BARRIERS TO THE IMPLEMENTATION OF ISO 14001

(With Special Reference to the Durban Automotive Cluster)

By

Andrew Iver Turner

A dissertation submitted in partial fulfillment of the academic requirements for the degree of Masters of Business Administration in the School of Business

UNIVERSITY OF KWAZULU – NATAL

Pietermaritzburg

December 2004

Supervised by

Professor Charles O'Neill

Abstract

The re-emergence of South Africa into the global automotive market has had a significant impact on domestically based Original Equipment Manufactures (OEMs) and their component suppliers. While South Africa's exposure to the global market has brought about opportunities for firms to gain access to global markets, it has brought with it a vast number of pressures, including the pressure to comply with local and international environmental standards. Many of the OEM's have been set a deadline of January 2005 for ISO 14001 certification.

The aim of the research was to explore and understand the complexities of the ISO 14001 implementation process with the objective of establishing the barriers that hamper its implementation, the determination of what factors influence these barriers and the investigation of possible recommendations on how organisations could overcome, or minimize, these barriers. To achieve this, a study was conducted on the Durban Automotive Cluster (DAC) investigating the following areas:

1. Determine the reasons for seeking ISO 14001 certification.
2. Determine what the organisations perceived and experienced as the barriers to implementation.
3. Determine the strategic implications of an Environmental Management System (EMS).

A theoretical basis of ISO 14001, the implementation process and its strategic implications were established by reviewing previous research. A survey was conducted on the DAC's members through the use of a self-administrated questionnaire.

The research showed that organisations chose to seek ISO 14001 certification in order to satisfy customer requirements and subsequently the strategic implications of ISO 14001 certification are very high. In terms of barriers to implementation, finance,

resources allocation, expertise and implementation time proved to be the most problematic areas.

In order for organisations to implement ISO 14001, they need to give due recognition to its strategic implications and use these implications as the basis for its justification. In order for organisations to be able to capitalize on the benefits of the system and use it to build a competitive advantage, they should attempt to integrate the environmental management system with their other management systems.

Acknowledgements

This research would not have been possible without the assistance of a number of people, too many to acknowledge individually. However I would like mention certain people in particular.

The research was supervised by Professor Charles O'Neill, and without his guidance, encouragement, and his persistence, this research would never have reached a closure. I am indebted to Professor O'Neill for this. I would also like to thank Professor Debbie Vigar for her continuous support, not only of this research, but throughout the entire MBA programme.

BM Analysts, in particular Chilo Deghaye, gave me a lot of assistance in conducting the survey and gaining access to the Durban Automotive Cluster, for this I am very grateful. Also, many thanks to the members of the Durban Automotive Cluster who so kindly participated in the survey.

Many people assisted my in compiling this dissertation; however in particular I would like to thank Mike Quail for his help with the statistics, both Marline Leach and Shannon Bosch (Goodricke) for their help with proof reading, and Charmaine Gradwell with administrative help.

Finally, and most importantly, many thanks to my wife, my children, my family and my friends for being so understanding and accommodating. Without your patience, encouragement, and moral support I could not have undertaken this task.

Declaration

I, Andrew Iver Turner, hereby declare that this dissertation in my own original work, that all sources used have been accurately reported and acknowledged, and that this document has not previously in its entirety or part been submitted to any university in order to obtain an academic qualification.

Andrew Iver Turner 8 December 2004

This research is dedicated to my wife, Desrae, and my children, Kelly-Ann and Anthony, for your love, support and dedication. You have stood by me and never let this task stand between us. You have accepted my goal as your goal and walked the road with me all the way. Your strength and determination has been my guide and kept me focused on our goals.

Table of Contents

List of Figures

List of Tables

CHAPTER 1

Background and Methodology

1.1 Introduction

This dissertation is about the implementation of ISO 14001 environmental management system (EMS) and the accompanying complexities and barriers pertaining to its implementation and integration, with particular reference to organisations in the Durban Automotive Cluster (DAC). The anticipated contribution of this research is in exploring how an EMS might be effectively implemented, and what organisations need to consider before embarking on such a program. The strategic implications of an EMS will also be reviewed.

1.2 Background

The International Organization for Standardization (ISO) was officially established on February 23, 1947. ISO is the world's largest developer of standards; it is a worldwide federation of national standards bodies from approximately 147 countries. "ISO is a network of the national standards institutes of 147 countries, on the basis of one member per country, with a Central Secretariat in Geneva, Switzerland, that coordinates the system" (http://www.iso.ch, 04/09/03). ISO's mission is to promote the worldwide development of standards and related activities, in order to facilitate the international exchange of goods and services and to foster cooperation in intellectual, scientific, and economic activities.

ISO has been developing voluntary technical standards over almost all sectors of business, industry and technology since 1947. With the exception of ISO 9000 and ISO 14000, the vast majority of ISO standards are highly specific and principally of concern to engineers and other technical specialists. They are documented agreements containing technical specifications or other precise criteria to be used consistently as

rules, guidelines, or definitions of characteristics to ensure that materials, products, processes and services are fit for their purpose. (http://www.iso.org, 08/10/2004)

"The ISO 9000 and ISO 14000 families are among ISO's most widely known and successful standards ever. ISO 9000 has become an international reference for quality requirements in business to business dealings, and ISO 14000 looks set to achieve at least as much, if not more, in helping organizations to meet their environmental challenges" (http://www.iso.ch, 04/09/2003). ISO 9000 is primarily concerned with enhancing customer satisfaction by meeting customer and applicable regulatory requirements, and to continually improve its performance in this regard. ISO 14000 is primarily concerned with minimizing the harmful effects on the environment caused by activities, and to continually improve environmental performance.

As in the past, where many organizations required their suppliers to have ISO 9000 accreditation, many organizations are now expanding to incorporate ISO 14000 accreditation as a mandatory requirement for doing business. Sasseville et al (1997, p7) found that automobile manufactures and manufactures of electronic consumer goods required their component suppliers to certify to ISO 9000 quality standards. Consequently they felt it was possible that large manufactures who had implemented ISO 14001 environmental standards would therefore also require their suppliers compliance with ISO 14001. Pawar et al (2001, p10) also found that ISO 14001 was recognized in both the private and public sector marketplaces, and many companies had mandated their suppliers and service providers to become certified under the ISO 14001 standard. As predicted by Sasseville et al (1997, p7), this is the case experienced by suppliers to the automotive industry, where there has been a global shift towards increased emphasis on sound environmental management. As a result, Environmental Management Systems, such as ISO 14001, are becoming increasingly important in the South African automotive industry. "Compliance with ISO 14001 is therefore no longer optional, and firms that have not yet been accredited are under increasing pressure to do so" (B&M Analysts, August 2003, p1). Internationally, up to the end of 2002, at least 49 462 ISO 14001 certificates had been awarded in 118 countries (ISO, 2003, p5).

South Africa's re-emergence of into the global automotive market has had a significant impact on domestically based Original Equipment Manufactures (OEMs) and their component suppliers. While South Africa's exposure to the global market has brought about opportunities for firms to gain access to global markets, it has brought with it a vast number of pressures, including the pressure to comply with local and international environmental standards. Many on the OEM's have been set a deadline of January 2005 for ISO 14001 certification.

The DAC was established in 2001 to foster the development of the automotive industry in the greater Durban area. Thirty two firms, representing 80% of the regional industry, support the DAC. The majority of these firms are small and medium enterprises (SME's). According to B&M Analysts, as of 15 September 2003, only 3 out of the 23 firms interviewed in KwaZulu Natal, have ISO 14001 certification. This means that over the next 15 months, the remaining 20 firms need to become accredited. The process of becoming accredited generally takes between 12 and 18 months, and is known to be fraught with challenges.

1.3 The Research Problem

The problem that is being investigated concerns the barriers that different organisations are likely to experience, the factors which could influence these barriers, and the strategic implications of an Environmental Management System.

Prior to embarking on any project, the management of an organisation will conduct research pertaining to that project and identify potential problems they are likely to encounter, these problems are often referred to as barriers. Management will pay particular attention to these barriers throughout the project in order to ensure the project runs smoothly. However, once the project has been completed, and when management reviews the project, they are likely to report having actually encountered different barriers, the reasons for these discrepancies could be attributed to the following:

1. Management did not truly understand the implications of the project and overlooked certain items,
2. Management underestimated the implications of certain aspects, or,
3. Having identified specific areas of concern and subsequently devoting attention to the areas, management did not experience any problems.

Another important aspect to consider regarding the project is the judgment of its success. When judging the effectiveness of implementation, especially in the case of management systems, the indicators of success are not determined once certification has been achieved, but rather need to be determined by looking at how the organisation has embraced the principles of the management system. In other words, in the case of an EMS, one would be trying to establish whether the organisation has changed the way it operates and whether environmental considerations are taken into account during not only its day-to-day operations, but also into its strategic planning. Thus, the problem revolves around the strategic implications of implementing an EMS are.

In brief, the research problems are:

1. What barriers are organisations likely to encounter in implementing ISO 14001, and what can influence these barriers.
2. What are the strategic implications of implementing an EMS.

1.4 Research Objectives

The research will aim to explore and understand the complexities of the ISO 14001 implementation process, with the objective of establishing the barriers that hamper its implementation, and determining what factors influence these barriers.

To achieve this, a study will be conducted on the DAC and its members. The following areas will be investigated:

1. Determine the reasons for seeking ISO 14001 certification.

2. Determine what the organisations perceive as the barriers to implementation prior to starting the implementation process.
3. Determine what the organisations experienced to be the barriers to implementation during the implementation process.
4. Determine the strategic implications of an EMS.

1.5 Structure of the Dissertation

Chapter 1 will deal with the background to the study. Chapter 2 covers the origins and history of ISO 14001 in order to provide the reader with a background to the standards. This chapter explores the reasons why organisations seek ISO 14001 accreditation, discusses what drives the process and what benefits can be derived from certification. In order to understand the barriers to the implementation process, the implementation process is briefly explained prior to the discussion of the barriers that organisations are likely to encounter and the changes that are required in the organisational culture. The arguments of the opponents to ISO 14001 are also dealt with.

Chapter 3 deals with the issues surrounding the strategic implications of environmental management systems. The theory and purpose behind strategic management and management systems, including measurement and management feedback implications, are discussed in order to investigate the issues and challenges associated with incorporating environmental management into strategic planning. Global and strategic environmental management, opposition to strategic environmental management and the integration of environmental management into strategic management models are reviewed and their implications discussed.

Chapter 4 covers the research methodology, including the design and application of the survey instrument that was used to conduct the empirical research among the DAC and its members. Chapter 5 deals with the information collected from this survey and the processing, summarizing and analysis of the result. Chapter 6 deals with the research findings and discussions around them. Chapter 7 deals with the summary,

conclusions and makes recommendations based on the findings and the theory. Chapter 8 deals with caveats and suggestion for further research. Appendices will include copies of the survey instruments and other information deemed appropriate to the research.

Chapter 2

Theory and Implication of ISO 14001

2.1 History of ISO 14001

The notion of protecting the environment has been around since the 1960's and it gained full acknowledgment in 1992 at the Earth Summit in Rio de Janeiro where Agenda 21 was adopted. This document encouraged businesses to adopt codes that establish "best environmental practice." That same year the British Standards Institute (BSI) established an environmental management standard, British Standard 7750 (BS 7750). In 1993, the European Union established the Eco-Management and Audit Scheme (EMAS). "Companies began to realize that the public were becoming very concerned about environmental issues, and that "green" issues were affecting consumer choices as well as investment decisions" (Murray, 1999, p39). In 1991 the Strategic Action Group on the Environment (SAGE) was established by ISO. It represented a variety of countries and international organizations, and helped to define how an international standard could support better environmental management. "SAGE's task was to determine whether an international environmental standard would accomplish three specific objectives:

- Encourage a common approach to environmental management;
- Strengthen a company's ability to improve and measure its environmental performance; and
- Ameliorate international trade and remove trade barriers" (Forsyth, 1996, p2).

In 1993, ISO formed the Technical Committee (IOS/TC) 207 in order to draft the ISO 14000 series. From its inception ISO/TC 207 worked closely with ISO/TC 176, the technical committee responsible for the ISO 9000 family of quality management systems, in order to ensure compatibility between the ISO quality management standards and the ISO environmental standards. The resulting ISO 14000 family of standards was thus developed in order to provide a practical toolbox to assist organizations with the implementation of actions, such as environmental management systems, which were supportive to sustainable development. "The ISO 14000

standards were designed to be used by any company, despite size or locale, to develop a quality environmental management system (EMS)" (Murray, 1999, p39). The ISO 14000 family of standards, guides and technical reports, including drafts is shown in Table 2.1.

Table 2.1 The ISO 14000 family of standards, guides and technical reports – including drafts

Designation	Publication	Title
ISO 14001:1996	1996	Environmental management systems – Specification with guidance for use
ISO 14004:1996	1996	Environmental management systems – General guidelines on principles, systems and supporting techniques
ISO 14010:1996	1996	Guidelines for environmental auditing – General principles
ISO 14011:1996	1996	Guidelines for environmental auditing - Audit procedures – Auditing of environmental management systems
ISO 14012:1996	1996	Guidelines for environmental auditing – Qualification criteria for environmental auditors
ISO 14015:2001	2001	Environmental management – Environmental assessment of sites and organizations (EASO)
ISO 14020:2000	2000	Environmental labels and declarations – General principles
ISO 14021:1999	1999	Environmental labels and declarations – Self-declared environmental claims (Type II environmental labelling)
ISO 14024:1999	1999	Environmental labels and declarations – Type I environmental labelling - Principles and procedures
ISO/TR 14025:2000	2000	Environmental labels and declarations – Type III environmental declarations
ISO 14031:1999	1999	Environmental management – Environmental performance evaluation – Guidelines
ISO/TR 14032:1999	1999	Environmental management – Examples of environmental performance evaluation (EPE)
ISO 14040:1997	1997	Environmental management – Life cycle assessment – Principles and framework
ISO 14041:1998	1998	Environmental management – Life cycle assessment – Goal and scope definition and inventory analysis
ISO 14042:2000	2000	Environmental management – Life cycle assessment – Life cycle impact assessment
ISO 14043:2000	2000	Environmental management – Life cycle assessment – Life cycle interpretation
ISO/TR 14047	To be determined	Environmental management – Life cycle assessment – Examples of application of ISO 14042
ISO/TS 14048:2002	2002	Environmental management – Life cycle assessment – Data documentation format
ISO/TR 14049:2000	2000	Environmental management – Life cycle assessment – Examples of application of ISO 14041 to goal and scope definition and inventory analysis
ISO 14050:2002	2002	Environmental management – Vocabulary
ISO/TR 14061:1998	1998	Information to assist forestry organizations in the use of the Environmental Management System standards ISO 14001 and ISO 14004
ISO/TR 14062:2002	2002	Environmental management – Integrating environmental aspects into product design and development
ISO/WD 14063	To be determined	Environmental management – Environmental communications – Guidelines and examples
ISO/AWI 14064	To be determined	Guidelines for measuring, reporting and verifying entity and project-level greenhouse gas emissions
ISO 19011:2002	2002	Guidelines for quality and/or environmental management systems auditing (This standard replaces ISO 14010, 14011 and 14012)
ISO Guide 64:1997	1997	Guide for the inclusion of environmental aspects in product standards
ISO/IEC Guide 66*	1999	General requirements for bodies operating assessment and certification/registration of environmental management systems (EMS)

Source: ISO, 2002, p8.

ISO 14001 is a specific standard in the ISO 14000 series, and is the corner stone of the series. It provides a good model for the development of an environmental management system, and is the only standard in the series under which an organization can become certified. Certification requires that an independent auditor compares the environmental management plan that has been developed by the organisation with the requirements set forth in ISO 14001.

ISO 14001 is also the starting point for organizations that want to use other environmental management tools developed by ISO/TC 207. The whole ISO 14000 family provides management tools for organizations to control their environmental aspects, and to improve their environmental performance. For example, ISO 14004 provides additional guidance and useful explanations and complements ISO 14001, and ISO 14031 provides guidance on how an organization can evaluate its environmental performance.

QSI-Afrocare (2003, P1 of module 3) define the basic philosophy behind the ISO 14001 standard as:

1. "The primary aim of environmental management is to achieve control of all the processes and activities affecting or likely to affect local and global environments.
2. ISO 14001 is not designed primarily to address technical inadequacy. To some degree technical competence is assumed. It is the management of the infrastructure of the company/organisation addressing environmental issues which needs to be examined and improved.
3. ISO 14001 does not, therefore, guarantee to provide environmental perfection at all times.
4. ISO 14001 does not in any way supersede or take the place of technical (product/service) specifications or standards or regulatory requirements for specific industries or specific products. It is complementary to such specification, requirements and standards.
5. ISO 14001 is meant to apply to all industry and organizational sectors of a country, both public and private sector, small and large: it is not industry or product specific."

2.2 Reasons for Implementing ISO 14001

In his survey of South African Businesses, Keogh (2000, p1) concluded that the main reason for implementing ISO 14001 arose from business conditions, public pressure and government regulations. This is similar to Bondi et al's (2000, p5) European based findings; where they identified the main motivating factors being increasing legal requirements, the desire for competitive advantage and the need to satisfy customer requirements. Tibor et al (1996, p9) found that the implementation of an ISO 14001 compliant EMS and achieving third-party certification could become a de facto requirement for conducting business. Yadav (1996, p18) drew a similar conclusion in as much as any company's desire to become ISO 14000 certified in today's competitive free market would stem from three factors, one being customer demand in the market place. It is the satisfaction of customer requirements that is the driving force behind the majority of the DAC's members attempts to gain ISO 14001 certification, and were it not for the pressure from their major customers, many would never embark on such a process for whatever reason. Rosen (2001, p1) found that managers took it for granted that environmental protection was peripheral to, or worse, a major threat to the challenge of maximizing corporate advantage in the increasingly competitive global market place. They believed that improving a firm's environmental performance was a matter of regulatory compliance, an activity that added nothing but economic cost and legal and political complications to the corporate bottom line.

Internationally companies are coming under increasing pressure to implement an EMS such as ISO 14001. Murray (1999, p45) found that as more international companies were registering to ISO 14000 and thus were requiring ISO 14000 certification as a precondition to doing business. Munilla et al (1998, p60) also felt that ISO 14000 would become a necessary condition for organisations trading on both the domestic and global markets. In addition ISO 14000 would also have a dramatic impact on the marketing mix including how products are designed, produced, distributed, labelled, promoted, sold and ultimately disposed of and recycled.

Regulatory requirements have been experiencing significant changes in the way that they are applied. Keogh (2000, p2) research revealed that until recently, the focus of

environmental management has been a "command and control" regulatory approach. However since the 1990's, environmental regulations have begun to move away from this penalty-driven approach and towards incentive-driven voluntary self-regulation. Keogh (2000, p6) found that ISO 14001 empowered organisations to monitor and enforce their own environmental performance and thus shifting the burden of proof to the organisations themselves as a requirement for certification.

Despite the perceived resistance to ISO 14001 compliance; many firms have already gained certification, and they claim a number of benefits were achieved as a result of the compliance. There are a number of documented benefits that can be gained as a result of ISO 14001 compliance. Some of these benefits will be discussed in the next section.

2.3 Benefits of ISO 14001

Miles et al (1997, p5) identified seven potential benefits accruing to organisations that achieve ISO 14001 certification, as listed below:

1. Internal motives based on a corporate culture that values morality, ethics, and corporate social responsibility.
2. The ability to charge more for products due to the effect of differentiation.
3. Certification as a barrier to entry in some markets resulting in less competition.
4. Enhanced corporate image that may allow some special considerations when dealing with public stakeholders.
5. The adoption of standards that may help to insulate the organisation against claims of environmental negligence.
6. The adoption of sound environmental practices, such as energy conservation and recycling, that may produce cost savings and lower interest rates.
7. The voluntary adoption of environmental practices that allows commerce to have input on standards and may pre-empt government regulations.

For Sissell et al (1995, p3) one of the main advantages to organisations of ISO 14001 was the provision of better management controls and more clearly defined targets and

responsibilities. While Cochran (1999, p2) identified the fact that ISO 14000 not only provides a focus and discipline that can help eliminate waste and expose opportunities for cost savings throughout the operation; but it also provides a systematic structure for complying with environmental regulations that are required by law, thereby making it easier for the company to be compliant. "ISO 14000 is a proactive standard that helps companies position themselves for increased profits and enhanced customer value while protecting the environment" (Keshav, 1999, p3).

According to Morrison (1999, p4), the greatest strength of ISO 14001 is that it provides a systematic plan-do-check-act continual improvement model for organizations. He adds further, that in theory the model of continual improvement can take organizations beyond compliance with existing laws, as the iterative nature of the process can enable environmental performance levels that surpass government standards.

It is not only the systematic plan-do-check-act model that benefits organizations. In many instances, performing the recommended initial environmental review, organisations have been able to identify legal provisions that were not previously considered relevant, or were simply not known because a thorough assessment had never been performed before. Biondi et al (2000, p61) found that the requirement to set up a register of relevant legal provisions also helped many SME's in selecting the most appropriate instrument to monitor their compliance.

Alberti et al (2000, p4463) recognized two broad categories of benefits that could be achieved from an effective environmental management system, such as ISO 14001, namely Economically Quantifiable Benefits and Economically Non-Quantifiable Benefits as shown in Table 2.2.

Economically quantifiable benefits depend on the organization's environmental efficiency, and require in-depth analysis of the organisation's production systems in order to be calculated. For example raw material savings would come from more complete utilization and the replacement or recycling of production factors. However, many of the benefits listed could be achieved through a Quality Management System (QMS), items such as increased capacity and the reduction of rejects are typical

benefits achieved from an effective QMS. Some benefits of an EMS are difficult to quantify with economic measurements. Corporate social responsibility and the organization's public image have always been difficult items to assign values to.

Table 2.2 Economic and non-economic benefits of EMS

Economic	Non-Economic
▪ Raw materials savings ▪ Energy savings ▪ Improvement in production system availability ▪ Reduction of rejects ▪ Reduction of waste treatment costs ▪ Rejects exploitation ▪ Reduction of idle times ▪ Public incentives ▪ Health care ▪ Insurance cost reduction ▪ Increase in capacity ▪ Decrease in some logistic costs ▪ Increase in resources usage efficiency	▪ Company image ▪ Liability and risk reduction ▪ Market opportunities ▪ Reduction of contamination risk ▪ Better knowledge of job and production system ▪ Product image towards customers ▪ Relationship with authorities ▪ Reduction of human risk ▪ Flexibility of management system ▪ Pro-active attitude to the environmental question ▪ Compatibility with ISO 9000 and ISO 14000

Source: Alberti et al, 2000, p4463.

Monitoring and associated matrices are critical in any management system; if you can't measure it, you can't manage it. Pawar (2001, p14) recommended that the value of an EMS could, and should, be quantified through performance measurements; he also found that by streamlining operations, improving employee morale, and increasing accountability within the organisation, an EMS could extend beyond the environmental focus and have a measurable positive impact on non-environmental functions within an organisation. Particular issues are often highlighted by measurements and matrices; thus by conducting measurements one has the advantage of not only creating a general awareness among stakeholders of the particular issues, but actions may also either eliminate any non conformances or lead to general improvements. Crognale (2002, P34) found that employee awareness and environmental consciousness were two critical issues in the implementation of ISO 14001. Keshav (1999, p117) maintained that ISO 14000 actually helped managers measure the direct and indirect environmental impacts of their activities on the

environment. Some typical factors that organisations could measure and their impacts on both the organisation and the environment are summarized below in Table 2.3.

Table 2.3 Factor Measurements, and Impact on the Organisation and Environment.

