmental Protection Agency, Cincinatti.

USEPA. 1992a. "Pollution Prevention Case Studies Compendium." US Environmental Protection Agency, Washington D.C.

USEPA. 1992b. "Facility Pollution Prevention Guide." USEPA, Washington D.C.

USEPA. 2000. Design for the Environment: More about the programme. USEPA, Washington D. C., http://www.epa.gov/opptintr/dfe/about.htm

USEPA. 1999. "33/50 program: The final record." USEPA, Washington D. C.

USOTA. 1986. "Serious Reduction of Hazardous Waste." US Office of Technology Assessment, Washington D. C.

Voehl, F. and W. M. Lindsay. 1997. Overview of Total Quality. In: W. M. Lindsay and J. A. Petrick. 1997. "Total Quality and Organization Development." St. Lucie Press, Delray Beach, Fla.

WBCSD/UNEP. 1996. "Eco-efficiency and Cleaner Production: Charting the Course to Sustainability." World Business Council on Sustainable Development/United Nations Environment Programme, Geneva/Paris.

WCED. 1987. "Our Common Future: The World Commission on Environment and Development." Oxford University Press, Oxford.

Weber, M. 1947. "The Theory of Social and Economic Organizations." Edited and translated by T. Parsons and A. M. Henderson (from the German original published in 1924), Free Press, New York

Weber, M. 1978. "Economy and Society: an Outline of Interpretative Sociology." Vols 1, 2. University of California Press, Berkeley.

Weick, K. E. and F. Westley. 1996. Organizational learning: Affirming and oxymoron. In: S. R. Clegg, C. Hardy and W. R. Nord (Eds.), "Handbook of Organization Studies", Sage, London. pp 440-458

Weinstein, N. D. 1987. Cross-hazard consistencies: Conclusions about self-protective behaviour. In: N. D. Weinstein (Ed.) "Taking Care: Understanding and encouraging self-protective behavior." Cambridge University Press, Cambridge.

Welford, R. and Gouldson, A. 1993. "Environmental Management and Business Strategy." Pitman Publishing, London.

Welford, R. 1995. "Environmental Strategy and Sustainable Development: The corporate challenge for the 21st century." Routledge, London.

Whetton, D. and K. S. Cameron. 1991. "Developing Management Skills." (2nd Ed.) Harper Row, New York.

White, L. 1967. The historical roots of our ecologic crisis. *Science*, 155: 1203-1207.

Whiteley, A. 1995. "Managing Change: A core values approach." Macmillan Education Australia, Melbourne.

Whyte, W. (Ed.). 1991. "Participatory Action Research." Sage, London.

Wolf, E. 1982. "Europe and the People without a History." University of California Press, Berkeley.

Woodward, H. and S. Bucholz. 1987. "Aftershock: Helping people through corporate change." Jon Wiley & Sons, New York.

Woodward, J. 1965. "Industrial Organisation: Theory and Practice." Oxford University Press, London.

Worldwatch Institute. 1998. "Vital Signs 1998." Worldwatch Institute, Washington D.C.

Worley. 1995. "Worley Environmental Management Survey 1995: A Management Survey of N.Z.'s Top Companies." Worley International, Ltd., Auckland.

Worley. 1996. "Basics in Environmental Management: A handbook for NZ business." Worley Consultants Ltd., Auckland.

Worley. 1997 (draft). "Worley Environmental Management Survey 1997: A Management Survey of N.Z.'s Top Companies." Worley International, Ltd., Auckland.

Worley, C. G., D. E. Hitchin and W. E. Ross. 1996. "Integrated Strategic Change: How OD builds competitive advantage." Addison-Wesley, Reading, Mass.

Wrong, D. 1961. "The over-socialized conception of man in modern sociology. *American Sociological Review* 26: 183-93.

Appendices

Appendix 1. Questionnaires.

Appendix 2. Abbreviations for the statements in Figs. 4.1 – 4.8b

Appendix 3. Relevant presentations and publications

Appendix 1. Questionnaires.

Part I. Feedback on the project. Questionnaire for demonstration organisations.

Part II. Broad trends attributable to the project. Questionnaire for demonstration organisations.

Part III. Organisational factors influencing progress. Format for progress reports.

PART I – Feedback on the effectiveness of the project
Questionnaire for demonstration organisations[1]

Please rate the contribution of the following components to the implementation of the TZ programme **within your organisation**

1= outstandingly good │ 2=very good │ 3=good │ 4=acceptable │ 5=mediocre │ 6=poor │ 7=very poor

Part Ia – Feedback on external components

"Club" approach (i.e. working with a group of organisations) …………... 1 2 3 4 5 6 7
"Club" meetings …………………………………………………………... 1 2 3 4 5 6 7
Training for the "club" (i.e. all organisations together) …………….…….. 1 2 3 4 5 6 7
Training provided specifically for your own organisation …....………… 1 2 3 4 5 6 7
Support from other organisations participating in TZ (i.e. "club" members) 1 2 3 4 5 6 7
Support from council ………………………………………………….…... 1 2 3 4 5 6 7
Support from local power company ……… …………………………….. 1 2 3 4 5 6 7
Participation of ECNZ s ………………………………………………….. 1 2 3 4 5 6 7
Assistance from student/s …. ……………………………………………… 1 2 3 4 5 6 7
Assistance from consultant (TZ appointed) ….………………………… 1 2 3 4 5 6 7
Assistance from other consultant/s .………………………………….…... 1 2 3 4 5 6 7
Technical information on options for improvement .……………...…... 1 2 3 4 5 6 7

Were there any other external components that contributed? (Circle)   YES   NO
    If yes, please list below and rate their contribution
       ………………………………………………………….. 1 2 3 4 5 6 7
       ………………………………………………………….. 1 2 3 4 5 6 7

Part Ib – Feedback on internal components
(If the components did not exist, please circle "n"*)*

Environmental policy .…………………………….…..………………….. 1 2 3 4 5 6 7 n
Support for TZ programme from Board ... .…………….………...………….. 1 2 3 4 5 6 7 n
Support for TZ programme from Site management .….………………….. 1 2 3 4 5 6 7 n
Support for TZ programme from Corporate management .……………….. 1 2 3 4 5 6 7 n
Management system to facilitate programme .…………..……………….. 1 2 3 4 5 6 7 n
Time availability for TZ work .……………….……..…..……………….. 1 2 3 4 5 6 7 n
TZ team .……………………………………………..…..……………….. 1 2 3 4 5 6 7 n
Communication of TZ progress to staff .…………………..…………….. 1 2 3 4 5 6 7 n
Staff training .………………………………...….…..………………….. 1 2 3 4 5 6 7 n
Involvement of other staff .…………………………..……………….. 1 2 3 4 5 6 7 n
Input/output analysis .……………………….……..……..…………….. 1 2 3 4 5 6 7 n
Waste audit/assessment .…………………………………….....….….. 1 2 3 4 5 6 7 n
Cleaner production options report .…………………………….......…… 1 2 3 4 5 6 7 n
Financial analysis .………………………….……..……..……..……….. 1 2 3 4 5 6 7 n

Were there any other internal components that contributed? *(circle)*   YES   NO
    If yes, please list below and rate their contribution
       ………………………………………………………….. 1 2 3 4 5 6 7
       ………………………………………………………….. 1 2 3 4 5 6 7

Please turn over

---

[1] This questionnaire was used to survey representatives from the demonstration group at the end of the TZ project period.

Part Ic - Feedback on the project as a whole

Please complete the following questions as indicated

1. Has the TZ programme benefited your company?   (circle)   YES   NO

    1a. If yes, how?

    1b. If no, why not?

2. Do you believe the TZ programme was successful? (circle)   YES   NO

    2a. If yes, what factors contributed most to its success?

    2.b. If no, what barriers did you encounter?