Factor	Impact on Organisation	Impact on Environment
1. Electrical Usage	Reduce Electrical Cost	Reduce the amount of fossil fuels being used
2. Water Usage	Reduce Water Cost	Conserve natural resources
3. Waste Generation	Reduce Disposal Cost	Small Disposal Areas

Source: Based on the Theory

2.4 The Implementation Process and its Barriers

ISO 14001 provides basic requirements for firms implementing an environmental management system. Miles et al (1997, p4) explained that the standard defined an environmental management system as that part of the overall management system, which included organisational structure, planning activities, responsibilities, practices, procedures, processes, and resources, for developing, implementing, achieving reviewing, and maintaining the environmental policy.

The implementation process involves taking the organisation from the stage of having no environmental management system in place to the point where it has a fully functional and certified EMS by an accredited certification body. It is possible for an organisation to "self certify" to ISO 14001, as the standard is not compulsory (www.iso.org, 08/10/2004). However with regards to the implementation process discussed in this research, implementation is considered complete once and an organisation has achieved certification through an independent audit by an accredited third party certification body. ISO (www.iso.org, 08/10/2004) defined certification as issuing of a written assurance by an independent, external body that has audited the organisation's management system and verified that it conforms to the requirements

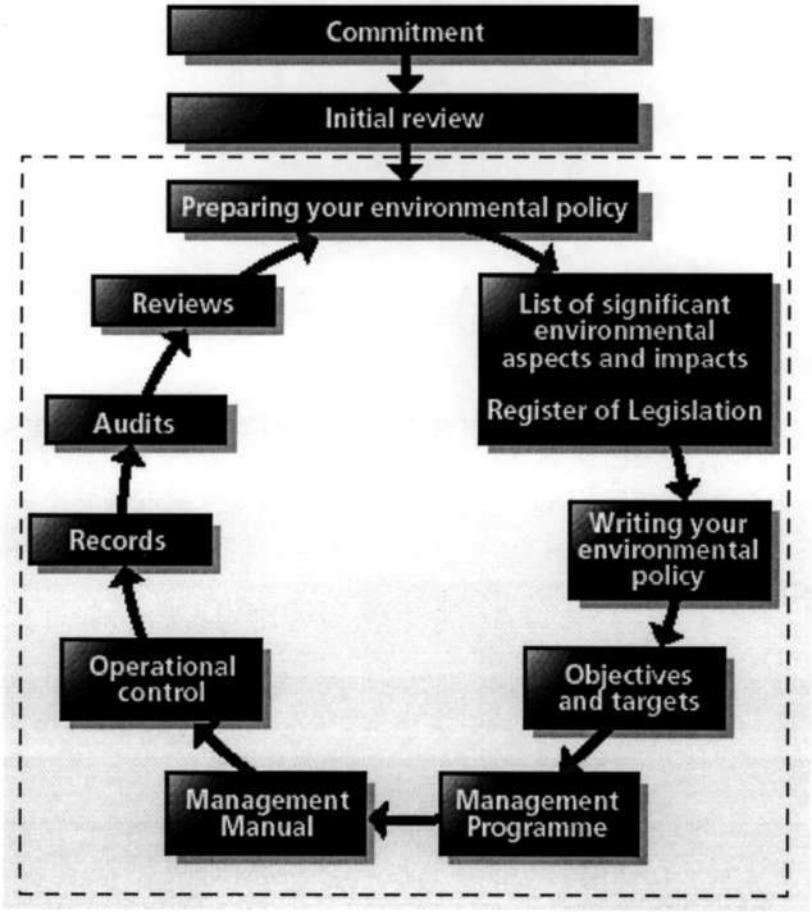
specified in the standard; registration was defined as recording of the certifications in auditing body's client register. ISO further explained that, accreditation refers to the formal recognition by a specialized body, the accreditation body that a certification body is competent to carry out management system certification in specific business sectors. Certificates issues by an accredited body are known as accredited certificates and are perceived by the market as having more credibility (www.iso.org, 08/10/2004).

It could be assumed that most of the DAC members will currently have been certified with a QMS of sorts, be it ISO 9000, QS 9000 or ISO/TS 16949, and thus will have a number of management systems in place. According to Pawar et al (2001, p13), a useful EMS should strive to build upon, and enhance, the existing organizational machine and its processes, not to replace it. The organisation's EMS should be promoted beyond its environmental benefits, and should encompass employee empowerment, improved communication, stronger accountability, streamlined operations, cost savings, and performance improvements. Sasseville et al (1997, p100) recommended that whenever possible, an EMS should be integrated into other business and management functions. This would not only create a more efficient overall management structure, but would also ensure that environmental performance became an integral part of the day-to-day business practices.

However many organisations are reluctant to embark on attaining an EMS, and name barriers such as lack of funds, availability of skills, and resource constraints as reasons. Biondi et al, (2000, p56) found that managing the environmental aspects of activities according to a systemic and preventative approach implied to most SME's a considerable effort in terms of human, financial and technical resources, regardless of their industrial or geographical context. Constraints on the availability of resources also compromised the SME participation in voluntary programmes, such as the European Eco-management and Audit Scheme (EMAS) and ISO 14001. In order to overcome these barriers, organisations should break the implementation process down into a series of steps, and address each of these steps and their associated barriers one at a time.

There are many similarities between ISO 14001 and ISO 9000 in terms of the structure of the code. In fact ISO 14001 has been described as a 'Quality Management System' where the customer is the natural environment, its regulators and the community at large. With this comparison in mind, the implementation process may be viewed as a process of evaluating the organisation and its activities, establishing how it interacts with the environment and putting in place a management system to manage these interactions in order to control their environmental impact. This evaluation will result in a whole series of policies, procedures, general instructions and protocols that the organisation will adopt in order to minimize the effect of the organisation's activities on the environment. Figure 2.1 illustrates a typical implementation of an EMS.

Figure 2.1 Diagram of a Typical Environmental Management System



Source: Anon, Environmental Technology Best Practice Programme, 1999, p3.

The sequential steps involved are:

a. Obtain top-level management commitment, appointing a project leader and team, and allocating resources.
b. Carry out an initial review, including:
    - Gathering data.
    - Preparing a list of environmental aspects and impacts.
    - Identifying significant aspects and impacts for your company.
    - Listing relevant legislation.
c. Start writing a site environmental policy.
d. Rate and list significant environmental aspects and impacts and link to relevant legislation.
e. Compile a register of relevant legislation and establish system to maintain it.
f. Set objectives and targets as part of an environmental improvement programme.
g. Develop written procedures to control activities with significant environmental impacts.
h. Train employees in the organisation on environmental issues.
i. Carry out internal environmental audits to check that the system is operating effectively.
j. Review the current system and make the necessary changes.

The implementation of a typical EMS is not just a case of pure implementation, but should be rather viewed as a process of integration. ISO 14001 is not a package that is purchased for a fixed amount and merely installed into the organisation as an add-on to its current management systems, but rather a series of tailor made solutions that evolve around the organization and its environment. Quality management systems, health and safety management and environmental management systems have a lot of similarities and links between them. Overlaps in these systems should be reinforced rather than re-invented (Anon, Environmental Technology Best Practice Programme, 2000, p3). For example of this would be the document data control procedures used in a quality management system would be suitable for use in an environmental management system.

In the implementation of ISO 14001, organisations need to realize that they cannot implement a system that will cover every single detail of their organisation and cover every single environmental concern. There will be environmental areas of concern that the organisation is not even aware of and these may only be revealed once the EMS has been entrenched in the organisation for some time. "ISO 14001 recognizes that you cannot implement an all encompassing EMS from day one" (Sasseville et all, 1997, p85). ISO 14001, like most QMSs, is based on the concept of continual improvement, with the result that with each review cycle new environmental aspects will be identified. It is the organisation specific determination of the most significant impacts and the subsequent planning that is the basis of the flexibility and universality of ISO 14001.

It is not considered necessary in the scope of this dissertation to cover every aspect of the implementation process in detail. However, there are certain areas in the implementation that need to be discussed, as they are areas where organisations are likely to encounter problems. The first of these areas will be in getting management commitment.

2.4.1 Management Commitment

ISO 14001 requires that the organization's management demonstrate a real commitment to its EMS. Management not only needs to approve the budget for the implementation and maintenance of the EMS, but also needs to give the project their support in terms of resources. Senior management's commitment to the programme is essential in order to ensure successful implementation and operation of the EMS (Anon, Environmental Technology Best Practice Programme, 2000, p6). Graves (2003, p64) found that embarking on ISO 14001 certification required a broad spectrum of support from the organisation and a strong internal commitment from its employees, particularly management. Sasseville et al, (1997, p101) noted that SME's often have much simpler organizational structures with limited resources, the latter generally constrained their ability to implement many of the elements within ISO 14001. In addition to a lack of resources, Biondi et al (2000, p58) also identified the fact that SME's are required to bridge a cultural gap with regard to awareness of environmental matters in their organisations. It is the bridging of this cultural gap that

will require extensive management support. The most significant barrier for SME's is not direct cost, but rather indirect costs, such as the amount of time managers devote to the EMS implementation and the lack of human and technical resources.

ISO 14000 is often focused on technical considerations of the organizational components as opposed to its integration into overall organizational management and thus are seldom efficiently implemented (Nyambe, 2001, p3). However the true backbone to ISO 14000 implementation is about changes in corporate culture and the organisation's attitude to the environment. Wellford (1995, p114) defined corporate culture as a cohesion of ideas, values, norms and modes of conduct, which have been accepted by a company, and should an organisation wish to change its culture, then everybody within that organisation will be required to reconsider their own roles, perceptions and values. Welford (1995, p43) elaborated further by stating that the most serious barriers to improvement are not the nature of the people, the business or the industry, but rather are attitudinal in nature, and therefore there is a need to change attitudes via a change in culture of an organization.

Organisations need to make a paradigm shift in the way they do things and conduct themselves in order to achieve the true benefits from ISO 14001. It is this shift that is often viewed as one of the largest obstacles to be faced by an organization's in seeking compliance. Organisations need to accept that certification is not an end in itself, but a means to an end, in other words they need to focus on what effect the EMS will have on its future operations and how it will affect the day to day running of the organisation and its environmental performance. Alberti et al (2000, p4457) found that implementation of an EMS often required changes in organisational structure, production processes, as well as investments to acquire new skills and techniques.

Welford (1995, p22) found that sustainability, in terms of the environmental context, ultimately required a change in the way business is concluded. The process of becoming more environmentally conscious in this regard must be explored at two levels; firstly, the organisation must look towards a cultural change within the organisation in order to change its behaviour, objectives and outlook; secondly, the organisation must recognize the benefits of acting cooperatively, rather than competitively, in managing its environmental improvements and defining sustainable

strategies which are effective and accepted at a local level. BM Analysts (August 2003, p8) suggested that co-operative learning is required if organisations wish to reduce costs and achieve the goals set on them by their customers. Shared knowledge and collaborative learning among firms could also assist them achieving improved efficiency of implementation, reduced costs and shorten the time for system implementation.

However, Welford (1995, p43) found that the very nature of contemporary capitalist structure, which stresses competition, the maximization of profits, and the reduction of costs, acted as a fundamental barrier to the adoption of ethical practices in business. In addition the overemphasis on money, dictated by the economic systems, therefore represented a barrier to the adoption of sustainable environmental strategies. It has been further argued that the competitive nature of markets is often a barrier to corporate environmental performance, and creates isolationist strategies. It should also be recognized that in some cases environmental and economic values are not consistent (Mayer, 1999, p13). Stephens (1999, p12) suggested that environmental performance equates to economic performance with social benefits and thus organisations should look beyond their immediate economic performances when motivating and implementing a system such as ISO 14001.

For Keshav (1999, p2) the solution to this predicament lies in understanding environmental economics and making a paradigm shift. Organisations need to realize that they are at the root of the situation and thereby demolish certain myths they harbour. The first myth is that anything to do with environmental improvement is a cost and hence will be a drain on the organisation's profits; the second myth maintains that the current ways of doing things are so close to perfection and consequently any other ways of conducting those activities is hardly worth examining. Thus there is a need to bring about a paradigm shift in organisation's perceptions, and this is precisely what ISO 14000 attempts to accomplish. The challenge facing the modern organisation is how to redefine and change its corporate culture in such a way as to be consistent with the concept of sustainable development (Welford, 1995, p114).

However, organisations need to be cautious, as the organisation's culture may be based on a particular definition of sustainable development or environmental

improvement that has not got the backing of its employees because they are not thinking laterally about real change, but rather thinking solely about improvements to the management system (Welford, 1995, p116). Each individual in the organisations needs to assess their contributions to ecological improvements and the organisation as a whole must introduce value-change programmes in order to entrench this process. Welford (1995, p203) recommends that a systemic management process must be at the heart of any culture change programme; this must also include worker participation, shared decision-making and workplace democracy.

The principles outlined by Welford are entrenched in the Department of Trade and Industry's (DTI's) Workplace Challenge (WPC) initiative, to which the majority of the DAC's members have subscribed. This initiative challenges current management structures and roles within the organisation. Management moves from a prescriptive function to a consultative function. The Workplace Challenge is discussed in detail in Subsection 2.7

2.4.2 Preparing the Environmental Policy

An environmental policy is a demonstration of management's commitment to develop a process to improve the organisation's environmental performance. The policy sets forth the goals that management considers important, and establishes a philosophical framework for the development on the EMS. Sasseville et al (1997, p76) defined the environmental policy, within the framework of ISO 14001, as a policy that establishes the principles, responsibilities, and performance requirements against which the rest of the EMS, and related actions, will be judged. Although everyone in the organization will be responsible for implementing the policy, ultimately it is the responsibility of top management to ensure that the policy is implemented in a manner consistent with the goals and principles set forth by the policy.

Biondi et al (2000, p60) found that most SME's encountered difficulties in defining their environmental policy and programmes. This was due mainly to the lack of environmental culture and lack of funds. In addition most SME's were generally not acquainted with explicitly programming and planning their activities in detail, especially with respect to issues outside their core business.

2.4.3 Initial Environmental Review

The initial environmental review provides the organisation with a snap shot of the status of its current environmental performance and where it is at that time with regard to environmental issues. Although it is not included in the scope of ISO 14001, QSI-Afrocare (2003, p1 of module 6) considered it a necessary precursor to the implementation of ISO 14001. From this initial review the organisation will be able to identify areas where environmental performance needs to be improved; opportunities that can lead to better or more efficient environmental performance; and ways to develop an environmental policy that will provide the proper guidance and direction to enable the organization to develop an effective EMS. It will also provide important data needed to begin planning the implementation of ISO 14001.

The initial review should cover aspects such as:

1. Regulatory and legislative requirements governing the organisation's operations.
2. How the organisation interacts with the environment and which of its activities have significant environmental impacts, or may create a liability for the organisation.
3. Evaluation of the organisation's current environmental management procedures and programmes.
4. Identify what aspects of the organisation's activities enable or impede better environmental performance.

Regulatory and legislative requirements, and the establishment of a Register of Legislation is an area where many SME's, due to financial restraints which may limit their ability to afford legal expertise, are likely to encounter difficulties. This is of such material concern to the DAC and its members that they established a Special Interest Group to address this precise issue.

2.4.4 Regulatory and Legislative Requirements

Operating within legal requirements is a minimum requirement of ISO 14001. These legal requirements will include any regulatory or statutory requirements that apply to the environmental aspects of the organisation. Other requirements may also include a variety of non-regulatory performance criteria; such as customer specific requirements, industry codes of practice and agreements with local authorities and neighbours. The register of environmental regulations must be relevant to the organisation, and should be drawn up by individuals with knowledge of the processes and operations involved, the relevant regulations and the requirements governing them. "The identification and evaluation of environmental aspects requires an understanding of your company's legal and other requirements" (Sasseville et all, 1997, p91). It is a requirement of ISO 14001 that an organisation establishes and maintains procedures to identify and have access to legal and other requirements that are applicable to the organisation. Many of these requirements need to be extracted from a multitude of sources, and would include among others the following:

- Constitution of the Republic of South Africa, Act 108 of 1996
- Environmental Conservation Act 73 of 1989
- Health Act 63 of 1977
- National Environmental Act 107 of 1998
- Atmospheric Pollution Act 45 of 1965
- Hazardous Substance Act 15 of 1973
- Occupational Health and Safety Act 85 of 1993
- Conservation of Agricultural Resources Act 43 of 1983
- Forest Act 122 of 1984
- Water Act 54 of 1956
- Mountain Catchment Areas Act 63 of 1970
- Lake Areas Development Act 39 of 1975
- Seashore Act 21 of 1935
- Sea Fishery Act 122 or 1988
- National Monuments Act 28 of 1969
- Animals Protection Act 71 of 1962
- Game Theft Act 105 of 1991

- Agricultural Pests Act 36 of 1983
- Sea Birds and Seals Protection Act 46 of 1973
- Minerals Act 50 of 1991
- Electricity Act 41 of 1987
- Nuclear Energy Act 133 of 1993
- Development Facilitation Act 67 of 1995
- Physical Planning Act 125 of 1991
- National Parks Act 57 of 1976

On the issue of legislation and regulations, Sasseville et al (1997, pp 92 – 93) notes that many of these acts and government notifications tend to be complicated and difficult to understand, especially in terms of these regulations' practical applicability. Industry groups usually provide useful updates or seminars on the "hot" regulatory issues, but cannot address every new regulation. However, commercial sources vary considerably in quality and breadth of coverage. Good services usually provide complete coverage with frequent updates at all government levels, but less coverage as you move down to local issues. Depending on the total coverage required, and the frequency of updates, the costs can escalate rapidly. Professional environmental consultants are useful in creating an understanding of the applicability of new regulations, or assisting organisations in tracking developing regulations. However, few individual consultants are knowledgeable enough in more than a few areas of environmental regulations to provide complete and in-depth tracking information.

The situation is not much better within the organisation, since many organisations lack the legal expertise. This is further complicated by the fact that there is often little understanding of environmental issues at all levels of an organisation. Similarly there is frequently a lack of knowledge as to who is responsible for complying with specific regulations. Another issue that is problematic as a result of this lack of environmental understanding, is that organisations have difficulties in conceptualising how they interact with the environment and what the environmental impact of their operations are.

2.4.5 Environmental Aspects and Impacts

ISO 14004:1996 (1996, p2) defined environmental aspects as elements of an organization's activities, products or services that could interact with the environments; and environmental impacts as any change to the environment, whether it adverse or beneficial, wholly or partially resulting from an organization's activities, products or services. The significance of these impacts should be considered within the specific framework of the organizations facilities and operations.

In practice, an environmental aspect is any activity that the organization performs that may have an effect on the environment, either in a negative or a positive way. This activity does not necessarily have to be currently effecting the environment; provided it has the potential to effect the environment. Environmental aspects form the basis for determining how the organization impacts on the environment. One of the key issues in ISO 14001 is the establishment of these aspects, and the placement of controls to minimize or negate the impact they have on the environment. "The fundamental purpose of the EMS and ISO 14001 certification is to control and reduce the environmental impacts of a facility's processes and products, therefore the environmental aspects and impacts associated with a facility must be identified and prioritised" (Graves, 2003, p65). The relationship between aspects and impacts is one of cause and effect.

ASPECT ↔ IMPACT

CAUSE ↔ EFFECT

Some aspects will have a greater significance than others, and thus the organisation will need to rate their significance. The aspects with the greatest significance will be used to set the objective and targets of the EMS. The analysis of all aspects of the organization's operations creates an environmental awareness of the organisation's operations.

The identification of aspects, and the evaluation of the impacts, requires the services of technical experts, who normally charge high fees, thus putting additional financial strain on many organisations. Suppliers of chemicals, plants and equipment will,

however, be able to assist in providing some of this information and services as part of their product support commitments.

2.4.6 Management Manual

The management manual is a document that describes the organisation's EMS; it will cover items such as responsibilities, activities, policies, objectives and their achievement. The Management Manual acts as a guide to EMS's procedures and documents, and describes the entire system. It also provides a useful guide to anyone wanting to understand the EMS. The manual will be designed by the organisation and in many ways will be unique to that organisation. It describes how the organisation shall operate and function, and will generally consist of a set of procedures, work instructions and policies that are put in place to ensure that the organisation minimizes and controls the negative impacts of its activities on the environment; it may also look at maximizing the positive impacts of its activities on the environment. In addition it will put in place systems for achieving environmental targets and objectives.

ISO 14001 is essentially a management process, albeit specific to environmental performance issues. Sasseville et al (1997, p82) recommended that organisations assess what management programmes and control systems they already have in place, be it quality, financial or human resource, and examine what works for the organisation. By examining what already works within the organisation, one will avoid the need to "reinvent the wheel". It is the documented manuals, procedures and records that form the foundation of any management control (QSI – Afrocare, 2003, p1 of module 4). Biondi et al (2000, p60) concluded that many organisations lacked the environmental culture and were not acquainted with explicitly programming and planning their activities in detail, especially with respect to issues outside their core business, thus many of them encountered difficulties in defining their environmental policies and management programmes. Compiling this management manual will require an intimate knowledge of how the organisation functions, its strategic direction and a good sound environmental understanding.

Many routine and daily operating procedures in an organisation are often assumed to work on an informal basis, and thus may be difficult to document in terms of practical

procedures. However, organisations must be cautious as too much documentation, in the form of procedures, work instructions and policies, can result in a system that is too regimented and stifles initiative. QSI – Afrocare (2003, p1 of module 4) recommended that these documents should be pitched at the level that is just enough to help staff implement the system, but not so overwhelming as to drown them in paperwork and procedures. Alberti et al (2000, p4464) found that an EMS implementation is the easiest in organisations that are standardized and well structured, which is normally larger organisations; however many smaller businesses feared such systems as they would lose flexibility in their organisational management.

2.4.7 Training

ISO 14001 requires that organisations identify and address environmental training needs. "Appropriate training relevant to the achievement of environmental policies, objectives and targets should be provided to all personnel within the organization" (ISO 14004, 1996, p17). Cochran (1999, p37) identified training as one of the biggest challenges to the implementation of ISO 14001. He argued that it is important to ensure employees are familiar with plantwide environmental issues as well as issues in their particular areas. Bondi et al (2000, p58) also recognized the lack of environmental management skills as one of the first constraints in terms of human resources.

QSI – Afrocare (2003, p7 of module 3) recommended that organisations should have employee awareness campaigns that cover issues such as; understanding the environmental impact of their activities, their responsibility to follow procedures and the effects that deviation from these procedures has on the environment. Graves (2003, p66) found training to be one of the most important aspects of ISO 14001 implementation as it could be used to communicate to all employees the environmental impacts of their activities, the organisations environmental policy, roles, responsibilities, procedures, methods and actions required to meet the organisation's EMS.

2.4.8 Audits

As with ISO 9000, ISO 14001 emphasizes the importance of using audits as a management tool for monitoring and verifying the effectiveness of the EMS's implementation. ISO 14001 (1996, p2) defined an audit as a systematic, independent and documented process for obtaining audit evidence and evaluating it objectively to determine the extent to which the audit criteria are fulfilled. There are basically two types of audits, namely and internal, or first-party audit, and an external, or second and third party audits. First-party audits are conducted by, or on behalf of, the organisation itself for management review and other internal purposes. Second-party audits are conducted by parties having an interest in the organisation, such as customers and third-party audits are conducted by external, independent auditing organisations, such as those providing registration or certification of conformity to the requirements of ISO 14001. Graves (2003, p68) found that audits should be used to identify and resolve ISO 14001 deficiencies in the organisation and they should focus on objective evidence.

Piasecki et al (1999, p53) found that by auditing an organisation's faults, it is possible to prevent that organisation from making significant errors as the result of the audit will highlight weakness in the organisation before they become problems. Thus in the organisational context, effective auditing has the potential to improve the management of the organisation, however senior management must be in a position to accept the finding of the audits and act on the recommendations made.

The problem SME's are likely to face with their internal audits is that many organisations lack the people with the necessary skills and knowledge to audit the organisation. These internal auditors would be required to have a sound understanding of environmental issues, the requirements of the standard and how the organisation operates. Organisations may choose to use an external person to carry out these audits, but this normally is a costly exercise. Cochran (1999, p37) recognized internal auditing as one of the big successes in existing QMS's, and recommended that organisations should look to extending their existing internal audit system to include environmental issues.

With regard to cost of implementation, Biondi et al (2000, p58) identified the following costs: costs relating to the necessary technical measures to guarantee the improvement of environmental performance; costs relating to EMS implementation; and costs incurred in obtaining third-party verification.

2.5 Opponents to ISO 14001

ISO 14001 has been seriously criticized by many organizations, especially those organizations reluctant to comply with environmental best practices and seek accreditation. "In many cases, companies see the investments in environmental quality simply as costs that must be sustained" (Alberti et al, 2000, p4456). Biondi et al (2000, pp63 – 64) related a disturbing trend that there was no acknowledged case of measurable economic benefit emerging from the improvement of an SME's competitive position, and in addition the only economic benefits are those obtained by optimising resource use.

In their analysis of South African companies, B&M Analysts (August 2003, p7) found that the organizations complained about the exorbitant costs, the high demand placed on resources, ineffectiveness and inadequate training at all levels of the supply chain. Smaller companies generally suffer from extreme time, financial and manpower resource constraints, and often the ends do not appear to justify the means in the eyes of the organizations. Many managers argue that they are too busy "doing business", and that the implementation of such systems do not materially alter the quality of their products.

Morrison's (1999, p6) greatest misgiving about ISO 14001 was that external stakeholders would misconstrue what ISO 14001 could deliver, as well as what certification actually meant. In addition he pointed out that an ISO 14001 certified organization would not necessarily guarantee improvements in their environmental performance or be in regulatory compliance. The ISO 14001 standard as a framework is a very effective tool for organizations that seeks to achieve certain performance objectives and targets; however the standard itself does not provide any guidance or requirements for what those targets might be. Morrison (1999, p6) also considered the

absence of these performance levels would become problematic when coupled with the lack of transparency to the organisation's external stakeholders.

Speir (1999, p8) argued that the present system of environmental regulations, despite its successes, did nothing to encourage the organisation to do more than comply with minimum regulatory requirements, in other words he was of the opinion that compliance had become a kind of ceiling, as well as a theoretical floor. However, according to Stephens (1999, p12) compliance with existing command and control-orientated regulations was the floor and the EMS's are about moving beyond the floor. Biondi et al (2000, p61) furthermore identified the fact that most SME's find maintaining continuous compliance with environmental legislation problematic and this required serious managerial effort. Moreover, environmental legislation is subject to frequent and sudden revisions, thus making continuous compliance problematic.

Although the goals of ISO 14000 are quite lofty, Murray (1999, p38) found environmentalists criticized the standards, on the grounds that standards do not set any particular level of environmental performance, thus, organisations would tend to adopt the lowest level of compliance, namely the local regulatory threshold. There is also no incentive to set ambitious goals. In addition, some organisations fear that the goal of continued environmental improvement, which is entrenched into the philosophy of ISO 14000, will lead to increased regulation by the environmental regulators, such as the Environmental Protection Agency (EPA). Another criticism of the ISO 14000 standards is that organisations can choose to self-certify rather than seek third-party verification. Without an independent means of verifying an organisation's information, the entire certification process is thrown into question. Nevertheless, some organisations fear that the information gathered in an ISO audit conducted by an outside auditor, will be a roadmap for environmental regulators to use against the organisation. The potential lack of confidentiality of the information uncovered as a result of an environmental management system has created a virtual cottage industry in advice and proposals to solve these problems. Organisations find themselves in a predicament, as on the one hand they fear that information gathered in the certification process could be discovered and used by regulators or environmental groups to turn against the organisation for its environmental violations; while on the other hand, environmental groups and others have expressed much scepticism

concerning the validity of the entire ISO 14000 process if there is no verifiable means to demonstrate that a company has met or exceeded its goals and objectives.

Murray (1999, p40) found that organisations were also concerned that if they improve their environmental performance substantially, regulators may impose even more stringent regulation instead of loosening their grip. While many organisations clearly welcomed a relaxation in the command-and-control type regulations, they where proceeding very cautiously to be certain that if by certifying to ISO 14000 and adopting an extensive EMS, they were not opening themselves up to substantial criminal and civil litigation and/or penalties. Thus the confidentiality issue will continue to hamper the efforts to create meaningful environmental management systems where continual improvement and self-regulation is entrenched in the day-to-day running of a modern organisation.

2.6 Corporate Social Responsibility

Smith (2002, p42) defined corporate social responsibility as the integration of business operations and values whereby the interests of all stakeholders, including customers, employees, investors and the environment are reflected in the organisation's policies and actions. Pearce et al (2000, p53) identified three principle reasons why managers should be concerned about their organisations social responsibility. The first was that an organisation's right to exist depended on its responsiveness to the external environment. The second was that government regulations are increasing and organisations need to evolve to meet the changing social standards. Finally, a responsive social policy could enhance the organisations long-term viability. Karapetrovic et al (2003, p451) found that organisations bottom-line performances also included the natural environment, occupation health and safety, corporate social responsibility accountability, internal and external complaints handling, finances and a myriad of similar organisational and managerial considerations.

The Coalition for Environmentally Responsible Economies (CERES) was formed six months after the March 1989 Exxon Valdez incident (Pearce et al, 2000, p60). The principle of CERES was to establish an environmental ethics with criteria by which investors and other stakeholders can assess an organisations environmental performance. "Companies that sign these Principles pledge to go voluntarily beyond the requirements of the law" (Pearce et al, 2000, p60). In essence, these are some of the underlying principles of ISO 14001. ISO is considering whether it should develop a set of CSR standards (Smith, 2002, p42).

As mentioned previously, ISO 14001 can be viewed as a management system that ensures the organisation acts in a responsible manner to the environment and community at large, i.e. the organisation's external environment. Thus it could be argued that ISO 14001 should form part of an organisation's CSR programme. This is an issue that Stephens (1999, p2) touched on when he equated environmental performance to economic performance with social benefits. "Local communities have a stake in the in the performance of organisations because employment, housing, and the general economic well being of a community are strongly affected by the success of failure of local businesses" (Jones, 2001, p17).

Pearce et al (2000, p60) found that consumers are becoming more interested in buying products from socially responsible organisations, and thus for long-run survival and growth, demands that managers learn to integrate CSR into company strategy. Furthermore, Miles et al (1997, p116) found that consumers are becoming more and more concerned about the natural environment and there is therefore an increased calling for the adoption of more environmentally congruent practices and policies by business. Munilla et al (1998, p59) recognized that ecologically sustainable organizations may be operationalized by the adoption of 'enviropreneurial marketing strategies' which include issues such as ecologically appropriate innovations, corporate social performance metrics and an orientation towards sustainable business.

From this, one could debate the fact that ISO 14001 certification can be seen as proof of the organisations commitment to CSR principles. However, for the majority of the DAC members, the true benefits they would achieve from a CSR programme are questionable. All these organisations manufacture industrial goods and are thus far

removed from the final consumer, i.e. the people who purchase the motor vehicles. Thus these consumers will not even notice any CSR exercises; in fact many consumers do not even know that these organisations even exist. However the Original Equipment Manufactures, OEMs, such as Toyota, Volkswagen and Ford, need to be seen as being committed to CSR and thus in turn will put downward pressure on the supply chain to adopt many of the principles contained within CSR. This is further complimented by the fact that ISO 14001 encourages organisations that hold certification, as many of the OEMs do, to encourage members of the supply chain to adopt the principles of the EMS.

2.7 The Work Place Challenge

It is important to mention the Workplace Challenge, WPC, as this programme is seen to be an important facilitator in achieving many of the requirements of ISO 14001, especially in terms of the cultural changes the organisation is required to make.

"The Workplace Challenge is a DTI supply-side programme established to meet the competitive challenges presented by South Africa's re-entry into the global market" (NPI, 2002, p5). This programme is designed to encourage government, business and labour to participate in a consultative process aimed at promoting improved performance, growth and employment across all industrial sectors in the South African economy. Its main function is to assist a cluster of organisations, such as the DAC, to develop workplace change processes that will lead to improved operating practices on the shop floor, and to disseminate the processes, methodologies, improved operating practices and lessons learnt during the process.

Welford (1995, p203) felt that systemic management should be at the heart of the culture change programme. The programme should place a greater emphasis on worker participation, shared decision-making and workplace democracy. Each individual should assess his or her contributions to ecological improvements and the organisation as a whole should introduce a value-change programme that adds to the process. In essence this is what the WPC sets out to achieve.

In the WPC, organisations are broken down into mini businesses. These mini businesses are referred to as mission directed work teams and they function like a business, each with their own set of customers and suppliers. Each team has a team leader, who is a democratically elected member of the team. In addition to this the team will have a coach and a sponsor, both of which represent management. Each team has its own set of matrices that they measure and report on.

2.8 Summary

The importance of Environmental management systems is ever increasing in the modern organisation, even to the extent that in certain industries, it has become a de facto requirement for doing business. The most universally adopted EMS is ISO 14001, a standard developed by the International Organisation for Standardization. As a result of the importance it is playing in modern management, more and more organisations are implementing the system in order to continue operating in their current industrial segments.

ISO 14001, like all EMSs, is basically about establishing a system to manage the interaction between an organisation's operations and the environment. The system offers organisations a host of benefits, such as cost saving from better resource utilization, improved risk management and liability containment. The system even has the potential to improve the organisation's public image. For most organisations, especially SME's, the major benefit of the system is being able remain in their current industrial set since failing to implement an EMS and gain certification would result in them being excluded from new, or even current, business.

The implementation of ISO 14001 revolves around the organisation becoming committed to continual environmental improvement. Organisations are required to review their operations and establish how they interact with the environment. Having done this they need to put in place a management system to manage these interactions. Organisations also need to establish the legal aspects of their operations and

establishing a procedure to maintain compliance with the law. Organisations need to ensure their staff is competent to perform their tasks and provide the necessary training programmes to address any training needs. The system needs to be audited and reviewed periodically by management.

All management systems are subject to debate, and inevitably attract criticism and EMSs are not spared the same fate (Nyambe, 2001, p22). ISO 14001 has attracted a fair amount of criticism such as its potential to drain an organisation's resources, it sets no particular levels of environmental performance, and some critics fear that information collected by the EMS is may be used to prosecute the organisation.

Due to the importance on an EMS, organisations need to consider the strategic implications on the management system. This is discussed in Chapter 3.

CHAPTER 3

Strategic Environmental Management

3.1 Introduction

It is important to understand the link between ISO 14001 and strategic environmental management, as this link will ultimately have a direct impact on the implementation of the environmental management system (EMS) and the maintenance thereof. As discussed in the previous chapters, ISO 14001 is an environmental management system and the purpose of this research is to investigate its implementation. When judging the success of any management system, such as an EMS, one does not look at the completion of its implementation process, but rather further down the line. Indicators of successfulness of the implementation will be the adoption of environmental indicators and factors into the organisation's strategic analysis and planning. These indicators and factors will be present in the three levels of the organisation, namely its policies, processes and products. Bansal et al (1997, p175) recommends that organisations need to look at changing the way they view their policies, processes and products in order to truly operationalise the environmental aspects of their business strategies.

Pearce et al (2000, p3) defines strategic management as the set of decisions and actions that result in the formulation and implementation of plans designed to achieve the organisation's objectives. Strategic management involves the planning, directing, organising and controlling of an organisation's strategy-related decisions and actions. Managers refer to strategy as their large-scale, future-oriented plans for interacting with the competitive environment in order to achieve the organisation's objectives. These plans provide the framework for managerial decisions.

Porter et al (1995, p122) drew a similarity between the resistance of managers in the 1980's to quality management programmes and the resistance environmental management programs are currently facing. Many managers saw quality as a cost since it involved inspection and rectification of the inevitable defects that came off

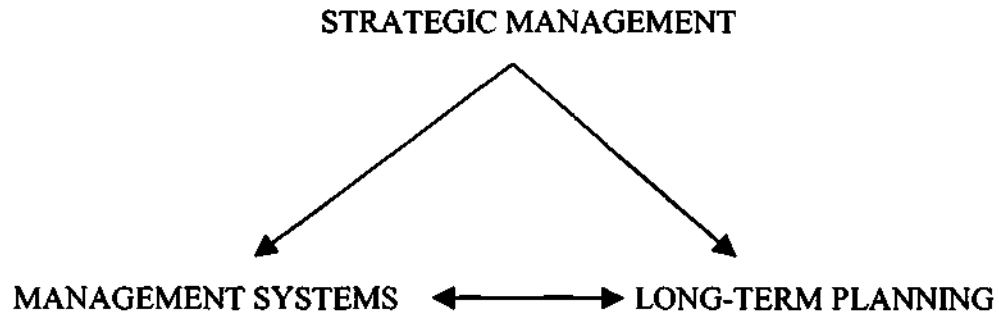
line; however quality guru Edward Deming soon corrected this misconception by building quality into every aspect of the organisation from design through to manufacturing, sales and servicing (Tibor et al, 1996, p23). It is now generally accepted that quality is a cost saver due to its defect prevention mechanisms. Like defects, pollution often reveals flaws in the product design or production process and efforts to eliminate pollution could therefore follow the same principles of the widely accepted quality management programmes. Environmental management programmes can lead to the more efficient use of inputs, eliminate the need for hazardous, hard-to-handle materials and eliminate unneeded activities. Quality management has formed an integral part of many organisations' strategic plans during the last decade, thus in similar vain, it can be expected to see environmental management programmes forming an integral part of organisation's strategic plans in the next decade.

3.2 Theory of Strategic Management

Competition is a core concept in strategic management (Gremenez et al, 2000, p363), and the main goal of strategic management is about building and maintaining a competitive advantage (Ohmae, 1983, p36). Thus it can be deduced that the primary objective of strategic planning is to enable an organisation to gain a sustainable competitive advantage over its competitors. Jones (2001, p8) defined a competitive advantage as the ability of one organisation to outperform another because its managers are able to create more value from the resources at their disposal. A sustainable competitive advantage can be created when an organisation adds value, which satisfies its customers' needs, in such a way that the organisation can defend it from its competitors. Campbell et al (1997, p99) found that in order to create and maintain a competitive advantage, organisations need to be able to deliver a given set of customer benefits at lower costs than competitors, or provide customers with a bundle of benefits its rivals cannot match. Thus, the challenge to any organisation is to have a business strategy that mobilises the organisational machine into achieving these factors.

Piasecki et al (1999, p47) loosely defined strategy as a mix of past mistakes, present predicaments and future solutions, while Quinn (1980, p204) defined strategy as the pattern, or plan, that integrates an organisation's major goals, policies, and action sequences into a cohesive whole. Taking these view points and combining them with that of Pearce et al's (2000, p3), strategic management can be broken down into two areas; the first being long-term planning; and second being management systems, as shown in Figure 3.1. Long-term planning involves the setting of future orientated goals and plans, while management systems are all about controlling the organisation. However there is also a link between management systems and long-term plans as most management systems, such as ISO 14001's clause 4.3.3 (ISO 14001, p3), require organisations to set up a program of targets and objectives.

Figure 3.1 Strategic Management Components



Based On and Designed According to the Theory

It is the management systems side of strategic management that is of particular interest in this research; however it is equally important to view planning aspects as well.

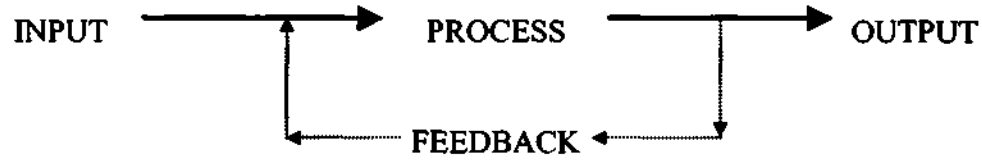
3.3 Management Systems

Delving briefly into the theory of systems thinking, reveals that systems thinking is based on a systematic approach to organisations. Trienekens et al (2001, p467) found

that elements of an organisation cannot be analysed on their own without taking into account how they relate to other system elements within the organisation and its business environment. The analysis of these elements should be founded on the goal-oriented behaviour of the system. Thus, systems thinking not only prescribes an integrated view of the organisation, but also aims at an interdisciplinary approach to organisational problems. In other words, when looking at an environmental management system, other management systems need to be taken into account. The systems approach defines a management system as a composite set of interdependent processes that operate harmoniously, sharing the same resources pool, and aimed towards the fulfilment of set goals (Karapetrovic et al, 2003, p455). Thus by breaking the system down, it can be viewed as a series of interrelated processes.

Pearce et al (2000, p15) defined a process as a flow of information through interrelated stages of analysis towards the achievement of an aim. A process basically consists of inputs, the process itself, outputs and feedback loops as shown in Figure 3.2.

Figure 3.2 A Simple System



Based On and Designed According to the Theory

Without feedback, it is impossible to control a process. Thus by reconstructing the system and putting together all the processes, the importance of feedback in order to control and regulate the system is evident. Without feedback, a system will become unstable and fail to achieve its objectives. Management systems are controlled in two ways, the first being the auditing of the system, the second being the day to day performance measurements.

3.4 Feedback and Measurements in Management Systems

By auditing an organisation's faults, it is possible to prevent that organisation from making significant errors since the results of the audit will highlight weaknesses in the organisation before they become problems. Thus in the organisational context, effective auditing has the potential to improve the management of the organisation. Senior management, however, must be in a position to accept the finding of the audits and act on the recommendations made.

Management needs feedback from the system in order to make effective decisions, thus validity of the system will be based on the quality of this feedback. Properly focused performance measurements have the potential to ultimately improve the overall competitive advantage of the organisation on the proviso that senior management accepts responsibility for judging the outcomes of the measurements and acting on the results of the measurements. An EMS provides to opportunity to integrate environmental criteria into an organisation's considerations at all levels (Gilbert, 1993, p91).

It is important to realise that measurements are not the solution to all management problems. On the issues of the environmental-related performance measurements Bennett el al (1998, pvii) felt these measurements usually had a supporting rather than primary role in environmental improvements. The justification for this belief lies in the fact that organisations are capable of making substantial achievements without using measurements, instead organisations rely on the commitment of its members, both individually and when acting as a team. Although measurements have the ability to enhance these members' actions, by giving them feedback and direction, without the commitment of members to the organisation, measurements will seldom translate into practical improvements. Thus in order to create an effective measurement system, a holistic view of how measurement fit the organisation is required, taking into account measurements, organisational members and their commitment to that organisation.

In line with building and maintaining a competitive advantage, measurements must be in line with the three factors highlighted earlier, namely value addition, customer needs and defence from competition. Piasecki et al (1999, p53) identified three primary attributes of performance measurements; time, quality and cost. In the Department of Trade and Industry's (DTI's) workplace challenge initiative, these same three measures emerge as critical. The mission directed work teams (MDTs) are required to measure and report on Quality, Speed (time) and Cost. These teams are also required to report on Morale, a measurement that highlights the issues raised by Bennett el al (1998, pvii) in the previous paragraph, namely that of commitment to the organisation.

Time measurements focus on the speed of the underlying process; it measures the time taken to perform a value adding activity, namely, the time between one value adding activity and another. The less time it takes to complete a process or task, the sooner the next value adding activity can take place. Quality measurements focus on the delivery of results that meet stakeholder expectations and measure the perceived "goodness" of the service in the eye of the stakeholder. Cost measurements focus on the financial impact or output of processes, and reflect the financial implication, and costs, of meeting stakeholder requirements.

Although these measurements are not the only measures that an organisation can make, they are measurements that can be universally applied to any aspect of a management system. By accurately representing organisational functions in these performance terms, it is possible to view the organisation's strengths, weaknesses, opportunities and threats (SWOT). There are a variety of system and process specific measurements, such as market share, that an organisation can also make. However if one is looking towards an integrated management system (IMS), one needs measures that are common across the various sub-systems.

In a quality management system (QMS), key performance areas (KPAs) are often externally initiated and monitored by the organisations customers. This is particular prevalent in the automotive industry, where the Original Equipment Manufactures (OEM) measure their suppliers on quality measurements such as reject rates and on-time deliveries. A breakdown in the QMS will surface as a failure to meet the

customer's expectation, such as a reject part being delivered to the customer or a late delivery. In an EMS, the situation is little trickier, as suppliers are not likely to experience the same levels of scrutiny. In the previous chapter a comparison was draw between a QMS and an EMS by comparing an EMS to a QMS, where the customers are the natural environment, its regulators and the community at large. Thus the question is asked, who will set the KPAs and how will they be monitored? Applying the same principles as are experience in a QMS, the answer would be the natural environment, its regulators and the community at large, however this poses a number challenges.

In South Africa, the regulators are made up of government departments and NGOs, people that are generally not welcomed into organisations. In addition, Keogh (2000, p5) found that the levels of details required to monitor environmental performance outstripped the state's capacity to response effectively. Regulators are also plagued with other issues such as chronic resource constraints and apathy. This is also complicated by the fact that this regulatory command-and-control approach is contradictory to the underlying principles of an EMS. Non-compliances with regulations, which generally are as a result of a breakdown in the EMS, also often have severe legal implications.

Public scrutiny, in terms of the community at large, can have profound impact of an organisation. This was demonstrated in 1986 when the US based Environmental Protection Agency (EPA) introduced the Emergency Preparedness and Community Right to Know Act. This act required organisations with significant quantities of hazardous materials to participate in the publicly available Toxics Release Inventory program (Piasecki et al, 1999, p55). Organisations were subsequently exposed to intense public scrutiny, and as a result many organisations began to look for new sets of environmental performance measures. However the public is often ignorant of where it stands in terms of its environmental rights.

The basic principles of an EMS are about self-regulation and going beyond regulatory compliance. Thus organisations should look in one of three directions for effective monitoring of their EMS, the first being their certification body, the second being their customers and the third being internally. Although third party certification

bodies, such as SABS, conduct biannual surveillance audits on the EMS, these often focus on compliance verification. Piasecki et al (1999, p32) found that in compliance verification audit, audits tend to review compliance by looking at each sentence of the site requirements manual and thus often miss the big picture. Customers on the other hand are not particularly interested in the day to day running of the EMS as a breakdown in the system is unlikely to affect them directly. The answer to this predicament lies internally. Piasecki et al (1999, p48) recommends that organisation need to look at blending fundamental environmental measures with more strategic indicators, such as where they are, where they have been and where they want to be.

Well designed and reliable measurements allow an organisation to quantify non-conformances or breakdowns in their management systems, and thus identify new opportunities. Piasecki et al (1999, p48) identified the fact that strategy is often about choice and about mobilising a few good options. Organisations should look at applying the same approaches used to change and improve traditional management procedures, in terms of measuring how well processes perform, to evaluate environmental performance.

However, organisations need to be cautious, as they could easily become over zealous and set exceptionally high environmental standards in order stay ahead of the growing regulatory burden. These organisations could run into difficulties when it comes to establishing comprehensive, cost-effective programs to address their environmental risks. Organisations need measurements that consider the key elements of time, cost quality and morale in the evaluation of processes throughout the organisation. The measurement system must measure elements that are controllable by the employee and the organisation.