3. What have been the most valuable aspects of the TZ programme?

4. How do you think the TZ programme could be improved?

5. Do you think that your organisation will continue to pursue cleaner production?
   (please circle)   YES   NO

    5a. If yes, why?

    5b. If no, why not?

THANK YOU VERY MUCH FOR YOUR TIME & GOOD LUCK WITH FUTURE ENDEAVOURS

PART II – Broad trends attributable to the project
Questionnaire for demonstration organisations[2]

Code:……

In order to ensure that we can learn from the Target Zero programme, ECNZ and the University of Auckland are again assessing needs and responses. We would appreciate it if you would take a couple of minutes to answer the following questions as shown. We guarantee full confidentiality of information. Thank you.

Part IIa – Organisation profile

Organisation name _____ Contact number_____

Type of activity _____ No. of staff (on-site) _____

Name of participant _____ Position_____

Main wastes (please circle):   liquid   solid   gaseous   hazardous   energy
            other (please specify) _____

Wastes that cause us the most difficulty are _____

Our difficulties with wastes stem from (please circle):
            RMA   disposal costs   council bylaws
            other (please specify) _____

Barriers to improving environmental performance are (please circle):
            financial   technical   political
            other (please specify) _____

We have the following management systems in place   (please circle):
            Quality   Environmental management system   OS&H
            other (please specify)_____

Part IIb – Statements

Please indicate your responses to the following statements by circling the appropriate numbers as follows: 1=strongly agree; 2=agree; 3=neither agree nor disagree; 4=disagree; 5=strongly disagree

It makes good business sense to improve environmental performance …………….1 2 3 4 5
Improving environmental performance always costs money ………………………1 2 3 4 5
Wastes are an inevitable consequence of business ……………………………….1 2 3 4 5
Wastes are best dealt with by treatment …………………………………………1 2 3 4 5
The best way to reduce wastes is by changing processes and products ……………1 2 3 4 5
Our organisation is already doing all it can to reduce wastes ……………………...1 2 3 4 5

Please turn over

---

[2] This questionnaire was used to survey the same representatives from the demonstration group at the start, during and at the end of the TZ project period (years 0, 1 and 2, respectively). Representatives from the control group were also surveyed at the same times. The formats used for the demonstration and control groups were different. Since the control group was interviewed by telephone, the questionnaire included a different heading and instructions to interviewers. There were no substantive differences between the two questionnaires.

Remember:
1=strongly agree; 2=agree; 3=neither agree nor disagree; 4=disagree; 5=strongly disagree

Our organisation has a formal programme to reduce wastes ……………………… 1 2 3 4 5
Our organisation has conducted a waste audit …………………………………… 1 2 3 4 5
Our organisation conducts waste audits as a regular component of business ……. 1 2 3 4 5
Environmental performance is a low priority for our organisation ……………….. 1 2 3 4 5
Organisational structure makes it difficult for environmental improvements ……. 1 2 3 4 5
Our CEO is committed to improving environmental performance ……………….. 1 2 3 4 5
Our organisation has a steeply hierarchical structure …………………………….. 1 2 3 4 5
Our quality, OS&H and EMS programmes are strongly linked …………………. 1 2 3 4 5
Environmental criteria are included in our staff performance appraisals ………… 1 2 3 4 5
Staff are actively encouraged to identify environmental improvements ………….. 1 2 3 4 5
Our organisation has a formal environmental policy …………………………….. 1 2 3 4 5
Our environmental programme is driven purely by compliance needs …………… 1 2 3 4 5
We have identified opportunities for waste minimisation in our company ………. 1 2 3 4 5
Waste treatment and disposal are the main focus of our environmental programme …1 2 3 4 5
Senior management presents barriers to improving environmental performance ….1 2 3 4 5
Improving environmental performance will enhance our competitiveness ………. 1 2 3 4 5
We have an on-going process for improving environmental performance ……….. 1 2 3 4 5
We have a confrontational relationship with community groups …………………. 1 2 3 4 5
We actively seek and encourage input from community groups …………………. 1 2 3 4 5
We have a comprehensive environmental management programme …………….. 1 2 3 4 5
Environmental management is carried out on an ad-hoc basis …………………… 1 2 3 4 5
There are no economic benefits to be gained from cleaner production ………….. 1 2 3 4 5