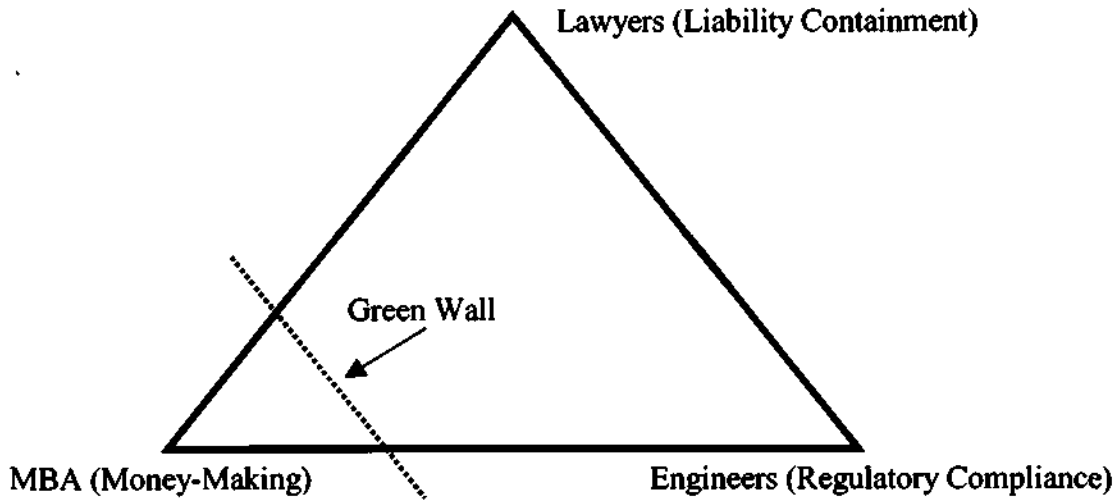
Managers wishing to improve their organisations competitive environmental standing should look carefully at their organisational measurement systems. Measurements can lead to enormous opportunities to improve productivity. Organisations should measure and quantify their direct and indirect environmental impacts. Porter et al (1995, p131) identified ignorance as one of the major reasons that organisations are not very innovative about the environmental problems.

Bennett et al (1998, p99) found at almost every organisation needs to pay greater attention to environmental-related performance measurements, both to have better data for internal decision making and to meet the demands of ever more sophisticated stakeholders.

3.5 Issues and Challenges for Organisations Incorporating Environmental Management into Strategic Planning

Organisations that fail to take a holistic view of their organisation and its structure find themselves in the situation where they compartmentalise the organisation. Subsequently their management systems do not integrate and achieve the broad proactive benefits the management systems had to offer. Piasecki et al (1999, p11) identified EMS specific phenomenon that they called the "Green Wall" and defined it as a point at which the overall organisation refuses to move forward with its strategic environmental management program, and the environmental initiatives stall. The reason for this stall lies in the fact that the core nature of the organisation is sliced from the environmental decision-making process, leaving the two-dimensional way of compliance, which lacks any strategic vision as shown in Figure 3.3. The green wall poses a real threat to strategic environmental management programmes as organisations tend to focus on the compliance with regulations and using liability containment as a back stop, instead of focusing on how the organisation can go beyond compliance in a cost effective manner.

Figure 3.3 Defining the "Green Wall"



Source: Piasecki et al, 1999, p12.

Compliance-oriented environmental management programmes have had difficulty in finding an effective place in the organisation due to the fact that environmental management is neither an operations nor a staff function. Integration with staff and operations business units is a major challenge for environmental management functions. In order for environmental management functions to become effective, they are required to be both sufficiently represented at a corporate level, yet at the same time be autonomous enough to provide the independent perspective required for environmental quality assurance and enforcement. Piasecki et al (1999, p13) found that strategic environmental initiatives have the potential to relieve the tension created by this dual role. However, the goal of these initiatives must be the integration of environmental management with other business functions and the building of a credible set of expectations regarding the potential contributions of these environmental initiatives. Attempts to achieve this integration can be compromised by the following factors as identified by Piasecki et al (1999, p13):

1. Corporate downsizing and restructurings often result in resource restrictions or reallocations. In many cases these resources are moved away from non-core functions, such as environmental initiatives, thus leaving them constrained and unable to function effectively.

2. The uncertainty of how environmental programs contribute to the financial well-being of the organisation often result in them not standing up to tight financial controls and scrutiny of the bottom-line contributions.
3. Management attention and prioritisation is often "hijacked" by new management paradigms such as re-engineering and TQM.
4. Overeager environmental managers set up programmes and strategies that are too broad, or try to achieve everything at once, instead of utilising the continuous improvement principles that many EMS's adopt. Programs thus become too costly and have extended payback periods thereby causing them to come into conflict with the overall business strategy.
5. Organisations are oversold on the benefits that can be achieved by the EMS thereby placing unrealistically high expectations on stakeholders, when there expectations are not met, the EMS falls fowl of corporate management.
6. Many of the benefits an EMS gives an organisation, is achievable through improved management in general and is not unique to an EMS. Thus organisations that already have effective management systems in place will not receive the full extent of the benefits an EMS has to offer; subsequently some organisations would not benefit from the low-effort/high return opportunities that help to "kick-start" environmental initiatives.
7. Traditional business cultures are about profit maximisation, however environmental cultures are about sustainability, thus there is often a conflict between the two cultures.
8. The types and sources of competitive advantage that can be accrued from environmental initiatives are often poorly communicated between the environmental organisations the other lines of business.

Porter et al, (1995, p120) found that the need to protect the environment gets a widespread but begrudging acceptance, widespread because everyone wants a liveable planet, grudging because there is a lingering belief that environmental regulations erode competitiveness, thus there a trade off of ecology versus economy. However, in light of the fact that an EMS is becoming a de facto requirement to do business, particularly for domestic organisation wishing operate on a global scale, organisations need to seriously consider its importance in their strategic planning.

3.6 Global and Strategic Environmental Management

Expanding globally allows organisations to increase their profitability in ways that are not available to purely domestic organisations. Hill (2002, p381) identifies the following opportunities that international organisations can capitalise on:

1. Organisations can earn greater returns by leveraging their distinctive skills or core competencies.
2. Organisations can locate particular value adding activities in locations where they can be preformed most efficiently thereby allowing them to realise certain location economies.
3. Organisations can take advantage of greater experience curve economies which reduce the cost of value creation.

In the global context, one of the mandates of TC 207, the committee responsible for drafting the ISO 14000 series, was the reduction of non-tariff trade barriers by having a single universally applied standard. However criticism has been levelled at the standard as many economically less developed countries, ELDCs, do not have the wherewithal to gain certification. Keogh (2000, p6) found that ISO 14001 certification was rapidly becoming a de facto requirement for organisations wishing to trade with both the European Union and North American Free Trade Area, NAFTA. The World Trade Organisation, WTO, views ISO 14001 as a "technical regulation" thus placing it outside restrictions placed on national standards by its Technical Barriers to Trade, TBT, agreement (Keogh, 2000, p7).

Many transnational corporations, TNCs, will locate their facilities in countries with the lowest costs, and in many cases these are based in the ELDCs, which have less strict, and consequently less expensive, environmental regulations. By capitalising on the exclusionary side effects of non-certification to ISO 14001, TNCs are able to exploit the standard to give them a competitive advantage over the small, less sophisticated, domestic organisations (Keogh, 2000, p13).

Fahey et al (2001, p90) found that the need for a global strategy depended on the nature of international competition in the particular industry. In this regard, the

automotive industry in South Africa in particular faces international competition that is becoming more and more intense. The requirement for an EMS is being driven by international pressure. Local companies are competing head on with the international suppliers, many of which are already certified with an EMS.

3.7 Opponents to Strategic Environmental Management

In Section 2.5, in the previous chapter, opponents to ISO 14001 were discussed. In this section the importance and implications of ISO 14001 on an organisations strategic management will be dealt with.

During the implementation process of an environmental management system, organisations experience numerous costs prior to being able to reap the benefits of the system. Alberti et al (2000, p4456) found that some organisations saw environmental management as a cost that should simply be sustained, i.e. it should be regarded as a cost centre for the organisation, while Biondi et al (2000, p61) found that maintaining continuous compliance with legislation to be problematic and required serious managerial effort. Thus, ineffective or immature EMS's are likely to drain organisational resources, both financial and physical, and as a result should an organisation find itself in a precarious situation, such as rapid growth, a financial crisis or staffing problems, they may consider putting their environmental management systems on hold, or even worse, terminate them permanently, in an attempt to reconsolidate the organisation and its focus. Smaller organisations are likely to be at a greater risk than larger ones. This is complicated further by Morrison's (1999, p6) concern that stakeholders could misunderstand what an EMS can deliver, and thus may have unrealistic expectations with regard to the payback period.

Management need to evaluate the EMS and make themselves aware of all the implication with regard to the implementation and the maintenance thereof. The failure of the implementation or even the temporary suspension of implementation could have far reaching effects on the organisation. The opportunity cost of failure

will be very high as time, effort and financial resources may have been more effectively used elsewhere. In addition, the organisation may sacrifice its reputation in the market.

In order to address and overcome many of these concerns, organisations need to consider how to integrate environmental management into their strategic management.

3.8 Integration of Environmental Management with Strategic Management Models

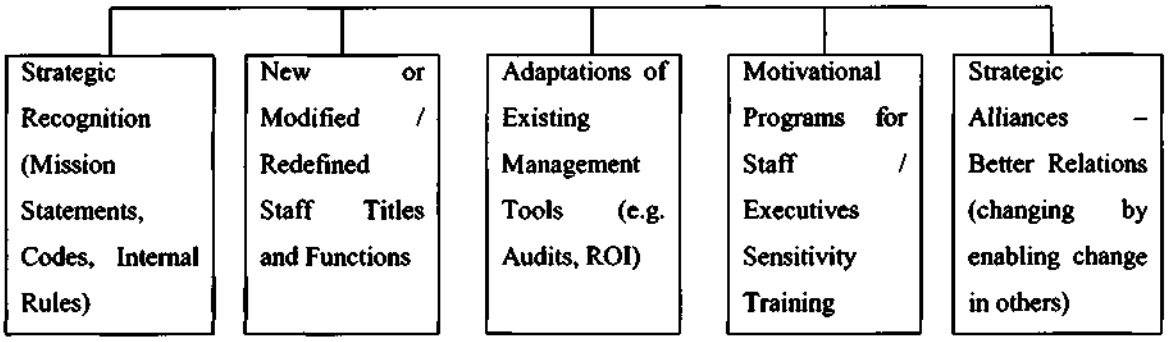
The fundamental purpose of any business is to be profitable in the competitive global arena. Organisations therefore need to offer products that customers are willing to pay more for than it cost to produce, namely add value. Hill (2002, p380) identified the fact that the strategy of an organisation must thus be concerned with identifying and taking actions that lower the cost of value creation and/or differentiate their product offerings. However, the environmental considerations concentrate on the issue of sustainability and bring with it many factors that are likely to raise the cost of producing the product. Thus the challenge is to formulate a strategy that satisfies an organisation's requirements to make a profit, while at the same time creating a sustainable environment. Porter et al, (1995, p130) recommends that managers need to recognise that environmental improvements are sources of competitive advantages. When formulating a business strategy, organisations need to take environmental considerations into account. Thus management needs to review the frameworks used to formulate their strategies and incorporate environmental issues into those frameworks.

Organisations are likely to be using one, or more, of the many strategic frameworks available to formulate their strategies, however the important issue is not so much what framework is being used, but rather the fact that environmental considerations are used as some of the inputs for the framework(s). If management is to be sincere

about the importance of environmental management in the future of the organisation, then they need to "embrace" its concepts and principles and incorporate them into their strategic models, regardless of what the models are. Sexton et al (1999, p281) found that in terms of strategy, it was not possible for an EMS to easily influence the prevailing strategic orientation of an organisation, yet it was one of the systems that needed to be addressed if environmental management was to be integrated into the organisation.

Piasecki et al (1999, p104) identified five factors, as shown in Figure 3.4, which a strategy is required to address in order for a proactive management system to be developed and maintained. Each of these factors represents the core set of concerns that should be folded into any strategy.

Figure 3.4 The Five Recurrent Elements for Success



Source: Piasecki et al, 1999, p104

Organisations need to recognise the strategic importance of an environmental management system, be it to build a strategic advantage or reduce a strategic disadvantage, such as not being excluded from the industry because they lack ISO 14001 certification, a de facto requirement of the industry. Secondly organisations need to look at their staff and either modify or redefine their titles and functions in order to empower them to perform tasks in terms of the newly defined procedures. Thirdly organisations must look at their existing management tools, such as audits and business analysis techniques, so as to adapt them so that they will be congruent with the new defined business policies. Fourthly organisations need to prepare their staff for the changes the organisation is going to experience, one needs them to "buy-in" to

the changes and become part of them. Finally organisations should look at the establishment of strategic alliances with other organisations in their industry, this may include suppliers, customers and even competitors. Through these alliances organisations may take advantage of cooperative learning.

Porter et al, (1995, p131) recommended that environmental strategies must become part of general management if organisations wish to look at the types of process and product redesigns that are required if true innovation is even be considered, let alone implemented.

3.9 Summary

The core concept of strategic management is competition and competitiveness. Organisations engaging in strategic planning will rely on data gathered from their past performance, evaluate their current business environments and conditions, and look at future trends and predictions. The organisation's management system should provide management with the data required for strategic planning.

When looking at management systems, it is important to look at the organisation in its entirety and take into account other management systems, their interactions and how they relate to each other. It is important to continuously audit and analyse these management systems in order to detect weakness in them before the weakness can lead to system failure.

Feedback forms an integral part of any system and the validity of the system will to a great degree depend on the quality of this feedback. A properly designed and focused measurement system will result in high quality feedback, and thus ultimately unlock the potential to improve the organisation's overall competitive standing. Environmental performance measurement systems need to be in line with basic business performance measurements if organisations are looking to an integration of their management systems.

Organisations that do not take a holistic view of their organisation run the risk of compartmentalising the organisation and having separate stand alone management systems. This can lead to management taking a two-dimensional view of their organisational problems, viewing them as either staff or operational challenges instead of looking at them from a multi-dimensional view point, and finding common ground. As a result organisations may face resistance when implementing new management systems as each new system will bring with it a new set of dimensions to be taken into consideration when reviewing organisational problems.

During the implementation of a new management system, an organisation may expose itself to business risks as a result of the resource constraints. The implementation process requires significant managerial effort and sufficient financial backing; consequently some organisations may find that during the implementation process, they need to temporarily, or permanently, suspend the process due to resource constraints. These conditions may be brought on by issues such as rapid uncontrolled growth, financial crisis or even staffing problems. These conditions are not healthy for an organisation and pose a real strategic threat to them. Not only could they face bankruptcy, but they also could lose market confidence. Thus before embarking on an exercise such as the implementation of a new management system, the organisation needs to be truly committed. Not only must management look at consequences of the implementation, but they also need to consider how the EMS will integrate into the other business functions and what the strategic implications are.

The fundamental purpose of any business is to make a profit and in order to do this in a competitive environmental, the organisation needs to "stay ahead of the game". Strategic management models assist management in developing an overall impression of their industry and determining what forces are likely to come into play and influence the way the organisation operates. Thus management needs to recognise the various levels in its business environment and what the driving forces are at these levels. An effective EMS, by the nature of its stakeholders, is well tuned to the organisation's business environment and its measurement systems should be collecting information from the various levels. Proactive organisations will use this information as one of the many inputs to their strategic models in order to facilitate

better decision making, and by being able to make better decisions, these organisations can improve their competitive standing.

CHAPTER 4

Research Methodology

4.1 Introduction

In the previous chapters, ISO 14001 was discussed. The advantages, disadvantages and implementation process were reviewed. In addition, the issues and challenges associated with incorporating environmental management into strategic planning were also discussed.

The problem being investigated was what were the likely barriers to implementation be that different organisations could experience and what the factors influence these barriers. In order to establish these barriers, theoretical research was done, as shown in the previous two chapters; this theory was then compared with the data obtained through qualitative research, which was carried out on a selected group of companies, and in this case the group was the Durban Automotive Cluster (DAC). The data was obtained through applying a survey instrument to the DAC members.

4.2 The Research Problem

In brief, the research problems were:

1. What barriers are organisations likely to encounter in implementing ISO 14001, and what are factors that can influence these barriers.
2. What are the strategic implications of implementing an Environmental Management System, EMS.

The problem that was investigated was the likely barriers to the implementation of ISO 14001 be that different organisations could possibly experience, and what factors could have an influence on these barriers.

Prior to embarking on any project, the organisation's management will conduct research pertaining to that project and come up with a set of potential problems they are likely to encounter, these problems are often referred to as barriers. Management will pay particular attention to these barriers throughout the project in order to ensure its smooth running. However, once the project has been completed, and when management reviews the project, they are likely to report differently on where they actually encountered barriers, the reasons for these discrepancies could be attributed to the following:

1. Management did not truly understand the implications of the project and overlooked certain items.
2. Management underestimated the implications of certain aspects, or,
3. Due to management having identified specific problematic areas, and subsequently devoting attention to them, they did not experience any problems.

Another important aspect to consider regarding the project is the judgment of its success. When judging the effectiveness of implementation, especially in the case of management systems, the indicators of success are not determined once certification has been achieved, but rather need to be determined by looking at how the organisation has embraced the principles of the management system. In other words, in the case of an EMS, one would be trying to establish whether the organisation has changed the way it operates and how it has taken environmental considerations into account, not only in its day-to-day operations, but also into its strategic planning. Thus, the problem is what the strategic implications of implementing an EMS are.

4.3 Research Objectives

The research aimed to explore and understand the complexities of the ISO 14001 implementation process with the objective of establishing the barriers that hamper its implementation and determining what factors influence these barriers.

To achieve this, a study was conducted on the DAC and its members. The following areas were investigated:

1. Determine the reasons for seeking ISO 14001 certification.
2. Determine what the organisations perceive as the barriers to implementation prior to starting the implementation process.
3. Determine what the organisations experienced to be the barriers to implementation during the implementation process.
4. Determine the strategic implications of an EMS.

By analysing these barriers the following was investigated:

1. Gaps in the perceptions of the barriers to implementation prior to the implementation process and those barriers experienced during the implementation process.
2. The greatest barriers, real and perceived, and areas that need to be highlighted and the various stages of the implementation process.
3. A proposal or series of recommendations of how to overcome these barriers.
4. The issues of collaborative learning and information sharing.
5. What are the main driving force behind organisations' decisions to seek ISO 14001 certification.
6. Links between ISO 14001 and Corporate Social Responsibility (CSR).

4.4 Nature of the Research

The research conducted was in essence descriptive research. Dane (1990, p236) defined descriptive research as research that involves an attempt to define or measure a particular phenomenon, usually by attempting to estimate the strength or intensity of a behaviours or the relationship between two behaviours. Parasuraman (1991, p135) on the other hand defined descriptive research as a form of conclusive research intended to generate data describing the composition and characteristics of relevant groups of units. Dane (1990, p236) further elaborated by stating that descriptive strategies involved assessing exactly what is going on rather than assessing whether or not something is in fact going on. For descriptive research, a survey is the

recommended data collection method as it may include a variety of questions, thus allowing for a variety of concepts to be described (Dane, 1990, p137). Three types of information can be collected from a survey, namely facts, opinions and behaviours (Dane, 1990, p121). Due to the time frame allowed for this research, a cross-sectional study was done. Parasuraman (1991, p137) defined a cross-sectional study as a one-time study involving data collection at a single period in time.

4.5 Population and Sampling

"The basic idea of sampling is that by selecting some elements of the population, conclusions may be made about the entire population" (Moodley, 2003, p28). In this research the population is the DAC. It was an objective of the research to survey the entire DAC, the population, and thus in essence there is no specific sampling methodology needed. A possible limitation of restricting the survey to the DAC only, is that inter-regional variables within South Africa will not be focused upon.

4.6 Questionnaire

4.6.1 Data Collection Methodology

The population consisted of three types of organisations, namely;

- Organisations that have already acquired ISO 14001 certification.
- Organisations that are in the process of acquiring ISO 14001 certification.
- Organisations that are still debating whether to acquire ISO 14001 certification.

Although the study was a cross-sectional study, some longitudinal data could be collected. However, due cognisance will be taken, as Parasuraman (1991, p139) warned that when cross-sectional studies are used to collect longitudinal data, the data is subjected to serious limitations, since the accuracy of the data will depend heavily on the respondents' mental capabilities. Many organisations that had started, or were

about to start, the implementation process, would have completed the process by the time the research has been completed. Thus many organisations were only able to provide information on what they perceived as the barriers to implementation prior to starting the implementation process. However, some of the members of the DAC have already been certified with ISO 14001 and thus were able to provide information on both perspectives. The information gained from these organisations could be used as a yard stick to measure the other organisations' perceptions against.

The survey instrument that was used was a questionnaire. The questionnaire design was based on the theory presented in the literature review. Since the population size was small, about 37, a pre-test was carried out by conducting a focused interview with an ISO 14001 consultant in order to get a balanced perspective on the issues involved in the implementation. Köhne (2002, p39) found that a pre-test was vital as it ensured that the questionnaire performed the various functions it was intended to. The down side of conducting a pre-test when working with small populations is that one will jeopardise the population size by having to remove members from the population to be used for the pre-test. By using a consultant, who in essence is an external party to the population, to review the questionnaire; the final sample size will not be affected as one would not have removed some of its members for the pre-test sample. By conducting the focused interview, the researcher had considerable flexibility in terms of follow-up questions, thus allowing for variations from the schedule, should it be required, in order to fully explore the opinions and behaviours of the respondents.

The empirical research was conducted by using a questionnaire based on the literature review and the results of the pre-test. The questionnaire may be found in Appendix 2. The questionnaire was designed to be distributed among the various DAC members via e-mail. The survey form was distributed to all the members of the DAC by the BM Analysts, the facilitators of the DAC, in the month of August 2004 with a covering letter. The covering letter clearly explained the purpose of the survey and emphasised the value of the respondent's support and cooperation to the success of the research in an effort to encourage them to respond. The respondents were asked to complete the questionnaire and either e-mail or fax it back within two weeks of receiving it. In exchange for completing the questionnaire, the respondents will be offered a copy of the research results. Dillman (cited in Dane, 1990, p134) viewed the survey research

process as a social exchange or an interpersonal relationship, in which an individual's willingness to participate depended on the expectations of rewards and costs. After the two week period had expired, outstanding returns were followed up; this follow up involved a number of steps starting with a reminder via e-mail and ended with phone calls being made in cases where no response was forthcoming. In order to pro-actively provide for the possibility of an eventual phone survey in some instances, the questionnaire was designed in such a manner that it could be used for a telephonic survey as well.

4.6.2 Measurement

A measurement is used to represent theoretical concepts, and most concepts in the behavioural sciences have more than one dimension. Dane (1990, p248) defined dimensionality as the number of different qualities inherent in a theoretical concept. These dimensions may be measured at one of four different levels or scales, namely nominal, ordinal, interval or ratio. Nominal, ordinal and interval measurements will mainly be used in this research. Ratio measurements are seldom found in behavioural sciences since data on the attributes of respondents, such as attitudes and opinions, typically do not conform to the requirements for the ratio scale (Dane, 1990, p252) (Parasuraman, 1991, p411). It is important to recognise the four levels of measurement, as the type of measurement used will have a direct impact on the type of analysis that can be carried out.

Dane (1990, pp249 – 252) defined nominal measurements as measurements that are determining the presence or absence of a characteristic, for example a quality; ordinal measurements as measurements involved with ranking or otherwise determining an order of intensity for a quality; interval measurements as measurements involved in a continuum composed of equally spaced intervals; and ratio measurements as measurements involved with a continuum that includes a value of zero representing the absence of a quality. Nominal measurements require that the characteristics be broken down into mutually exclusive categories (Cooper et al, 2001, p205). Numbers assigned to these categories do not represent the intensity, but rather its presence. Ordinal measurements on the other hand result in an assessment of the relative intensity of a particular characteristic, but do not reflect any level of absolute

intensity. Interval measurements require that the continuum be broken down into equally spaced intervals that involve arbitrary numbers representing anchor points on that continuum.

The use of scales was an important consideration in this research. Dane (1990, p264) defined a scale as a measurement technique that contains a number of slightly different operational definitions of the same concept. By using scales it is possible to home in on a particular concept from a variety of different directions, since each item on the scale is a different operational definition of the same concept. A variety of scales were used in the questionnaire, thus enabling particular issues to be highlighted from different perspectives. Both single-item and multiple-item scales were used; however, multiple-item scales were used predominately as they are considered to be more reliable than single-item scales (Parasuraman, 1991, p444).

4.6.3 Questionnaire Design

The questionnaire predominantly made use of structured questions in order to collect quantitative data, making use of both dichotomous and multiple-category questions. Martins et al, (1996, p229) found that structured questions can be used to determine the frequency of answers and to find specific relationships between answers and questions. Some open-ended, or nonstructured questions, were also used in the questionnaire in order to put the respondent at ease, kindle interest in the study and obtain any additional or relevant information, as recommended by Parasuraman (1991, p369). Allison et al, (1996, p82) found that open ended questions also have the advantage of allowing respondents to provide information and ideas that the researcher had not thought of. Due diligence was also given to the questionnaire design in order to prevent issues such as double-barrelled questions, leading or loaded questions, one-sided questions, implicit questions and complex questions.

Martins et al, (1996, p300) found that an inherent disadvantage of self-administered questionnaires was the response bias, which is caused by the respondents misunderstanding or misinterpreting the question. Köhne (2002, p40) recommended that in order to reduce the effects of this bias, respondents be provided with a telephone number and e-mail address so that the researcher could be contacted in the

case of any queries regarding the questionnaire. Due diligence to these recommendations was given and contact details for the researcher was given in the covering letter.

The Questionnaire was broken down into 7 sections, a covering letter, and 6 sections making up the main body of the questionnaire. The first section, the covering letter, consisted of a few paragraphs in order to provide the respondents with some background information on the research, it informed them of the purpose of the research and how the information obtained would be used. Respondents were also guaranteed confidentiality and given general instructions on how to complete the questionnaire.

The main body of the questionnaire consisted of the actual questions. The questionnaire was divided in 6 sections (Sections A to F), each of which focused on different environmental management issues. The sections in the questionnaire enabled the data collected to be analysed and interpreted more efficiently and accurately. Sections A and B consisted of a series of observational questions designed to gather specific data about the respondents and their organisations. Sections C, D and E predominantly used an itemised rating scale, similar to the Likert Scale. Here a number of direct questions were asked concerning the respondent's attitude to specific issues and points of interest and respondents were asked to tick against appropriate positions that best reflected their opinions. Section F was a non structured question where respondents were asked to give any additional information that they thought would be pertinent to the research.

Section A was used to gather information about the respondent and the organisation in general in order to facilitate categorisation of the various organisations in terms of location, size, existence of management systems expertise and nature of their business.

Section B was used to gather information about the organisation and other general environmental related issues. Some of the questions were designed to gather specific information in order to further categorise the organisations, such as progress towards IS0 14001 certification. Other questions were also asked in order to ascertain where

environmental management fits into the organisation, the impact of environmental management on the organisation's management structure and the existence of organisational culture change programmes. This information was used to determine the organisation's strategic view on environmental management.

Section C was used to determine what motivated the organisation to seek ISO 14001 certification, what they saw as the major benefits to certification and what the barriers to gaining certification were. The section was divided into 4 questions. In the first question, respondents were asked to select which statement best described the organisation's reason to seek ISO 14001 certification. Respondents were also offered the option to list a reason not stipulated in the list; as the reasons given in the list were summarised from a much larger list and only those that were expected to be pertinent to the research were listed. The second question listed a series of benefits that organisations could accrue from ISO 14001 certification. The respondents were asked to rank the top three benefits that they believed applied to their organisation in particular, 1 being the most attractive benefit and 3 being the least attractive benefit of the top 3. The third question was an open ended question designed to allow the respondent to list any benefits that had not been identified in the previous question. The respondents were also asked to rate their additional listed benefits relative to the previously listed benefits in order to indicate their importance. The final question was a structured question where the respondent was asked to rate the level of difficulty, or barriers, their organisation experienced, or expected to experience, while carrying out the various stages of the implementation process.

Section D was used to gather the respondents' opinions and attitudes on specific ISO 14001 issues. Questions were designed to collect information on issues such as changes in the organisation, resource allocations, environmental awareness and organisational expertise. Respondents were asked to rate how strongly they agreed or disagreed with the given statements that were pertinent to ISO 14001, its implementation or the organisation's strategic view points on environmental management.

Section E was used to gather information about opposition to and criticism of ISO 14001. As in the previous section, respondents were asked to rate how strongly they

agreed or disagreed with a number of given statements about ISO 14001, environmental management and their applicability in their industry in general.

Section F was an optional section that allowed the candidates to express their own views and opinions on any issues that were raised in the previous sections that they thought to be pertinent to the research.

The results of the questionnaire were collected and aggregated using a spreadsheet programme in order to facilitate analysis.

4.7 Data Analysis

The first part of analysis involved the segregation of the responses to fall in line with the research objects. The responses were segregated along the line of firms with and without ISO 14001 and at what stage of the implementation process they were. The results of this analysis were used throughout the rest of the analysis in order to facilitate two-way tabulation of the survey results. Parasuraman (1991, p631 – p632) defined two-way tabulation as a process of simultaneous tabulation of data on two or more variables, and as a useful preliminary step in understanding the nature of the associations between different sets of variables. However due cognisance was given to Parasuraman's (1991, p634 – p367) warnings that although two-way tabulation is helpful in uncovering relationships, it has pitfalls that could lead to unwarranted conclusions being drawn, since it doesn't always tell the whole story about the relationships between the sets of variable. One of these pitfalls would be to focus on the percentages and ignore the size of the raw totals involved, and for this reason the sizes of each segment will be given on every table, shown in brackets on the column headings.

Having segmented the respondents into the three categories, descriptive analysis techniques were applied to the data in order to provide insight on the opinions of the various segments to particular issues related to ISO 14001 and its implementation. There were two areas of interest in the analysis, the first being the difference in opinions between the segments and the second being the general opinions expressed

by the entire population, or group surveyed. The pivotal point between these two areas of interest lies in the concept of statistically significant differences.

The first area of interest was to look at differences of the opinions between the various segments and by determining the statistical significance of these differences, it was possible to separate the results where the differences are likely to exist, as opposed to those results where the differences were as a result of random sample fluctuations. Cooper et al, (2001, p486) defined a difference to have a statistical significance if there is a good reason to believe the difference does not represent random sampling fluctuations only. For the results where there is no significant difference, the research would, at most, only be able to indicate the general opinions of the entire population, namely the second area of interest. Thus, by conducting the significance testing, the areas of the survey that provide conclusive evidence will be highlighted, thereby allowing the research to focus on particular issues. In order to determine the statistical significance of the data, the method of hypothesis testing was used.

Hypothesis testing is a form of inferential analysis, and it involves data analysis that goes beyond descriptive analysis as it involves verifying specific statements or hypothesis about the population, (Parasuraman, 1991, p643). The hypothesis that was tested was that organisations with ISO 14001 would respond differently to those who are in the process of implementing the standard, and to those who have not yet started the implementation process. The parameter used was the state of ISO 14001 certification amongst the population and the statistic was the response to the various questions asked and statements made. Cooper (2001, p517) recommended the Kruskal-Wallis Test, as an appropriate test for data collected using an ordinal scale where there are 3 or more independent samples.

4.7.1 The Kruskal Wallis Test

The Kruskal-Wallis Test is a nonparametric test that is a one-way analysis of variance by ranks, and assumes random selection and independence of samples and an underlying continuous distribution. However it is possible to use the Kruskal-Wallis Test as a two-way analysis of variance (http://www.le.ac.uk/biology/gat/virtualfc /Stats/kruskal.html, 10/10/04). As a result of the high response rate (76%), it can be

reasonably expected that the response was representative of the whole population. However the characteristics of random sampling are not claimed. As the research is of an exploratory nature, the emphasis is on the determination of opinions of those organisations that are certified to ISO 14001 and those that are not. As differences may occur in their responses, it was decided to use the Kruskal-Wallis Test as three groups were identified, each having a cell size larger than five (www.itl.nist.gov/div898/software/dataplot/refman1/auxillar/kruskwal.htm, 21/10/04). The observations from the survey were independent, Cooper et al (2001, p495) defined an independent observation as one where the selection of any one case does not effect the chances for any other sample to be included in the sample.

Since the Kruskal-Wallis Test is based on the ranks, tied results can cause it to become problematic, thus reducing the power of the test. However in this research, the test was used for descriptive purposes and not inferential analysis. The statistically significance was not the main concern, but rather the fact that there was a difference in the responses obtained. Thus the hypothesis testing was used only to highlight those questions or statements where there was a statistically significant difference in the responses from the various segments, therefore a low significance level, 80%, was used in the analysis. The critical value for the Kruskal-Wallis Test is approximately the same value for the Chi-square Test (http://www.stat.ufl.edu/~sali/L16-3024-4ppg.pdf, 10/10/04, p9), and thus the Chi-square value was used as the critical value for the Kruskal-Wallis tests when analysing the data. The Hypothesis testing of sections C4, D and E are discussed later on in this section.

The null hypothesis is that there is no difference in the response obtained from the three segments. The alternate hypothesis is that the different segments will answer the questions differently. Thus summarising;

Null Hypothesis (H_o): There were no differences in the responses given by organisation with ISO 14001 to those who are in the process of gaining ISO 14001 certification to those who are still debating the whole ISO 14001 issue.

Alternate Hypothesis (H_A): There were statistically significant differences in the responses given by organisation with ISO 14001 to those who are in the process of gaining ISO 14001 certification to those who are still debating the whole ISO 14001 issue.

The testing of the hypothesis was aimed at determining whether or not there was a difference, and thus a two-tailed hypothesis test was used. Parasuraman (1991, p653) defined a two-tailed hypothesis test as one in which the values of the test statistics leading to rejection of the null hypothesis fell in both tails of the sampling distribution curve. To test this hypothesis, the regions of rejection were divided into two tails of distribution (Cooper et al, 2001, p491).

4.7.2 Structure of Data and Analysis

Sections A and B contained mainly non-metric data that was nominal in nature. Thus mode analysis is the appropriate method to determine the central tendency of the data (Parasuraman, 1991, p409) (Cooper et al, 2001, p206). Questions A1 and B6 asked information about the number of people employed and the number of people dedicated to ISO 14001. This data is metric data, and the responses were classified as ratio scaled responses; thus a number of different statistical methods could be used to determine the central tendencies and dispersion, however, for the purpose of this research the mean was used as the measure of data's central tendency.

In section C1 the data was derived from a nominal scaled response and thus mode analysis was used to determine the data's central tendency. In Section C2, respondents were asked to rank the top three benefits that ISO 14001 would give their organisations. The comparative rating scale used in this question gives the response the property of rank order, thereby allowing the response to be classed as an ordinal scaled response. Parasuraman (1991, p423) defined a comparative rating scale as one that seeks the respondent's feelings about an issue or object by asking them to compare it with a specific frame of reference. By assigning a factor, or weighing, to each level of rating and adding all the responses together, it was possible to define the relative positions of each option, i.e. 1 to 12, in a one dimensional space. A weighting

3 was given to the top benefit, 2 to the second and 1 to the third. This method is similar to the method of multidimensional scaling. Parasuraman (1991, p736) defined multidimensional scaling as method used to identify key dimensions underlying respondent's evaluations and determine the relative positions of the objects in a multidimensional space.

The Kruskal-Wallis Test was applied to sections C4, D and E in order to divide the data into two sections; the first being data that showed conclusive differences between the segments, i.e. data where there has a statistically significant difference between, and data that showed the general opinions of the entire group. Prior to conducting the Kruskal –Wallis Test the data was collapsed from 5 options down to three options. For section C4 the options were reduced from Very Easy, Easy, No Opinion, Difficult and Very Difficult, down to Easy, No Opinion and Difficult. For sections D and E the options were reduced from Strongly Disagree, Disagree, No Opinion, Agree and Strongly Agree down to Disagree, No Opinion and Agree. This information was then fed into a statistical analysis package, SPSS version 11.5.1 for Windows. The programme was then used to compute the Kruskal-Wallis value for each statement. The outputs from the programme are shown in Appendix 1; however the following is a summary of the calculations.

Number of options representing opinions:	3 (Options had been reduced from 5 to 3)
Number of segments (groups):	3
Degrees of Freedom (d.f.):	(3-1) × (3-1) = 4
Significance Level (80%):	$\alpha = 0.2$
Critical Test Value:	5.99 (obtained using Excel)
Kruskal-Wallis Value (H):	an per equation 1

$$H = \frac{12}{N(N-1)} \sum_{j=1}^{k} \frac{T_j^2}{n_j} - 3(N+1) \qquad (1)$$

Where:

T_j = Sum of ranks in column j

n_j = Number of cases in j^{th} sample

N = Σw_j = Total number of cases

K = Number of samples

Source: Cooper et al, 2001, p744

Once the data had been separated, descriptive analysis techniques were used in order to determine its central tendency. For the purpose this analysis, the un-compacted data was used, namely the original data where there were 5 options, not the 3 as used for the Kruskal-Wallis Test. For Sections C4, D and E, the questions were designed to measure attitudes and opinions, and strictly speaking they cannot be quantified to yield exact interval scales, however, according to Parasuraman (1991, p410), the response given can be assumed to form an interval scale since the respondents will treat the difference between adjacent response categories to be equal. Although the unit of measure between the responses to particular statements, or questions, may remain constant throughout the interval scale, its zero point is arbitrary and thus responses to the various statements, and questions, can not be aggregated cumulatively.

Table 4.1 Options and Weighting Factors for Sections C4, D and E

Option	Meaning		Weighting Factor
	Section C4	Section D and E	
1	Very Easy	Strongly Disagree	1
2	Easy	Disagree	2
3	No Opinion	No Opinion	3
4	Difficult	Agree	4
5	Very Difficult	Strongly Agree	5

The attitude levels were each given a weighting factor as laid out in Table 4.1. The weighting factor was then multiplied by the number of response for each statement, in percentage form, to give the arithmetic mean of the responses to that particular statement. This arithmetic mean, a value between 1 and 5, represented the central tendency of respondents' attitudes. A value of 3 would represent no conclusive evidence of any opinions; any value less than 3 would represent evidence in favour of

option 2 and option 1, the smaller the value, the stronger the support of options 2 and 1; any value greater than 3 would represent evidence in favour of option 4 and option 5, the larger the value, the stronger the support of options 4 and 5. Table 4.2 shows the breakdown of the arithmetic mean versus its interpretation.

Table 4.2 Interpretation of Arithmetic Mean for Sections C4, D and E

Arithmetic Mean	Interpretation	
	Section C4	Section D and E
≦2.8	Easy	Disagreement
>2.8 to <3.2	No Opinion	No Opinion
≧3.2	Difficult	Agreement

The results from sections C4, D and E were then compared with the results of the Kruskal-Wallis Test and a decision was made whether to look at the aggregated response of all the respondents, in the case of the null hypothesis being accepted, or to look at each of the three segments individually, in the case of the null hypothesis being rejected. In the case of the null hypothesis being accepted, i.e. there were no differences in the responses given by organisation with ISO 14001 to those who are in the process of gaining ISO 14001 certification, to those who are still debating the whole ISO 14001 issue. It would thus not make sense to look at each segment individually since there are no statistically significant differences in the responses obtained, thus only the aggregated response of all the respondents need be considered. In the cases were the null hypothesis was rejected, it meant that there were significant differences in the responses obtained from the three segments, and thus it would be meaningful to analyse and compare them on an individual basis.

A number of Sections and Sub Sections called for open ended responses, the results of these responses were not included in Chapter 5, Research Findings, but instead will be used in the Chapter 6, Discussion, where the results are discussed and correlations drawn to the findings of the literature review.

The results of the survey and their analysis are presented in the Chapter 5.

4.8 Summary

Two basic problems were investigated, firstly what were the barriers that different organisations would possibly experience in the implementation of ISO 14001 and what factors would influence these barriers, and secondly what were the strategic implications of implementing an Environmental Management System (EMS).

Thus the objective was to explore and understand the complexities of the ISO 14001 implementation process with the aim of establishing the barriers that hamper its implementation and the determination of what factors influence these barriers. To achieve this, a cross-sectional study was conducted on the DAC and its members.

This study involved carrying out descriptive research by conducting a survey on the entire DAC in order to define or measure a particular phenomenon and concepts relating to the implementation of ISO 14001. Three types of organisations in the DAC were surveyed, namely organisations that have already acquired ISO 14001 certification, organisations that are in the process of acquiring ISO 14001 certification, and organisations that are still debating whether to acquire ISO 14001 certification. The empirical research was conducted by using a questionnaire as the survey instrument.

This questionnaire was based on the theory presented in the literature review and the results of a pre-test. The pre-test involved conducting a focused interview with an ISO 14001 consultant. The final question was designed to be a self-administered questionnaire and it was sent out to the entire DAC via e-mail. The questionnaire made use of both structured and nonstructured questions. The structured questions made extensive use of scales, similar to the Likert Scale, in order to collect the quantitative data. The nonstructured, or open-ended, questions were asked to put the

respondent at ease, kindle interest in the study and obtain any additional or relevant information. The questionnaire was divided into sections, thus allowing the data to be collected, analysed and interpreted more efficiently and accurately.

The results of the questionnaire were collected and aggregated using both a spreadsheet programme and a statistical analysis package. Summary statistics and exploratory data analysis were used to analyse the data in order to determine its central tendency and dispersion. In the next chapter, the research finding will be presented and analysed.

CHAPTER 5

Survey Findings

5.1 Introduction

The research conducted involved investigating ISO 14001, the management aspects of its implementation and its maintenance. The technical aspects, although important, are not the focus of this dissertation. In the analysis of the results, the main focus of the research will be analysing information from a management perspective, with regard to issues such as organisational structures, size, culture, management expertise and resource allocation.

A survey was distributed amongst the Durban Automotive Cluster (DAC) members in the form of a questionnaire. The results and finding of this questionnaire are presented in this chapter.

5.2 Survey Response

Questionnaires were sent out to a total of 37 firms in the DAC. Of those 28 responses were obtained, thus giving a total response rate of 76%. The response obtained form the firms was good and higher than the 60% response expected. The high response rate was due to continuous pressure being applied to the various organisations to respond. In the beginning of August 2004, the survey was sent out to all the members of the DAC by BM Analysts, the facilitators of the DAC. They gave firms two weeks to respond to the survey, after which they phoned all the interested parties and requested them to complete the form as soon as possible. BM Analysts managed to get 9 firms to respond to the survey. After a further two weeks the list of all the firms and their response was handed back to the researcher. The researcher then phoned all the firms that had not replied to the survey, and requested to speak to the individual who would be responsible for completing the questionnaire. The purpose of survey was explained and a request made to get it completed and returned as soon as

possible. A further 9 responses were received in the week following the phone calls. After two weeks, non responsive organisations were phoned and requested again to complete the survey. A further 10 responses were received in the final week, the end of September 2004. This brought the response rate up to 76%, which was higher than the expected response rate, thus the need to investigate further alternatives, such as telephone and personal interviews, was not entertained. However extensive use of telephone interviews was used in order to follow-up on and correct sections of the survey that had not been completed correctly. One of the respondents failed after numerous attempts to complete sections C4, D and E of the questionnaire. However the response obtained from the respondent was used for the analysis of sections A, B C1 and C2.

In terms of lessons learnt from conducting the survey, the importance of establishing a personal link with respondents was demonstrated. Follow up interviews with firms that had not initially responded revealed that the low response rate (only 9) was due to.

1. The Survey form only reached them after the cutoff date.
2. The respondents believed the survey did not apply to them.
3. The survey was sent to the wrong people.
4. The respondents were simply just too busy to complete the survey.

By personally phoning and establishing a direct line of communication with the respondents, the reasons for non response were addressed and subsequently the response rate improved. However, it must be noted that without the help of BM Analysts and their support of the survey, this research would not have been possible as their support of the research gave it the necessary impetus to gain access to the DAC.

5.3 Overview of Analysis Methodology

The Questionnaire was broken down into 7 sections, a covering letter, and 6 sections making up the main body of the questionnaire. The covering letter consisted of a few

paragraphs in order to provide the respondents with some background information on the research, the purpose of the research, how the information obtained would be used and general instructions on how to complete it.

The main body of the questionnaire consisted of the actual questions. The questions were divided in 6 sections (Sections A to F), each of which focused on different environmental management issues. Sections A and B consisted of a series of observational questions designed to gather specific data about the respondents and their organisations. Sections C, D and E predominantly asked a number of direct questions concerning the respondent's attitude to specific issues and points of interest and respondents were asked to tick against appropriate positions that best reflected their opinions. Section F was a non structured question where respondents were asked to give any additional information that they thought would be pertinent to the research.

The first part of analysis was the segregation of the responses to fall in line with the research objectives. The responses were segregated along the line of firms with and with out ISO 14001 certification and at what stage of the certification process they were in. This breakdown is shown in Table 5.1.

Table 5.1 Certification Status of Surveyed Firms

Certification Status	No Firms	Average No Employees
With ISO 14001 Certification	11	599
Without, but started process	11	462
Without, but not started process	6	171
Total	28	453

Descriptive analysis techniques were applied to the data in order to provide insight to opinions of the various segments to particular issues related to ISO 14001 and its implementation. There were two areas of interest in the analysis, the first being the difference in opinions between the segments and the second being the general opinions expressed by the entire population, or group, surveyed. The first area of

interest was to look at the differences of opinions between the various segments and by determining the statistical significance of these differences it was possible separate the results where the differences are likely to exist, as opposed to those results where the differences were as a result of random sample fluctuations. For the results where there was no significant difference, the research would, at most, only be able to indicate the general opinions of the entire population, i.e. the second area of interest. In order to determine the statistical significance of the data, the method of hypothesis testing was used.

The hypothesis that was tested was that organisations with ISO 14001 would respond differently to those who are in the process of implementing the standard and to those who have not yet started the implementation process. The null hypothesis was that there was no difference in the response obtained from the three segments. The alternate hypothesis was that the different segments would answer the questions differently. The statistical significance was not the main concern, but rather the fact that there was a difference in the responses obtained. Thus the hypothesis testing was used only to highlight those question or statements where there was a difference in the responses from the various segments, and therefore a low significance level, 80%, was used in the analysis.

Sections A, B and C1 used mode analysis to determine the central tendency of the data. Questions A1 and B6 asked information about the number people employed and the number of people dedicated to ISO 14001, the mean was calculated and used as the measure of data's central tendency. In Section C2 the relative positions of each option, for example 1 to 12, was calculated by assigning a weighing factor to each level of rating and adding the response together.

The Kruskal-Wallis Test was applied to sections C4, D and E and the data was divided into two sections; the first being data that showed conclusive differences between the segments, i.e. data where there has a statistically significant difference, and data that showed the general opinions of the entire group, i.e. data where there was no statistically significant difference. Once the data had been separated, descriptive analysis techniques were used in order to determine its central tendency. In the analysis of Sections C4, D and E, the data was treated as interval scaled data

and the arithmetic mean for each question was calculated and interpreted as per Table 5.2.

Table 5.2 Interpretation of Arithmetic Mean for Sections C4, D and E

Arithmetic Mean	Interpretation	
	Section C4	**Section D and E**
≦2.8	Easy	Disagree
>2.8 to <3.2	No Opinion	No Opinion
≧3.2	Difficult	Agree

A number Sections and Sub Sections called for open ended responses, the results of these responses were not included in this chapter, but instead were used in the next chapter where the results were discussed and comparisons made to the findings of the literature review.

Note on Nomenclature

In the discussion of the results from the survey, specific reference is made to certain questions, in order to prevent confusion; the following nomenclature will be used:

$$X\#_n$$

Where:

X: *refers to the Section of the Survey, i.e. A, B, C, D, E or F.*

#: *refers to the Subsection number, i.e. 1, 2, 3 or 4.*

$_n$: *refers to the question or statement number within that subsection, i.e. 1, 2, 3 ... 26..*

The results of the survey and their analysis are presented in the next section.

5.4 Data Analysis and Presentation

5.4.1 Section A and B – General Organisational Information and Environmental Related Matters

Section A was used to facilitate categorisation, key characteristics of the respondents and the organisation in general was collected, such as location, size, management systems and nature of their business. Section B collected information about general environmental issues relating to the organisations in particular. Some of the questions were designed to collect specific information in order to further categorise the organisations, such as progress towards IS0 14001 certification. Other questions were also asked in order to ascertain where environmental management fits into the organisation, the impact of environmental management on the organisation's management structure and the existence of organisational culture change programmes. This information was used to determine the organisation's strategic view on environmental management. The information collected is summarised in Table 5.3.