THANKS VERY MUCH FOR YOUR HELP

Code:……

PART III – Organisational factors influencing progress
Format for progress reports[3]

TARGET ZERO - SITE PROGRESS REPORT

TO:	*[TZ Project manager's name]*
FROM:	*[Consultant's name]*
DATE:	
SITE NAME:	

Part IIIa - PROJECT PROGRESS
Indicate whether the specified tasks have been completed. If yes, briefly comment on the process used. (Include relevant documentation/forms where appropriate). If no, give reasons why not, indicating what is planned, and provide a revised schedule.

Tasks   *Completed*

Planning the waste assessment

- *Develop environmental policy and implementation strategy*   ***yes****/no*

Comment:

Undertake walk-through of the site and complete process

  input-output analysis with known information   *yes/**no***

Comment:

- *Identify gaps in existing information and resources required to*

  complete a materials and energy balance   *yes/**no***

Comment:

The waste assessment

- *Undertake 'live' materials and energy balance*   *yes/**no***

Comment:

- *Prepare summary report*   *yes/**no***

Comment:

---
[3] Consultants assigned to the demonstration organisations were required to use this format for their monthly progress reports.

Part IIIb - OTHER COMMENTS

What is working well?

Why?

What is not working well?

Why not?

How will this/these issues be resolved?

Comment on any other issues currently being faced or likely to arise?

Identify any additional training needs or resources required by the company.

Part IIIc - BUDGET
Detail project invoiced and in-kind expenditure for the reporting period.

	Budget	*Actual*
Consultant (current to 26 9 97)		
Disbursements (travel, communication)		
Site staff in-kind		
Monitoring equipment		
Analyses		
Student		

Appendix 2. Abbreviations for the statements in Figs. 4.1 – 4.8b

Figure 4.1.

"Club" approach = *"Club" approach (i.e. working with a group of organisations)*

"Club" meetings = *"Club" meetings*

"Club" training = *Training for the "club" (i.e. all organisations together)*

Specific training = *Training provided specifically for your own organisation*

Support from "club' members = *Support from other organisations participating in TZ (i.e. "club" members)*

Support from council = not abbreviated

Support from local power company = not abbreviated

ECNZ = Participation of ECNZ

Assistance from student/s = not abbreviated

Assistance from TZ consultant = *Assistance from consultant (TZ appointed)*

Assistance from other consultant/s = not abbreviated

Technical info. on options = *Technical information on options for improvement*

Figure 4.2.

Environmental policy = unabbreviated

Support from Board = *Support for TZ programme from Board*

Support from site management = *Support for TZ programme from Site management*

Support from corporate management = *Support for TZ programme from corporate management*

Management system = *Management system to facilitate programme*

Time availability = *Time availability for TZ work*

TZ team = unabbreviated

Communication of TZ progress to staff = unabbreviated

Staff training = unabbreviated

Involvement of other staff = unabbreviated

Input/output analysis = unabbreviated

Waste audit/assessment = unabbreviated

CP options report = *Cleaner production options report*

Financial analysis = unabbreviated

Figures 4.3a and b.

CEO commitment = *Our CEO is committed to improving environmental performance*

Environmental policy = *Our organisation has a formal environmental policy*

EMS = *Our organisation has an environmental management system*

On-going process = *We have an on-going process for improving environmental performance*

EM comprehensive = *We have a comprehensive environmental management programme*

Performance appraisal = *Environmental criteria are included in our staff performance appraisals*

Figures 4.4a and b.

Waste reduction programme = *Our organisation has a formal programme to reduce wastes*

Waste audit conducted = *Our organisation has conducted a waste audit*

Regular waste audits = *Our organisation conducts waste audits as a regular component of business*

CP options identified = *We have identified opportunities for waste minimisation in our company*

Figures 4.5a and b.