Table 5.3 showed a relationship between the size, i.e. the number of employees, and the certification status of the organisations. The larger organisations, with an average of 599 employees, have all been certified, while the medium sized organisations, with and average of 462 employees, are in the process of implementing the standard, and small organisations, with and average of 171 employees, have not yet started the process. The larger an organisation is, the larger its pool of resources is and subsequently the easier it is to run a management system. This trend is further substantiated by looking at the next set of findings, being the existence of other management systems amongst the DAC.

Table 5.3 also showed that for organisations with ISO 14001, all had other management systems in place. Every organisation survey had ISO 9001, while 82% had ISO/TS 16949 and 9% had been certified with OSHA 18001, the Health and Safety Management system. Organisations without ISO 14001, but who were in the process of gaining certification, showed a similar high level of certification to other management systems, again all organisations had ISO 9001 and 73% had ISO/TS 16949. Organisation without ISO 14001, but who had not started the process of

gaining certification, showed a lower level on certification to other management systems, with 83% having ISO 9001 certification and only 17% had ISO/TS 16949. The high level of ISO 19001 certification exhibited amongst the three segments is to be expected, the ISO 9001 quality management system has been around since 1987 with more than 634,000 organisations currently certified (ISO, 08/10/2004). "ISO 9000 has become an international reference for quality management requirements in business-to-business dealings" (ISO, 08/10/2004). In South African, and internationally, the standard has for many years been a mandatory requirement for all first tear original equipment manufacturing (OEM) suppliers to the Automotive Industry. The ISO/TS 16949 is a newer and more complex quality management system than ISO 19001 and has replaced ISO 9001 as the mandatory requirement for all first tear OEM suppliers. The standard incorporates the requirements of ISO 9001, QS 9001, VDA 6 and other automotive specific quality management systems.

To become certified with ISO/TS 16949 requires high levels of management systems expertise and the levels of ISO/TS 16949 certification can be viewed as an indicator of management systems expertise within an organisation. Thus a deduction was made that, using the levels of ISO/TS 16949 certification as the indicator, that organisations already certified with ISO 14001 have a high level of management systems expertise, organisation without ISO 14001, but who had started the process of gaining certification, have a slightly lower level of expertise and those organisations who are still debating ISO 14001 certification have a low level of management expertise.

In order for environmental management programmes to become effective, they need to be sufficiently represented at senior management level; organisations with ISO 14001 and organisations that are currently implementing the EMS both had the same statistics, that being 45% of the environmental managers / representatives were senior managers and 55% were middle managers. Organisations that were still debating ISO 14001 had much lower representation figures, with only 17% of the environmental managers being senior managers and 17% being middle managers. This low percentage was offset by the fact that many of the organisations, 67%, had yet to appointed environmental managers.

Table 5.3 Results of Sections A and B - General Organisational Information and Environmental Related Matters

General Organisational Information and Environmental Related Matters	ISO 14001 Certification Status			
	All Firms (28)	With (11)	Without Started (11)	Without Not Started (6)
Number of People Employed	453	599	462	171
Smallest Firm (No of Employees)	30	36	30	30
Largest Firm (No of Employees)	1532	1200	1532	340
Management Systems				
ISO TS 16949	64%	82%	73%	17%
ISO 9001	96%	100%	100%	83%
ISO 14001	39%	100%		
OHSA 18001	4%	9%		
Other (VDA 6, Q1, etc)	11%	27%		
Percentage Towards ISO 14001	49%	100%	24%	-
Level of Environmental Manager:				
Senior Management	39%	45%	45%	17%
Middle Management	46%	55%	55%	17%
No Manager	14%			67%
Additional Areas of Responsibility	100%	100%	100%	100%
Main Areas of Responsibility:				
Health and Safety	63%	73%	55%	50%
Quality	58%	55%	64%	50%
Maintenance	17%		27%	50%
ISO 14001 will have an Impact on Management Structure (Yes)	48%	45%	55%	40%
Staff Has been Dedicated to Implementation and Maintenance of ISO 14001 (Yes)	54%	73%	55%	17%
Average Number of Staff Dedicated	4.2	6.1	2.3	2.0
Environmental Performance Measures Set (Yes)	64%	100%	45%	33%
Cultural Change Program in Place (Yes)	57%	64%	55%	50%
Part of Work Place Challenge (Yes)	43%	36%	55%	33%

The results of the survey showed that environmental management was the domain of other functional areas within the organisations, areas such as Health and Safety, Quality, and even Maintenance. None of the surveyed organisations had environmental managers solely dedicated to environmental management. For organisations with ISO 14001, Health and Safety was the main area of additional responsibility, with 73% of environmental managers being responsible for it; Quality followed behind, with 55%, as being another area of responsibility. Organisations in the process of ISO 14001 implementation showed lower percentages, 55%, of environmental managers being responsible for Health and Safety and a higher percentage, 64%, being responsible for Quality. In this segment, the finding showed that environmental managers are responsible for Maintenance, 27%. This trend is possibly due to the fact that many organisations had concerns over technical challenges, especially concerning changes to plant and equipment, in order to achieve environmental compliance and subsequently appointed the Plant Engineer, or Maintenance Manager, the duty of being the environmental representative for the organisation. The organisations that are still debating ISO 14001 showed the trend that 50% of their environmental managers were responsible for Quality, Maintenance, Health and Safety. The explanations for this trend lies in the fact these organisations are generally small and subsequently managers will be responsible for a wide variety of functions. In one of the survey organisations, the organisation employed 56 people and the proprietor was responsible for environmental management.

Forty eight percent of the organisations that participated in the survey felt that ISO 14001 would have an impact on their management structures. In this regard one of the respondents made the following statement as to why ISO 14001 would have an impact on their management structure.

> *"The ISO 14001 programme requires that responsibilities for the programme are clearly defined. Depending on the size of the company, the number of aspects and impacts, it may not be possible to operate such a programme without additional resources.*
>
> *The 14001 programme may be integrated into an existing management system, but additional responsibilities may require special skills, for*

example legal requirements, internal auditing to the ISO 14001 standard, chemists, as well as regular maintenance and upkeep of system related activities. Small companies with very little aspects and impacts, and small staff numbers may not feel the impact on the management structure as significantly as larger companies with bigger staff numbers. More control, training and awareness are required in bigger companies that have significant impacts and aspects. Companies whose nature of business is such that their activities impact more on the environment than others, require a more dedicated programme."

Many of the respondents discussed issues of additional workload the EMS would place on current structures and felt that ultimately they would require a dedicated environmental manager with his/her own department. When looking at the implementation process, 73% of the organisations which were ISO 14001 certified had staff dedicated to the implementation process, and on average 6.2 staff members were on the team. It is important to remember that these organisations are large organisations, employing on average 600 people, therefore they were likely to be more complex organisations with larger resource pools. When looking at organisations that are currently implementing the EMS, 55% of them had staff dedicated to the implementation process with 2.3 staff members being involved on the team. Only 17%, 1 organisation, of the organisations that are still debating ISO 14001 had staff dedicated to the implementation process, and this organisation in particular had not yet formally decided to implement the standard. They had a team of 2 people looking at the standard in order to assist their management with the decision process.

All organisations with ISO 14001 had set environmental performance measures, which are to be expected, as it is a requirement of the EMS. Certain organisations without ISO 14001 had also set environmental performance measures, 40% of organisations in the process of implementation and 33% of organisations debated ISO 14001. The reasons for these trends were that many had already started ad-hoc environmental initiatives, such as DANCED's Cleaner Production Programme, a programme sponsored by the Danish government and aimed at the Metal Finishing Industry in Kwa-Zulu Natal with the objective of promoting cleaner production and waste minimisation.

The implementation of ISO 14001 requires certain cultural changes to take place within an organisation. There are a number of programmes currently used throughout industry; the most popular one with the DAC was the DTI's Work Place Challenge. 57% of the organisations surveyed were part of a culture change programme, and of these 75% were part of the work place challenge, 43% of all surveyed organisations. The high percentage of organisations participating in culture change programmes gives an indication of the various organisations commitment to changing the way they operate.

5.4.2 Section C – Motivation for and Barriers to Implementing ISO 14001

Section C was used to determine what motivated the organisation to seek ISO 14001 certification, what the major benefits to certification were, and what the barriers to gaining certification were. The section was divided into 4 subsections. In the first subsections, C1, respondents were asked to select which statement best described the organisation's reason to seek ISO 14001 certification. Respondents were also offered the option to list a reason not stipulated in the list; as the reasons given in the list were summarised from a much larger list and only those that were expected to be pertinent to the research were listed. The second subsection, C2, listed a series of benefits that organisations could accrue from ISO 14001 certification. The respondents were asked to rank the top three benefits that they believed applied to their organisation in particular, 1 being the most attractive benefit and 3 being the least attractive benefit of the top 3. The third subsection, C3, consisted of an open ended question designed to allow the respondent to list any benefits that had not been identified in the previous question. The respondents were also asked to rate their additional listed benefits relative to the previously listed benefits in order to indicate their importance. The final sub section, C4, was a structured question where the respondent were asked to rate the level of difficulty, or barriers, their organisation experienced, or expected to experience, while carrying out the various stages of the ISO 14001 implementation process.

The Data from Section C1 was analysed and the results are shown in Table 5.4. From these results, the most commonly occurring response was reason number 1; their customers required them to certify to ISO 14001 in order to get new business or keep current business, $C1_1$. 82% of organisations with ISO 14001 certification, 70% of organisation in the process of gaining certification, and 66% of organisation who have not yet started the certification process, opted for this reason. Very few organisations looked at ISO 14001 in order to facilitate management compliance with all the laws and regulations, $C1_2$, and even fewer looked at ISO 14001 in order to improve their environmental performance, $C1_3$. Thus a conclusion can be reached that most ISO 14001 certified organisations, or organisations looking to gain certification, did so because their customers required them to do so. No respondents made use of option 4, where they were asked to list a reason not stipulated in the list of 3 reasons.

Table 5.4 Results for Section C1 – Reasons for ISO 14001 Implementation vs. Number of Response Supporting Reasons

Section C1: Reason for ISO 14001 Implementation	**ISO 14001 Certification Status**			
	All Firms (28)	**With (11)**	**Without Started (11)**	**Without Not Started (6)**
1. Your customers required you to certify to ISO 14001 in order to get new business or keep current business.	74%	82%	70%	66%
2. ISO 14001 offered the company a management system that would facilitate management compliance with all the laws and regulations.	19%	18%	20%	17%
3. ISO 14001 offered the company a management system that would improve its environmental performance.	7%	0%	10%	17%
4. Other	-	-	-	-

The results from section C2, i.e. the benefits that would be derived from ISO 14001 certification, were analysed and are presented in Table 5.5. The number shown in

brackets is the ranking of the options, i.e. (1) mean it was the option rated top or first. These findings confirm the findings of Section C1, that being that most firms choose to implement ISO 14001, or investigate its implementation, as a result of customer demands, $C2_8$. Other major benefits included, a system that provided a structure for compliance with environmental regulations, $C2_4$, cost savings as a result of sound environmental practices, $C2_3$, enhancement of corporate image, $C2_1$, improved management responsibility, $C2_5$, and improved employee awareness, empowerment, communication and accountability, $C2_6$.

Table 5.5 Results for Section C2 – Benefits Derived from ISO 14001

Section C2: Benefits Derived from ISO 14001 (Points Calculated and Ranking)	ISO 14001 Certification Status			
	All Firms (28)	With (11)	Without Started (11)	Without Not Started (6)
1. Certification would enhance the company's corporate image which may allow some special considerations when dealing with public stakeholders.	21 (3)	5 (6)	6 (5)	10 (2)
2. Certification may help to insulate the company against claims of environmental negligence.	12 (7)	5 (6)	5 (7)	2 (5)
3. Certification results in the adoption of sound environmental practices that will lead to cost savings.	25 (2)	16 (2)	7 (3)	2 (5)
4. Certification provides a systematic structure for complying with environmental regulations.	18 (5)	7 (3)	9 (2)	3 (4)
5. Certification results in better management controls and more clearly defined targets and responsibilities.	19 (4)	7 (3)	6 (5)	5 (3)
6. Certification results in improving employee awareness, empowerment, communication and accountability.	14 (6)	7 (3)	7 (3)	0 (9)
7. Certification provides a systematic plan-do-check-act continual improvement model that will improve the company's efficiency and effectiveness.	6 (8)	2 (8)	2 (8)	2 (5)
8. Certification is a mandatory customer requirement of existing customers and is thus required in order to protect current business.	44 (1)	17 (1)	16 (1)	11 (1)
9. Certification opens up new opportunities for new business.	0 (11)	0 (9)	0 (10)	0 (9)
10. Certification can be used to differentiate the company's product offering and thus allow it to charge more for its products.	1 (10)	0 (9)	0 (10)	1 (8)
11. Certification increases the barriers to entry and thus resulting in less competition.	2 (9)	0 (9)	2 (8)	0 (9)

The Kruskal-Wallis Test was applied to the results of Section C4, as shown in Table 5.6. Using a significance level of 80%, namely a critical value of 5.99, only one stage of the implementation process was accepted by the alternate hypothesis, i.e. there is a difference in the responses obtained from the organisations in the three different segments, and that was stage 9, writing the management manual, $C4_9$.

Table 5.6 Results for Section C4 – Difficulty of Stages of Implementation vs. Kruskal-Wallis Test Results

Section C4: Difficulty of Stages of Implementation $\leqq$ 2.8 - Easy $3^{\pm 0.2}$ - No Opinion $\geqq$ 3.2 - Difficult	**Mean of Response For All Firms (27)**	**Kruskal - Wallis Value**
1. Obtaining commitment from top management.	2.1	0.69
2. Obtaining commitment from middle and lower management.	3.0	0.86
3. Conducting the Initial Environmental Review.	2.5	1.35
4. Preparing the company's Environmental Policy.	2.4	0.40
5. Listing of environmental aspects and impacts.	2.7	1.75
6. Establishing a register of all pertinent legislation.	3.6	0.85
7. Setting environmental objectives and targets.	2.8	3.54
8. Establishing the management programme and structure.	3.3	0.02
9. Writing the management manual.	2.9	6.44
10. Establishing the operational controls and procedures.	3.1	0.52
11. Environmental training of company personnel.	2.9	0.53
12. Internal auditing of the company against ISO 14001.	2.7	0.45

Looking at stage 9 in more detail, as shown in Table 5.7, and interpreting the results as per Table 5.2, showed that ISO 14001 certified organisations believe that writing the management manual was difficult; organisations that had not started the implementation process had no opinion; while organisation who had started the implementation believed it would be easy to write the management manual. This difference highlights the fact that when the organisations, who are in the process of implementing ISO 14001, come to write their management manual, it could be a lot more difficult than they expect and subsequently could delay their implementation programme.

Table 5.7 Stage 9 of Implementation Process accepted by Alternate Hypothesis

Section C4: Difficulty of Stages of Implementation ≦ 2.8 - Easy $3^{\pm 0.2}$ - No Opinion ≧ 3.2 - Difficult	ISO 14001 Certification Status		
	With (11)	Without Started (10)	Without Not Started (6)
9. Writing the management manual.	3.2	2.3	2.9

Expanding on Table 5.6, excluding $C4_9$ and interpreting the results as per Table 5.2 produced the results shown in Table 5.8. These results showed that organisations had no problems, or foresaw no problems, with getting commitment from top management, $C4_1$, conducting the Initial Environmental Review, $C4_3$, preparing the organisation's Environmental Policy, $C4_4$, listing of environmental aspects and impacts, $C4_5$, setting environmental objectives and targets, $C4_7$, and the internal auditing of the organisation against ISO 14001, $C4_{12}$. Organisations had problems, or foresaw problems, with establishing a register of all pertinent legislation, $C4_6$, and establishing the management programme and structure, $C4_8$. No opinion could be gained on the issues of obtaining commitment from middle and lower management, $C4_2$, establishing the operational controls and procedures, $C4_{10}$, and training of company personnel, $C4_{11}$.

Table 5.8 Results for Section C4 – Difficulty of Stages of Implementation vs. Interpretation

Section C4: Difficulty of Stages of Implementation	Mean of Response For All Firms (27)	Interpretation
1. Obtaining commitment from top management.	2.1	Easy
2. Obtaining commitment from middle and lower management.	3.0	No Opinion
3. Conducting the Initial Environmental Review.	2.5	Easy
4. Preparing the company's Environmental Policy.	2.4	Easy
5. Listing of environmental aspects and impacts.	2.7	Easy
6. Establishing a register of all pertinent legislation.	3.6	Difficult
7. Setting environmental objectives and targets.	2.8	Easy
8. Establishing the management programme and structure.	3.3	Difficult
10. Establishing the operational controls and procedures.	3.1	No Opinion
11. Environmental training of company personnel.	2.9	No Opinion
12. Internal auditing of the company against ISO 14001.	2.7	Easy

5.4.3 Section D – Opinions on ISO 14001 Issues

Section D was used to gather the respondents' opinions and attitudes on specific ISO 14001 issues. Questions were designed to collect information on issues such as changes in the organisation, resource allocations, environmental awareness and organisational expertise. Respondents were asked to rate how strongly they agreed or disagreed with the given statements that were pertinent to ISO 14001, its implementation or the organisation's strategic view points on environmental management.

The Kruskal-Wallis Test was applied to the results of Section C4, as shown in Table 5.9. Using a significance level of 80%, namely a critical value of 5.99, only five issues were accepted by the alternate hypothesis, namely there was a difference in the responses obtained for the organisations in the three different segments, and they were points D_8, D_9, D_{15}, D_{16} and D_{23}. Table 5.14 shows these points in more detail, where the opinions of the different segments are shown on an individual basis.

On the issues of technical knowledge of environmental matters, D_8, organisations with ISO 14001 felt that they had very good technical knowledge, as would be expected. On the other hand organisations that had not yet implemented the standard felt they did not have a very good technical knowledge. These findings are closely tied to those of D_{15} and D_{23}, as both ultimately came down to the issue of technical capability. Issue D_{15} asked the question about reliance on external technical expertise, to cover any shortfalls of internal expertise, and organisations with ISO 14001 felt they would not have to rely on external experts, while those organisations that have not yet been certified felt they would. Issue D_{23} focused on the issue of internal auditor skills, or expertise, and again the same trend was observed as for those of organisations with ISO 14001 who felt they had the expertise, while organisations not yet certified felt they did not have expertise amongst their internal auditors.

Table 5.9 Results of Section D - Opinions on ISO 14001 Issues vs. Kruskal-Wallis Test Results

Section D: Opinions on ISO 14001 Issues ≦ 2.8 - Disagree $3^{\pm 0.2}$ - No Opinion ≧ 3.2 - Agree		**Mean of Response For All Firms (27)**	**Kruskal - Wallis Value**
1.	ISO 14001 will have severe cost implications to the company's current production processes and practices.	1.9	4.08
2.	Relationships with regulators are likely to improve.	3.7	1.09
3.	The emphasis is placed on short term financial gains are in line with strategies for sustainable growth.	3.0	3.19
4.	There will be a high level of integration between the company's various management systems.	3.2	0.22
5.	The people responsible for compiling the management manual have an intimate knowledge of how the company functions, its strategic direction and a good sound environmental understanding.	3.9	4.10
6.	Each employee knows exactly how to contribute to environmental improvements.	2.5	5.67
7.	The number of people that have been dedicated to ISO 14001 implementation is sufficient.	2.6	0.65
8.	The company has a very good technical knowledge of environmental issues.	3.0	7.16
9.	The financial resources for the implementation of ISO 14001 are, or were, sufficient to cover all costs incurred.	3.3	16.25
10.	Sound environmental management lowers the cost of doing business.	3.2	0.44
11.	The ISO 14001 implementation process will be put on hold should the company be faced with a severe financial crisis.	3.2	1.15
12.	Environmental management concentrates on the issue of sustainability and subsequently brings with it factors that raise the costs of production.	3.1	0.31
13.	Employee conduct in respect of environmental issues is likely to improve, or did improve, due to ISO 14001.	3.6	2.22
14.	The company's culture is conducive to sincere environmental management.	3.6	1.72
15.	The company will have to rely extensively on external technical experts in the determination of its aspects and impacts.	2.9	7.81
16.	The expectations of what an environmental management system can deliver are unrealistic or exceptionally high.	2.6	7.51
17.	The company has a high level of compliance to its regulatory and legal requirements.	3.7	4.08

Section D: Opinions on ISO 14001 Issues (continued ...) ≦ 2.8 - Disagree $3^{\pm 0.2}$ - No Opinion ≧ 3.2 - Agree	Mean of Response For All Firms (27)	Kruskal - Wallis Value
18. Legal issues are dealt with by people within the company.	3.0	3.13
19. The parties (internal or external) that are responsible for legal requirements are capable of interpreting them into solutions that are practically applicable to your company in particular.	3.7	1.78
20. The company has set performance levels that are well in excess of the regulatory threshold.	3.3	3.79
21. Environmental regulations in South Africa are more relaxed than the global average and subsequently legal compliance is less costly.	3.1	1.96
22. The company has sufficient internal auditors to effectively audit all its management systems.	3.0	1.77
23. Some of the internal auditors have the necessary environmental and management systems knowledge to effectively conduct environmental audits.	3.1	3.72
24. Customers often scrutinize and audit of the company's environmental management system.	3.0	9.31
25. Regulators, such as the Municipality or government departments, often scrutinise and audit the company.	3.1	3.00
26. Management responds seriously to internal audit findings.	3.7	1.86

Table 5.10 Results of Section D - Issues accepted by Alternate Hypothesis

Section D: Opinions on ISO 14001 Issues ≦ 2.8 - Disagree $3^{\pm 0.2}$ - No Opinion ≧ 3.2 - Agree	ISO 14001 Certification Status		
	With (11)	Without Started (10)	Without Not Started (6)
8. The company has a very good technical knowledge of environmental issues.	3.6	2.7	2.5
9. The financial resources for the implementation of ISO 14001 are, or were, sufficient to cover all costs incurred.	3.9	3.2	2.2
15. The company will have to rely extensively on external technical experts in the determination of its aspects and impacts.	2.4	3.2	3.7
16. The expectations of what an environmental management system can deliver are unrealistic or exceptionally high.	2.4	2.3	3.5
23. Some of the internal auditors have the necessary environmental and management systems knowledge to effectively conduct environmental audits.	3.9	2.6	2.7

In terms of financial resources available for the implementation of ISO 14001, D_9; organisations with ISO 14001 felt they had had sufficient funds to cover all the cost involved, while organisations in the process of implementation believed they would have sufficient funds, but were not too sure; while organisations that had not yet started the implementation process, felt that they did not have sufficient funds to cover all the cost involved. The expectations of what an environmental management systems can deliver, D_{16}, was another area of major differences. Organisations with ISO 14001 and those in the process of implementation felt that the expectations were unrealistic or exceptionally high, while those that have not started the process were more negative about an environmental management system and felt that the expectations were unrealistically or exceptionally high. These two issues were both raised in the literature review as being reasons why organisations had chosen not to certify, i.e. the system is expensive to implement and they do not deliver what they claim.

Expanding on Table 5.9, excluding D_8, D_9, D_{15}, D_{16} and D_{23}, and interpreting the results as per Table 5.2, produced the results shown in Table 5.11. All the surveyed organisations felt that ISO 14001 would not have severe cost implications to their current production processes and practices, D_1, and agreed with the notion that sound environmental management lowers the cost of doing business, D_{10}, however they did feel that the ISO 14001 implementation process would be put on hold should the organisation face a severe financial crisis, D_{11}. No opinion could be gained on the surmise that the emphasis placed on short term financial gains was in line with strategies for sustainable growth, D_3, and belief that environmental management concentrates on the issue of sustainability and subsequently bring with it factors that raise the cost of production, D_{12}. Organisations felt that the people responsible for compiling their management manual had an intimate knowledge of how the organisation functioned, its strategic direction and a good sound environmental understanding, D_5, They also felt that the parties responsible for the organisations legal requirements were capable of interpreting them into solutions that were practically applicable to their organisation in particular, D_{19}, however no opinion could be gained on the issue who would deal with the organisations' legal matters, D_{18}.