Env. low priority = *Environmental performance is a low priority for our organisation*

Env. management ad-hoc = *Environmental management is carried out on an ad-hoc basis*

Compliance driven = *Our environmental programme is driven purely by compliance needs*

Treatment/disposal focus = *Waste treatment and disposal are the main focus of our environmental programme*

Q, OSH, EM linked = *Our quality, OS&H and EMS programmes are strongly linked*

Figures 4.6a and b.

Senior mgt barriers = *Senior management presents barriers to improving environmental performance*

Structure causes difficulties = Organisational structure makes it difficult for environmental improvements

Steep hierarchical structure = *Our organisation has a steeply hierarchical structure*

Staff encouraged = *Staff are actively encouraged to identify environmental improvements*

Seek community input = *We actively seek and encourage input from community groups*

Confront community groups = *We have a confrontational relationship with community groups*

Figures 4.7a and b.

Improving environmental performance makes good business sense = *It makes good business sense to improve environmental performance*

… will enhance competitiveness = *Improving environmental performance will enhance competitiveness*

… always costs money = *Improving environmental performance always costs money*

CP has no economic benefits = *There are no economic benefits to be gained from cleaner production*

Figures 4.8a and b.

Process & product changes best = *The best way to reduce wastes is by changing processes and products*

Wastes best treated = *Wastes are best dealt with by treatment*

Wastes inevitable = *Wastes are an inevitable consequence of business*

Already doing all we can = *Our organisation is already doing all it can to reduce wastes*

Appendix 3. Relevant presentations and publications

Stone, L. J. 1997. Improving the effectiveness of cleaner production education for business. In: *Proceedings of the Fourth European Roundtable on Cleaner Production*, Oslo, 1 - 3 November.

Stone, L. J. 1999a. When case studies are not enough: The influence of corporate culture and employee attitudes on the success of cleaner production initiatives. In: *Proceedings of the Second Asia Pacific Roundtable on Cleaner Production*, Brisbane, 21 -24 April.

Stone, L. J. 1999b. Beneath the surface of success: Measuring progress and preventing failure in individual organisations during the course of a cleaner production programme. In: *Proceedings of the Sixth European Roundtable on Cleaner Production*, Hungary, Sept.

Stone, L. J. 2000a. "Target Zero: An evaluation of the project and the dynamics of change within participating organisations." Presented as part of a series of workshops to report on the results of the Target Zero Demonstration Project, funded by the NZ Ministry for the Environment and Meridian Energy, organised by councils in Christchurch, Auckland, Hamilton, Tauranga, Hastings, Wellington, Blenheim, Nelson, Greymouth, Invercargill, Dunedin. *(Summary report available on NZ Ministry for the Environment website www.mfe.govt.nz.)*

Stone, L. J. 2000b. When case studies are not enough: The influence of corporate culture and employee attitudes on the success of cleaner production initiatives. *Journal of Cleaner Production* 8 (5): 353-359.
http://www.sciencedirect.com.ezproxy.auckland.ac.nz/science/journal/09596526/8/5

Stone, L. J. 2000c. "What makes a cleaner production project work: Voices from the factory floor." In: *Proceedings of the Waste Management Institute of New Zealand Twelfth Annual Conference*, Auckland, November. pp 9-15.

Addendum. Summary papers published after the thesis was concluded

Stone, L. J. 2006a. Limitations of cleaner production programmes as organisational change agents. I. Achieving commitment and on-going improvement. *Journal of Cleaner Production* 14 (1): 1-14.

http://www.sciencedirect.com.ezproxy.auckland.ac.nz/science/journal/09596526/14/1

Stone, L. J. 2006b. Limitations of cleaner production programmes as organisational change agents. II. Leadership, support, communication, involvement and programme design. *Journal of Cleaner Production* 14 (1): 15-30.

http://www.sciencedirect.com.ezproxy.auckland.ac.nz/science/journal/09596526/14/1