Table 5.11 Results of Section D - Opinions on ISO 14001 Issues vs. Interpretation

Section D: Opinions on ISO 14001 Issues $\leqq$ 2.8 - Disagree $3^{\pm 0.2}$ - No Opinion $\geqq$ 3.2 - Agree	**Mean of Response For All Firms (27)**	**Interpretation**
1. ISO 14001 will have severe cost implications to the company's current production processes and practices.	1.9	Disagree
2. Relationships with regulators are likely to improve.	3.7	Agree
3. The emphasis placed on short term financial gains is in line with strategies for sustainable growth.	3.0	No Opinion
4. There will be a high level of integration between the company's various management systems.	3.2	Agree
5. The people responsible for compiling the management manual have an intimate knowledge of how the company functions, its strategic direction and a good sound environmental understanding.	3.9	Agree
6. Each employee knows exactly how to contribute to environmental improvements.	2.5	Disagree
7. The number of people that have been dedicated to ISO 14001 implementation is sufficient.	2.6	Disagree
10. Sound environmental management lowers the cost of doing business.	3.2	Agree
11. The ISO 14001 implementation process will be put on hold should the company be faced with a severe financial crisis.	3.2	Agree
12. Environmental management concentrates on the issue of sustainability and subsequently brings with it factors that raise the costs of production.	3.1	No Opinion
13. Employee conduct in respect of environmental issues is likely to improve, or did improve, due to ISO 14001.	3.6	Agree
14. The company's culture is conducive to sincere environmental management.	3.6	Agree
17. The company has a high level of compliance to its regulatory and legal requirements.	3.7	Agree
18. Legal issues are dealt with by people within the company.	3.0	No Opinion
19. The parties (internal or external) that are responsible for legal requirements are capable of interpreting them into solutions that are practically applicable to your company in particular.	3.7	Agree

Section D: Opinions on ISO 14001 Issues (continued ...) ≦ 2.8 - Disagree $3^{\pm 0.2}$ - No Opinion ≧ 3.2 - Agree	Mean of Response For All Firms (27)	Interpretation
20. The company has set performance levels that are well in excess of the regulatory threshold.	3.3	Agree
21. Environmental regulations in South Africa are more relaxed than the global average and subsequently legal compliance is less costly.	3.1	No Opinion
22. The company has sufficient internal auditors to effectively audit all its management systems.	3.0	No Opinion
24. Customers often scrutinise and audit the company's environmental management system.	3.0	No Opinion
25. Regulators, such as the Municipality or government departments, often scrutinise and audit the company.	3.1	No Opinion
26. Management responds seriously to internal audit findings.	3.7	Agree

Organisations felt that their culture was conducive to sincere environmental management, D_{14}, and employee conduct, in respect of environmental issues, would likely improve due to ISO 14001, D_{13}. However organisations felt that employees did not know exactly how to contribute to environmental improvements, D_6. Organisations alleged that they had a high level of compliance to their regulatory and legal requirements, D_{17}, their performance levels had been set well in excess of the regulatory threshold, D_{20}, and that relationships with regulators were likely to improve, D_2. Organisation believed that there would be a high level of integration between their various management systems, D_4, and the number of people that had been dedicated to ISO 14001 implementation was sufficient, D_7, however no opinion could be gained on the issue of whether the organisation had sufficient internal auditors to effectively audit all its management systems, D_{22}, and levels of scrutiny from external parties such as customers, D_{24}, and regulators, D_{25}. Yet organisations thought their management did responded seriously to internal audit findings, D_{26}. No opinion could be gained of the speculation that environmental regulations in South Africa were more relaxed than the global average and subsequently legal compliance was less costly, D_{21}.

5.4.4 Section E – Criticism of ISO 14001

Section E was used to gather information about opposition to and criticism of ISO 14001. As in the previous section, respondents were asked to rate how strongly they agreed or disagreed with a number of given statements about ISO 14001, environmental management and their applicability in their industry in general.

The Kruskal-Wallis Test was applied to the results of Section C4, as shown in Table 5.12. Using a significance level of 80%, namely a critical value of 5.99, two points of criticism were accepted by the alternate hypothesis, namely there was a difference in the responses obtained for the organisations in the three different segments, and they were the accusation that if organisations improve their environmental performance substantially, regulators will just impose more stringent regulations, E_{10}; and notion that the ends do not justify the means, E_3. These points are shown in more detail in Table 5.13, where opinions of the different segments are shown on an individual basis.

Organisations with ISO 14001 and organisations in the process of implementing the standard both felt that the ends did justify the means, E_3, and substantial improvements their environmental performance would not result in more stringent regulations being imposed by the regulators, E_{10}. While organisations that have not yet started the implementation process felt the ends did not justify the means, E_3, and substantial improvements their environmental performance would results in more stringent regulations being imposed by the regulators, E_{10}. Both these findings are closely correlated to D_9 and D_{16} in Table 5.10.

Table 5.12 Results of Section E - Criticism of ISO 14001 vs. Kruskal-Wallis Test Results

Section E: Criticism of ISO 14001 ≦ 2.8 - Disagree $3^{\pm 0.2}$ - No Opinion ≧ 3.2 - Agree	**Mean of Response For All Firms (27)**	**Kruskal - Wallis Value**
1. ISO 14001 is criticised because companies are reluctant to comply with environmental best practices and seek certification.	3.4	2.66
2. ISO 14001 places high demands on a company's resources	3.3	3.37
3. The ends do not justify the means.	2.6	7.07
4. Management is too busy doing business to worry about environmental considerations.	2.7	3.49
5. ISO 14001 will not materially alter the quality of the company's products.	3.5	1.34
6. ISO 14001 does not necessarily guarantee improvements in environmental performance and regulatory compliance.	2.7	1.15
7. The current system of environmental regulations does nothing to encourage companies to do more than merely comply with minimum regulatory requirements.	3.2	3.25
8. Maintaining continuous compliance with environmental legislation is problematic and requires serious managerial effort.	3.0	3.90
9. Information uncovered by the environmental management system can be used as a roadmap for prosecution.	2.9	1.67
10. If companies improve their environmental performance substantially, regulators will just impose more stringent regulations.	2.4	6.71
11. Environmental regulations erode competitiveness.	2.4	1.46

Table 5.13 Results of Section E - Criticism of ISO 14001 accepted by Alternate Hypothesis

Section E: Criticism of ISO 14001 ≦ 2.8 - Disagree $3^{\pm 0.2}$ - No Opinion ≧ 3.2 - Agree	ISO 14001 Certification Status		
	With (11)	Without Started (10)	Without Not Started (6)
3. The ends do not justify the means.	2.5	2.6	3.3
10. If companies improve their environmental performance substantially, regulators will just impose more stringent regulations.	2.2	2.3	3.2

Table 5.14 Results of Section E - Criticism of ISO 14001 vs. Interpretation

Section E: Criticism of ISO 14001 ≦ 2.8 - Disagree $3^{\pm 0.2}$ - No Opinion ≧ 3.2 - Agree	Mean of Response For All Firms (27)	Interpretation
1. ISO 14001 is criticised because companies are reluctant to comply with environmental best practices and seek certification.	3.4	Agree
2. ISO 14001 places high demands on a company's resources.	3.3	Agree
4. Management is too busy doing business to worry about environmental considerations.	2.7	Disagree
5. ISO 14001 will not materially alter the quality of the company's products.	3.5	Agree
6. ISO 14001 does not necessarily guarantee improvements in environmental performance and regulatory compliance.	2.7	Disagree
7. The current system of environmental regulations does nothing to encourage companies to do more than merely comply with minimum regulatory requirements.	3.2	Agree
8. Maintaining continuous compliance with environmental legislation is problematic and requires serious managerial effort.	3.0	No Opinion
9. Information uncovered by the environmental management system can be used as a roadmap for prosecution.	2.9	Disagree
11. Environmental regulations erode competitiveness.	2.4	Disagree

The results of the survey in terms of criticism of ISO 14001, as shown in Table 5.14, showed that organisations felt ISO 14001 was criticised because organisations were reluctant to comply with environmental best practices and seek certification, E_1, ISO 14001 placed high demands on organisations resources, E_2, ISO 14001 did not materially alter the quality of the organisation's products, E_5, and the current system of environmental regulations did nothing to encourage companies to do more than merely comply with minimum regulatory requirements, E_7. However organisations disagreed with the fact that ISO 14001 was criticised because management was too busy doing business to worry about environmental considerations, E_4, ISO 14001 did not necessarily guarantee improvements in environmental performance and regulatory compliance, E_6, information uncovered by the environmental management system could be used as a roadmap for prosecution, E_9, and environmental regulations eroded competitiveness, E_{11}. No opinion could be gained on the topic of maintaining continuous compliance with environmental legislation being problematic and requiring serious managerial effort, E_8.

5.5 Summary

The survey was conducted through the use of a questionnaire and it was distributed among the members of the DAC. It was sent out to a total of 37 organisations with a total of 28 responding, thus giving a response rate of 76%. The responding organisations were made up of 11 organisations certified to ISO 14001, 11 organisations in the process of gaining certification and 6 organisations that had not yet started the implementation process and were debating whether or not to go ahead with it.

The analysis of the research findings revolved around two main points. First the research investigated what were the differences in views and opinions between those organisations with ISO 14001 certification, those organisations that were currently involved in the implementation process and those organisation that were still debating whether or not to become ISO 14001 certified. The second area of investigation was the general opinions of all the organisations surveyed.

In order to distinguish between the two areas of interest, a significance test was done on the data obtained in the survey and where there was a statistically significant difference in the responses obtained, the data was analysed in accordance with the first area of investigation, namely the differences in opinions; where there was no statistically significant difference in the responses, the data was analysed in accordance with the second area of interest. The significance test that was used was the Kruskal-Wallis Test.

The first part of the analysis involved categorising the responses into the three previously mentioned segments and determining the characteristics of the organisations making up the three segments and their central tendencies. The second part of the analysis explored why organisation chose to implement ISO 14001 and what benefits they would accrue from having certification.

The final part of the analysis investigated the opinions of the respondents on issues regarding the implementation process, general environmental matters and criticism of ISO 14001.

The findings of this analysis will be discussed in the next chapter, Chapter 6, The Discussion.

CHAPTER 6

Discussion

6.1 Introduction

In this Chapter comparisons will be made and discussed between the theory, as presented in the Literature Review, Chapters 2 and 3, and the finding of the Survey, as presented in Chapter 5.

The results obtained from the survey contained a lot of information about the members of the Durban Automotive Cluster (DAC), their organisations and the various points of view relating to ISO 14001 and environmental management in general. The survey was compiled in a sequence that would assist the respondent in its completion. However, in order to get a clear understanding of the complexities of ISO 14001, its implementations and the respondents' viewpoints, a holistic view of the survey is required to piece together the information from the various sections of the survey in order to assemble the final picture.

The primary objective of the research was to look at the implementation process and its barriers with the view of making recommendations while considering the strategic importance of ISO 14001. Thus there are two areas of interest; namely theory and implications of ISO 14001, as reviewed in Chapter 2; and the strategic issues involved in environmental management, as reviewed in Chapter 3. In this section the first area of interest will be reviewed and discussed prior to looking at the second area of solutions to the problems encountered in the first area.

For sections C4, D and E, results can be summarised into one of three opinions, namely "Agree / Easy", "Disagree / Difficult" or "No Opinion". A no opinion result is like a null result, as it adds no view on the issues, and thus little to no conclusions may be drawn. In the case, where a result of "No Opinion" was obtained, the results needed to be investigated further. In these cases the results in Appendices 3, 4 and 5 were referred to as this appendix gave a more detailed breakdown of the results,

showing for each statement of question, the percentage of surveyed organisations opting for each specific view point.

Note on Nomenclature

In the discussion of the results from the survey, specific reference is made to certain questions, in order to prevent confusion; the following nomenclature will be used:

$$X\#_n$$

Where:

- *X:* *refers to the Section of the Survey, i.e. A, B, C, D, E or F.*
- *#:* *refers to the Subsection number, i.e. 1, 2, 3 or 4.*
- *$_n$:* *refers to the question or statement number within that subsection, i.e. 1, 2, 3 ... 26..*

6.2 The Theory and Implications of ISO 14001

In this section the Theory and Implications of ISO 14001 were discussed and correlations drawn between the Literature Review, as presented in Chapter 2, and the findings of the Survey, as presented in Chapter 5.

6.2.1 Reasons for Implementing ISO 14001 and its Benefits

Determining reasons for seeking ISO 14001 was one of the research objectives. In a business environment, the financial justification of any project; be it the installation of new equipment, a market penetration initiative, or certification to a new management system is of paramount importance. Shareholders demand returns on their investments and thus, prior to embarking on a project, organisations need to investigate the costs involved versus the benefits derived. ISO 14001, and environmental management in general, is not a natural impulse for an organisation as the benefits derived are not intrinsically bound to the organisation's products or business processes. Environmental management does not affect the products leaving an organisation's

factory today, however, it has the potential to make important changes to the products leaving tomorrow, thus it can be concluded that environmental management has strategic implications for an organisation. Pearce et al (2000, p3) defined strategic management as the set of decisions and actions that result in the formulation and implementation of plans designed to achieve the organisation's objectives.

Piasecki et al (1999, p47) loosely defined strategy as a mix of past mistakes, present predicaments and future solutions. The question thus remains, why do organisations implement environmental management systems (EMS), such as ISO 14001; was it as a result of a corrective action strategy in order to prevent past mistakes, such as major pollution; was it due to present predicaments, such as requirements from the organisation's current customers, weaknesses in its management control systems or compliance with government regulations; or was it due to the organisation's need to be proactive and build a new competitive advantage or create a better environment for future generations?

Keogh (2000, p1), Bondi et al (2000, p5), Tibor et al (1996, p6), Murray (1999, p45), Munilla et al (1998, p60) and Yadav (1996, p18) all found that one of the major reasons for organisations seeking ISO 14001 certification was the satisfaction of customer demands. Seventy four percent of organisations surveyed in this research, as shown in Table 5.4, stated that the main reason for them implementing, or looking to implement, ISO 14001 was because their customers required them to do so in order to get new business or keep their current business. These results are echoed again in Table 5.5 where results of the survey showed the major benefit of ISO 14001 was that it was a mandatory customer requirement. Thus, evidence from the survey showed that the majority of organisations viewed ISO 14001 as a tool to solve current predicaments, and that predicament was that suppliers must certify to ISO 14001 or face the risk of losing business. ISO 14001 is a de facto requirement of all first tier original equipment manufacturing (OEM) suppliers to Toyota SA for new models released after 2005. Suppliers that do not become certified will be downgraded to second tier suppliers which are less lucrative and are often excluded from the primary tendering process for new business.

The literature reviewed highlighted a number of other benefits that a certifying organisation could accrue. The cost saving that resulted from sound environmental practices were proved, by the survey, to be another major benefit. Both Cochran (1992, p2) and Miles et al (1997, p5) identified this benefit as one of many benefits. The cost savings that are to be made from sound environmental practices, such as waste minimisation and recycling, do not happen overnight. They require changes to the way the organisation operates, and are therefore considered to provide future solutions, in terms of cost saving, to the organisation.

Improved corporate image was another consideration that many surveyed organisations considered to be a major benefit, and was identified by Miles et al (1997, p5) and Alberti et al (2000, p4463) as another benefit of ISO 14001. An organisation's corporate image can exist in three time planes; past, present and future. An organisation's corporate image may be affected by past mistakes, taking the Exxon Valdez case for example (Pearce et al, 2000, p60) and current practices or future plans, such as building a new nuclear power station. The adoption of ISO 14001 may help to insulate an organisation against claims of environmental negligence (Miles et al, 1997, p5). Certification to an environmental management system also allows organisations to publicly state, in order to improve its image, that they are aware of the impact of their activities on the environment and have a system in place to manage this impact for the benefit of the environment. "ISO 14001 is primarily concerned with 'environmental management'. In plain language, this means what the organisation does to minimise harmful effects on the environment caused by its activities" (ISO, 08/10/2004). The desire to publicly demonstrate an organisation's commitment to the natural environment, and subsequently the community at large, has its roots in an organisation's corporate social responsibility (CSR). Stephens (1999, p2) equated environmental performance to economic performance with social benefits.

Smith (2002, p42) defined corporate social responsibility as the integration of business operations and values whereby the interests of all stakeholders, including customers, employees, investors and the environment are reflected in the organisation's policies and actions. Pearce et al (2000, p53) identified three principal reasons why managers should be concerned about their organisation's social

responsibility. The first was that an organisation's right to exist depended on its responsiveness to the external environment. The second was that government regulations are increasing and organisations need to evolve to meet the changing social standards, finally, a responsive social policy could enhance the organisation's long-term viability. Karapetrovic et al (2003, p451) found that organisations bottom-line performances also included the natural environment, occupation health and safety, corporate social responsibility accountability, internal and external complaints handling, finances and a myriad of similar organisational and managerial aspects.

Certain organisations surveyed had not yet started the implementation process. Under the topic of reasons for implementing ISO 14001, it would be pertinent to consider the responses given by these organisations in order to compare them with those of organisations with ISO 14001 and those who are in the process on implementation. Table 5.10 in Chapter 5 showed the differences in views expressed by the various segments. Two areas of response are of particular important in connection with this point of discussion, namely D_9 and D_{16}, the sizes of the organisations is another important point, A_1, these are shown in Table 6.1.

Table 6.1 Issues Relating to ISO 14001 Justifications

Issues Relating to ISO 14001 Justifications	With (11)	Without Started (11)	Without Not Started (6)
A_1. Average Number of People Employed	599	462	171
D_9. The financial resources for the implementation of ISO 14001 are, or were, sufficient to cover all costs incurred.	Agree	Agree	Disagree
D_{16}.The expectations of what an environmental management system can deliver are unrealistic or exceptionally high.	Disagree	Disagree	Agree

Organisations that have not yet started the implementation process raised two issues about ISO 14001 implementation. The first issue is financial resources and they felt that there would be insufficient funds to cover the cost of implementation. The approval of any project is subject to financial approval, i.e. the budget being made available, and part of this approval process weighs off the benefits versus the cost.

The finding of D_{16} showed why there were not enough funds to cover the cost; the organisations believed that an environmental management system would not deliver all it promised to do, and subsequently the amount of financial resources assigned would be reduced. Another consideration to take into account is that these organisations are smaller than those of the other two segments and subject to tighter financial constraints.

The issue of first tier and second tier suppliers will also have an influence on these outcomes. ISO 14001 is only mandatory for first tier suppliers and subsequently the pressure to seek certification would have been significantly diminished. However the pressure would still be present as ISO 14001 does put a downward pressure on the supply chain, as those organisations that have gained certification will in turn pressurise their supplier to seek certification.

Thus summing up, ISO 14001 provides a certifying organisation with a system, if used properly, which will correct, or mitigate the effects of past mistakes; solve present predicaments, and provide future solutions. "ISO 14000 is a proactive standard that helps companies position themselves for increased profits and enhanced customer value while protecting the environment" (Keshav, 1999, p3). In justifying the cost involved with its implementation, organisations should look carefully at the benefits offered by the system and base their justification on these benefits, while recognising the strategic significance of certification.

6.2.2 Implementation Process and Its Barriers

Any project can, and should, be broken down into a number of steps, or stages. In the justification for a project, the difficulty of each of these steps needs to be taken into consideration as they have a direct bearing on the risks associated with the project and the costs involved. However, before embarking on a project such as ISO 14001 implementation, organisations need to realise that ISO 14001 is not a package that is purchased for a fixed amount and merely installed into the organisation as an add-on to its current management systems, but rather a series of tailor made solutions that evolve around the organisation and its environment.

The main objective of the research was the investigation of this implementation process and the determination of what the barriers were likely to be that the various organisations could experience. Tables 5.6 to 5.8 showed the various stages and the results of the survey, however, these tables do not show the entire picture, and thus the findings need to be taken in context with the finding of the entire survey and the literature review. The various stages of the implementation process will now be discussed and information will be drawn from other areas of the survey and the literature review.

Management Commitment

Senior management's commitment to ISO 14001 is essential in order to ensure the successful implementation and operation of the EMS (Anon, Environmental Technology Best Practice Programme, 2000, p6), and this was the findings of the survey. All firms surveyed said it was easy to obtain commitment from top management, however, no opinion could be reached in terms of obtaining a commitment from middle and lower management. The reasons for this are explained by looking at the theory presented in the literature review and other sections of the survey.

Most surveyed organisations, 74%, viewed ISO 14001 certification as a means to satisfy customer requirements. The modern way to look at an organisation is from a service-based point of view, and it prescribes that an organisation should view itself as a service organisation, in other words its activities should revolve around the satisfaction of customer requirements. It is senior management's duty to insure that customer requirements are met. In the case of the surveyed organisations, their customers, the automotive assembly plants, have required them to become ISO 14001 certified, or face losing business; thus top management is duty bound to give ISO 14001 their commitment.

The problem, in terms of commitment, centres on middle and lower levels of management. These levels of management are normally given the operational task of

the physical mechanics involved in the implementation process and thus will tend to be more negative about the process. No opinion could be reached on the issue of commitment form middle and junior management, which in the bigger picture means some organisations had no problem, while others did. However according to the Kruskal-Wallis test conducted on results of the specific questions asked, $C4_2$, the null hypothesis was accepted, i.e. there was no difference in the responses between the different segments. Looking at the summarised version of actual response, as shown in Appendix 3, 48% of the surveyed organisations said it was easy to get commitment from middle and lower levels of management and 48% of organisations said it was difficult, 4% had no opinion. Alberti et al (2000, p4457) found that implementation of an EMS often required changes in organisational structure, while Welford (1995, p22) said it ultimately required a change in the way business was done, and it is this change that is a possible cause of these discrepancies.

Resource allocation and constraints is a major issue in ISO 14001 and since middle and junior management are normally responsible for the mechanics of the implementation process, this becomes a major concern. D_7 highlighted the point that organisations felt insufficient people had been dedicated to the implementation of ISO 14001 and E_2 highlighted the point that organisations felt ISO 14001 placed high demands on the organisation's resources. Biondi et al, (2000, p56) found that managing the environmental aspects of activities according to a systemic and preventative approach implied a considerable effort in terms of human, financial and technical resources, regardless of their industrial or geographical context to most small and medium enterprises (SME's).

None of the surveyed organisations, as shown by B_3, had managers solely dedicated to environmental management; environmental management was added onto existing managers portfolios thereby giving them more responsibility and subsequently increasing their workload. Although this was in line with Sasseville et al's (1997, p100) recommendations that whenever possible an EMS should be integrated into other business and management functions, the issue of workload was of concern. Rosen (2001, p1) also raised the point that managers took it for granted that environmental protection was peripheral to the challenge of maximising corporate advantage. They believed that improving a firm's environmental performance was a

matter of regulatory compliance, an activity that added nothing but economic cost and legal and political complications to the corporate bottom line. Another challenge was that of environmental awareness among managers. Bondi et al (2000, p58) recognised the lack of environmental management skills as one of the first constraints in terms of human resources. The temptation, in an attempt to create integration, is to take existing managers and give them the responsibility, however, some of them do not have the necessary skills. The conflict is thus created between an efficient management structure versus one that allows focus. Although integration would provide an efficient management structure that ensured environmental performance became an integral part of the day-to-day business practices, there would not be sufficient focus in the system to allow for the proper treatment of non conformances.

ISO 14001 is likely to have an impact on an organisation's management structure, be it new levels or changes in portfolios. Forty eight percent of surveyed organisations agreed. Certain surveyed organisations made specific comments on the issues of additional workload that results from the implementation of ISO 14001, quoting issues such as:

> *"It should be a dedicated functional area with someone dedicated to it."*

> *"Needs specifically assigned responsibility."*

> *"If workload excessive it may add to the management structure i.e. employ additional staff."*

> *"Extra load on management structures and more paper work."*

However the following statement possibly best summed up the general feelings:

> *"The ISO 14001 programme requires that responsibilities for the programme are clearly defined. Depending on the size of the company, the number of aspects and impacts, it may not be possible to operate such a programme without additional resources.*

The 14001 programme may be integrated into an existing management system, but additional responsibilities may require special skills, for example legal requirements, internal auditing to the ISO 14001 standard, chemists, as well as regular maintenance and upkeep of system related activities. Small companies with very little aspects and impacts, and small staff numbers may not feel the impact on the management structure as significantly as larger companies with bigger staff numbers. More control, training and awareness are required in bigger companies that have significant impacts and aspects. Companies whose nature of business is such that their activities impact more on the environment than others, require a more dedicated programme."

Looking at the findings of culture change programmes among the respondents, B_5, 57% of organisations had an organisational culture change programme in place. Expanding and comparing these findings to those of $C4_2$ revealed that those organisations with a culture change programme in place, 56% said obtaining commitment from middle and junior management was easy, while 38% said it was difficult. Organisations with no culture change programme in place said obtaining commitment from middle and junior management was easy, 36%, while 64% of them said it was difficult. Although these trends show that a cultural change programme does help get commitment from middle and junior management, it was not conclusive.

ISO 14001 is often focused on technical considerations of the organisational components as opposed to its integration into overall organisational management and thus are seldom efficiently implemented (Nyambe, 2001, p3). However, the true backbone to ISO 14000 implementation is about changes in corporate culture and the organisation's attitude to the environment. Keshav (1999, p2) suggested that the solution to this predicament lies in understanding environmental economics and making a paradigm shift. Organisations need to realise that they are at the root of the situation and thereby demolish certain myths they carry. The first myth is that anything to do with environmental improvement is a cost and hence will be a drain on the organisation's profits; the second myth being that the current ways of doing things are so close to perfection and subsequently any other ways of conducting those

activities is hardly worth examining. Therefore the challenge facing the modern organisation is how to redefine and change its corporate culture in such a way as to be consistent with the concept of sustainable development (Welford, 1995, p114).

Initial Environmental Review, List Environmental Aspects and Impacts and the Establishment of a Register of Legislation

Although these sections were addressed individually in C4, they are linked together. In order to conduct the initial review, a sound knowledge of the organisation's aspects, impacts, laws and regulations pertaining to the organisation is required. Sasseville et al (1997, p91) found that the identification and evaluation of environmental aspects requires an understanding of the organisations legal and other requirements.

The initial environmental review provides the organisation with a snap shot of the status of its current environmental performance and where it is at that time with regards to environmental issues. Although it is not included in the scope of ISO 14001, QSI-Afrocare (2003, p1 of module 6) considered it a necessary precursor to the implementation of ISO 14001. From this review the organisation will be able to identify areas where environmental performance needs to be improved, opportunities that can lead to better or more efficient environmental performance, and ways to develop an environmental policy that will provide the proper guidance and direction to enable the organisation to develop an effective EMS. It will also provide important data needed to begin planning the implementation of ISO 14001.

The initial review should cover aspects such as:

1. Regulatory and legislative requirements governing the organisation's operations.
2. How the organisation interacts with the environment and which of its activities have significant environmental impacts, or may create a liability for the organisation.

3. Evaluation of the organisation's current environmental management procedures and programmes.
4. Identify what aspects of the organisation's activities enable or impede better environmental performance.

The findings of the survey showed that organisations did not see any problems with the initial environmental review or listing of environmental aspects and impacts, however, the establishment of register of all pertinent legislation proved to be a difficult step. Looking at the results of Section D, as shown in Table 5.10 in Chapter 5, indicated some differences in opinions of the organisations in the three segments. Organisations with ISO 14001 certification felt their organisations had a very good technical knowledge of environmental issues, D_8, and subsequently did not need to rely extensively on external technical experts in the determination of their aspects and impacts, D_{15}. Organisations who had not yet certified, felt that they did not have a good technical knowledge of environmental issues and subsequently would have to rely extensively on external technical experts in the determination of their aspects and impacts. Organisations need to be careful in their identification of their aspects and impacts, as this is an area where organisations can go astray and suffer from 'analysis paralyses' by delving too deep into the identification process.

Operating within legal requirements is a minimum requirement of ISO 14001. These legal requirements will include any regulatory or statutory requirements that apply to the environmental aspects of the organisation. Other requirements may also include a variety of non-regulatory performance criteria, such as customer specific requirements, industry codes of practice, and agreements with local authorities and neighbours. The register of environmental regulations must be relevant to the organisation. These should be drawn up by someone with knowledge of the processes and operations involved, the relevant regulations and the requirements governing them.

Regulatory and legislative requirements and the establishment of a Register of Legislation is an area where many organisations, due to the possibility of financial restraints limiting their ability to afford legal expertise, are likely to encounter

difficulties. Biondi et al (2000, p61) furthermore identified the fact that most SME's find maintaining continuous compliance with environmental legislation problematic and this implied serious managerial effort. Moreover, environmental legislation is subject to frequent and sudden revisions, thus making it difficult to keep up with.

The establishment of a legal register requires legal expertise. Again, looking at Section D, the survey showed that organisations believed that they had a high level of legal compliance, D_{17}. However no opinion could be reached on who dealt with the organisations legal issues, D_{18}. Looking at D_{18} in more detail showed that 37% of organisations used outside people, while 41% used internal people. The compilation of a legal register does not only require legal knowledge, but also an environmental understanding. Industry groups usually provide good updates or seminars on the "hot" regulatory issues, but cannot address every new regulation. However, commercial sources vary considerably in quality and breadth of coverage. Good services usually provide complete coverage with frequent updates at all government levels, but less coverage as you move down to include municipal levels. Depending on the total coverage required and the frequency of updates, the costs can escalate rapidly. Professional environmental consultants are useful in creating an understanding of the applicability of new regulations or assisting organisations in tracking developing regulations. However, few individual consultants are knowledgeable enough in more than a few areas of environmental regulations to provide complete and in-depth tracking information. In addition Sasseville et al (1997, pp 92 – 93) found that many acts and government notifications tend to be complicated and difficult to understand, especially in terms of these regulations' practical applicability. Developing countries are sometimes too aggressive and put in place regulations that are not possible to meet because the infrastructure to support the regulations does not exist (H & M Associates SA, 2004, p26), and thus practical applicability of the laws and regulations is further complicated in terms of ISO 14001.

Preparing Environmental Policy

An environmental policy is a demonstration of the organisation's commitment to develop a process to improve the organisation's environmental performance. The

policy sets forth the goals that management considers important and establishes a philosophical framework for the development of the EMS. Sasseville et al (1997, p76) defined the environmental policy, within the framework of ISO 14001, as a policy that establishes the principles, responsibilities, and performance requirements against which the rest of the EMS, and related actions, will be judged. Although everyone in the organisation will be responsible for implementing the policy, ultimately it is the responsibility of top management to see that the policy is implemented in a manner consistent with the goals and principles set forth by the policy.

The results of the survey showed that organisations saw no problems with the preparation of the environmental policy. The policy is set by top management, which as shown by the result to have given their commitment to ISO 14001, and thereby are committed to the establishment the policy.

Setting Environmental Objectives and Targets

ISO 14001 requires an organisation to establish and maintain documented objectives and targets. The establishment of these objectives and targets will initially be based on the findings of the Initial Environmental Review and the Organisations Environmental Policy. The aspects with the greatest significance will be used to set the objectives and targets of the EMS. The analysis of all aspects of the organisation's operations creates an environmental awareness of the organisation's operations.

The results of the survey showed that organisations viewed the setting of objectives and targets to be easy and saw no problems with it. However, the setting of targets and objectives is one thing, quantification and monitoring of these targets and objectives is another issue. Without being able to quantify a target or objective, it cannot be monitored and controlled. Among the surveyed organisations, most performance measurements focused on the controlling waste, water use and power consumption.

Pawar (2001, p14) recommended that the value of an EMS could, and should, be quantified through performance measurements. He also found that by streamlining

operations, improving employee morale, and increasing accountability within the organisation, an EMS could extend beyond the environmental focus and have a measurable positive impact on non-environmental functions within an organisation. Although the goals of ISO 14000 are quite lofty, Murray (1999, p38) found environmentalists criticised the standards. Among these was the fact that standards do not set any particular level of environmental performance. Morrison (1999, p6) considered the absence of these performance levels to be problematic only when coupled with the lack of transparency to the organisations external stakeholders.

The results of the survey showed that most organisations had set performance levels in excess of the regulatory threshold, D_{20}. However there were discrepancies on the issue of improving performance and regulators' responses to improved performance, as shown in Table 5.13, E_{10}. Organisations with ISO 14001 and those in the process of gaining certification believed if they improved their environmental performance, the regulators would not impose more regulations, while organisations that have not started the implementation process believed that the regulators would impose more stringent regulations in response to organisations improving their environmental performance. This opinion portrayed a negative attitude to the entire process among this specific group.

Establishing the Management Programme and Structure

Once the organisation has set its environmental objectives and targets, ISO 14001 requires the organisation to establish and maintain an environmental programme to achieve them (H & M Associates SA, 2004, p32). This programme includes the designation of responsibility, for example, the structure, the time frame and means by which it will be achieved.

The establishment of the management programme and structure is an area where the surveyed organisations believed they would have problems, $C4_8$. H & M Associates SA (2004, p32) cautioned organisations in assigning responsibilities, as by devolving responsibly to the lowest level within the organisation, inconsistencies could occur, and while keeping the responsibility at too high a level, could result in no action being

taken. These views expressed by H & M Associates highlighted where the problems lie, namely where responsibility is centred.

In the section on management commitment, the issue of middle and lower management workload was raised and found to be problematic in terms of ISO 14001 implementation. Managers are reluctant to take on more work and subsequently will be inclined to shirk away from additional responsibilities, such as ensuring that environmental objectives and targets are met. Sasseville et al (1997, p82) recommended that organisations need to assess what management programmes and control systems they already have in place, be it quality, financial or human resource, and determine what works best for the organisation. By examining what already works within the organisation, they will avoid the need to 'reinvent the wheel'. These may include documented manuals, procedures and records that form the foundation of any management control system (QSI – Afrocare, 2003, p1 of module 4). Biondi et al (2000, p60) found that many organisations lacked the environmental culture and were not acquainted with explicitly programming and planning their activities in detail, especially with respect to issues outside their core business, thus many of them encountered difficulties in defining their environmental policies and management programmes. Alberti et al (2000, p4464) found that an EMS implementation is the easiest in organisations that are standardised and well structured, which is normally your larger organisations, however, many smaller organisations feared such systems, as they would lose their flexibility.

Writing the Management Manual

The management manual is a document that describes the organisation's EMS. It will cover items such as responsibilities, activities, policies, objectives and their achievement. The Management Manual acts as a guide to the EMS's procedures, it documents and describes the entire system. It also provides a useful guide to anyone wanting to understand the EMS. Compiling this management manual will require an intimate knowledge of how the organisation functions, its strategic direction and a good sound environmental understanding.

Writing the management manual was an area where there were discrepancies between the three segments. Organisations certified to ISO said the step was difficult. Organisation in the process of implementing ISO 14001 felt the step would be easy, while organisations that had not started the implementation process gave no opinion on the issue. The area of concern is the discrepancy between those organisations with ISO 14001 and those in the process of implementing ISO 14001. On average organisations in the process of implementation were only 24% of the way to completion, thus they are unlikely to have got to the stage of writing the management manual. On the other hand ISO 14001 certified organisations have already written their manuals and are possibly in a better position to comment. Thus it is likely that writing the management manual will be a lot more difficult than organisations believe and subsequently it could have the potential to delay their certification process. Learning curve effects could also delay this implementation further.

All organisations would have written a management manual for their quality management systems, QMS, and subsequently those organisations that are in the process of implementation believed they would be able to 'copy' their manual across, make minor adjustments and in the process create an integrated management system (IMS). In terms of integration between their management systems, D_4, organisations felt there would be a high level of integration between their management systems. In addition, D_5, organisations felt that those people responsible for compiling the management manual had an intimate knowledge of how the organisation functions, its strategic direction and a good sound environmental understanding. The problem with integration of management systems is that to set the system up requires an intimate knowledge of all the systems involved and subsequently tends to be a time consuming task, and time is something which companies that have not yet certified do not have.

Establishing the Operational Controls and Procedures

No opinion could be gained on the issues of establishing operational controls and procedures, however, the survey results showed that organisations did not consider ISO 14001 to have severe cost implications on the organisation's current productions processes and practices, D_1. The fact that some of the organisations had maintenance

managers involved with ISO 14001 is an indicator that they had concerns over the establishment of operational controls and procedures.

Environmental Training of Company Personnel and Environmental Awareness

ISO 14001 requires that organisations identify and address environmental training needs. "Appropriate training relevant to the achievement of environmental policies, objectives and targets should be provided to all personnel within the organisation" (ISO 14004, 1996, p17).

No opinion could be reached on the issue of training. Thirty seven percent of surveyed organisations felt training would be problematic, while 48% felt it would be easy. Cochran (1999, p37) identified training as one of the biggest challenges to the implementation of ISO 14001. He argued that it is important to ensure employees are familiar with environmental issues in their areas as well as plant wide issues. Bondi et al (2000, p58) also recognised the lack of environmental management skills as one of the first constraints in terms of human resources and ISO 14001. These results are similar to the findings of BM Analysts (August 2003, p7) who found that the organisations complained about inadequate training at all levels of the supply chain.

Looking again at the findings of Culture Change Programmes among the respondents, B_5, 57% of organisations had an organisational culture change programme in place. Culture Change Programmes provide the ideal vehicle to train employees and build environmental awareness, as the programmes cut through all levels of the organisation and are put across in such a way that is understandable to everyone.

Surveyed organisations felt that their organisational culture was conducive to sincere environmental management, D_{14}, and their employee's conduct in respect of environmental issues was likely to, or did, improve as a result of ISO 14001, D_{13}. However organisations did feel that each employee did not know exactly how to contribute to environmental improvements, D_6, which again emphasised the need for training. Graves (2003, p66) found training to be one of the most important aspects of ISO 14001 implementation as it could be used to communicate to all employees the

environmental impacts of their activities, the organisation's environmental policy, roles, responsibilities, procedures, methods and actions required to meet the organisation's EMS.

Internal Auditing of the Company against ISO 14001

ISO 14001 emphasises the importance of using audits as a management tool for monitoring and verifying the effectiveness of the EMS's implementation. ISO (1996, p2) defined an audit as a systematic, independent and documented process for obtaining audited evidence and evaluating it objectively to determine the extent to which the audit criteria are fulfilled. Graves (2003, p68) found that audits should be used to identify and resolve ISO 14001 deficiencies in the organisation and they should focus on objective evidence.

Cochran (1999, p37) recognised internal auditing as one of the success factors in existing QMS's, and recommended that organisations should look to extending their existing internal audit system to include environmental issues. Piasecki et al (1999, p53) found that by auditing an organisation's faults, it is possible to prevent that organisation from making significant errors, as the result of the audit will highlight weaknesses in the organisation before they become problems. Thus in the organisational context, effective auditing has the potential to improve the management of the organisation, however senior management must be in a position to accept the finding of the audits and act on the recommendations made.

Surveyed organisations saw no problems with carrying out internal audits of the organisation against ISO 14001 and in the cases where there were findings made, management responded seriously to them, D_{26}. However there were discrepancies in the responses given by the organisations in the three segments, as shown in Table 5.10. ISO 14001 certified organisations felt they had internal auditors with the necessary environmental and management systems knowledge to effectively conduct environmental audits. However organisations that had not yet been certified felt they did not. On the issue of overall effectiveness of an organisation's internal audit programme, in terms of having sufficient internal auditors to effectively audit all their

management systems, D_{22}, no opinion could be reached. Looking at D_{22} in more details showed that 41% of organisations believed they did not have sufficient internal auditors, while 45% felt they did. These findings thus pointed to two areas, namely resources and training.

The problem SME's in particular are likely to face is with their internal audits as many organisations lack the people with the necessary skills and knowledge to audit the organisation (Biondi et al, 2000, p60). These internal auditors would be required to have a good sound understanding environmental issue, the requirements of the standard and how the organisation operated.

6.3 Strategic Environmental Management

The success of ISO 14001 implementation is ultimately explicitly linked to its strategic importance and since the primary objective of the research was to look at the implementation process and its barriers with the view of making recommendations, the strategic importance of ISO 14001 must be considered. It was beyond the scope of this research to go into the strategic inclinations of the various organisations in the DAC, however, the survey was constructed in such a way so as to shed some light on the strategic significance of environmental management to these organisations.

6.3.1 Strategic Significance of ISO 14001

Seventy four percent of organisations surveyed said that they certified to ISO 14001, or were considering certification, because their customers required them to do so, and 63% listed ISO 14001 certification being a mandatory customer requirement as one of the top 3 benefits certification had to offer. ISO 14001 certification is not a task to be taken lightly and involves serious management effort. Biondi et al, (2000, p56) found that managing an environmental management system implied to most organisations a considerable effort in terms of human, financial and technical resources, regardless of their industrial or geographical context.

In terms of Porter's Fives Forces Model, it can be argued that the members of the DAC have a weak bargaining power with their customers considering the nature of the industry. This factor was further substantiated by the fact that none of the respondents listed $C2_9$ as a benefit of ISO 14001; $C2_{10}$ and $C2_{11}$ similarly had very low levels of support with them scoring 1 and 2 points respectively and this is indicative of the same factors, namely weak bargaining power. These results are summarised in Table 6.2. The industry consists of large multinational automotive assembly plants as the customers, and smaller domestic based organisations as the suppliers. The customers have a very strong hold over the suppliers and categorically stated that if local suppliers cannot meet all their requirements, in terms price, delivery and certification to various management systems, they would source components internationally. This was the fundamental concern for domestic based organisations with regard to operating in a global economy, as domestic organisations are competing with international organisations. Fahey et al (2001, p90) found that the need for a global strategy depended on the nature of international competition in the particular industry. In this regard, the automotive industry in South Africa faced international competition that is becoming more and more intense. The requirements for an EMS are being driven by international pressure. Domestic organisations are competing head on with the international suppliers, many of which are already certified to a recognised EMS.

Table 6.2 Results for Section C2 – Benefits Derived from ISO 14001 (Summarised)

Benefits Derived from ISO 14001 Points Calculated and Ranking	**All Firms (28)**
9. Certification opens up new opportunities for new business.	0
10. Certification can be used to differentiate the company's product offering and thus allow it to charge more for its products.	1
11. Certification increases the barriers to entry and thus resulting in less competition.	2

Gremenez et al (2000, p363) defined competition as a core concept of strategic management, while Omhae (1983, p36) further stated that the main objective of strategic management was the building and maintaining of a competitive advantage. Campbell et al (1997, p99) found that in order to create and maintain a competitive advantage, organisations need to be able to deliver a given set of customer benefits at lower costs than competitors, or provide customers with a bundle of benefits its rivals cannot match. The strategy of an organisation must be concerned with identifying and taking actions that lower the cost of value creation and/or differentiate their product offerings (Hill, 2002, p380). However, the environmental considerations concentrate on the issue of sustainability and bring with it many factors that are likely to raise the cost of producing the product. Thus the challenge is to formulate a strategy that satisfies an organisation's requirements to make a profit, while at the same time satisfying their customers' requirements for an EMS. Porter et al, (1995, p130) recommended that managers should recognise that environmental improvements are sources of competitive advantage.

Sound environmental practices have the potential to lower the cost of doing business and subsequently lower the cost of value creation, D_{10}. The results of the survey showed that the organisations accepted this view point. However no opinion could be reached on the issue of sustainability and the fact that environmental management brings with it factors that raise the costs of production, D_{12}. Here 26% disagreed while 37% agreed.

Domestic based organisations have an intrinsic competitive advantage over their international competitors when it comes to meeting their customer requirements; and that advantage is in terms of logistical support and response to the assembly plants. However there are still certain mandatory customer requirements that suppliers must meet, and certification to ISO 14001 is one of them. The challenge to domestic organisations is how to use ISO 14001 to help build and maintain a competitive advantage over their international competitors. Keogh (2000, p13) found that there was lingering belief that environmental regulations in third world countries where less stringent and thus making legal compliance less costly. Forty one percent of surveyed organisations believed that environmental regulations in South Africa were more

relaxed than the global average and subsequently legal compliance is less costly, D_{21}. While only 30% felt environmental regulations in South Africa were not more relaxed than the global average.

When formulating a business strategy, organisations need to take environmental considerations into account. Thus management needs to review the frameworks used to formulate their strategies and incorporate environmental issues into those frameworks. Sexton et al (1999, p281) found that it was not possible for an EMS to easily influence the prevailing strategic orientation of an organisation, yet it was one of the systems that needed to be addressed if environmental management was to be integrated into the organisation. Survey organisations felt that they would like to have a high level of integration between their various management systems, D_4.

Quinn (1980, p204)) defined strategy as the pattern, or plan, which integrates an organisation's major goals, policies, and action sequences into a cohesive whole. Trienekens et al (2001, p467) found that these elements cannot be analysed on their own without taking into account how they relate to other system elements within the organisation and its business environment. A management system, as defined by the systems approach, is a composite set of interdependent processes that operate harmoniously, sharing the same resources pool, and aimed towards the fulfilment of set goals (Karapetrovic et al, 2003, p455). In terms of an EMS, these goals would be the controlling and minimisation of the harmful effects of the organisation's activities on the environment.

The purpose of a management system as defined by ISO (www.iso.org, 08/10/2004) is the organisational structure for managing its processes, or activities, that transform inputs of resources into a product or service that meets the objectives, such as satisfying the customer's quality requirements, complying to regulations, or meeting environmental objectives. The concept of systemisation is the establishment of set procedures that ensure that the organisation goes about its business in an orderly and structured way thus leading to the efficient utilisation of its resources; financial, intellectual, human, infrastructual or other. Any system requires feedback in order to ensure the system achieves its objectives. In management systems, this feedback comes in the form of system audits and performance measurements.

6.3.2 Performance Measurements

Piasecki et al (1999, p53) found that by auditing an organisation's faults, it is possible to prevent that organisation from making significant errors since audits can expose or highlight weaknesses in the organisation before they become problems. Thus in the organisational context, effective auditing has the potential to improve the management of the organisation. These audits should provide management with feedback from the system it needs to make effective decisions, thus validity of the system will be based on the quality of this feedback.

Properly focused performance measurements have the potential to ultimately improve the overall competitive advantage of the organisation on the proviso that senior management accepts the responsibility for judging the outcomes of the measurements and acts on the results of the measurements. By providing feedback to management on environmentally related performance measures, an EMS provides the opportunity to integrate environmental criteria into an organisation's considerations at all levels (Gilbert, 1993, p91). Piasecki et al (1999, p48) recommended that organisations need to look at blending fundamental environmental measures with more strategic indicators, such as where they are, where they have been and where they want to be. Strategy is about mobilising a few good options and organisations need to pay greater attention to environmental-related performance measurements in order to have better data for decision making (Bennett et al, 1998, p99).

All organisations with ISO 14001 had set environmental performance measures, which are to be expected, as it is a requirement of the EMS. Certain organisations without ISO 14001 also had set environmental performance measures. Forty percent of organisations in the process of implementation and 33% of organisation debating ISO 14001 had set environmental performance measures. The reasons for this trend was that many had already started ad-hoc environmental initiatives, such as DANCED's Cleaner Production Programme, a programme sponsored by the Danish government and aimed at the Metal Finishing Industry in Kwa-Zulu Natal with the objective of promoting cleaner production and waste minimisation. However, only 7% of surveyed organisations said that the reason for them looking to certify to ISO

14001 was because it offered them a management system that would improve their environmental performance, $C4_3$.

In a quality management system (QMS), key performance areas (KPA) are often externally initiated and monitored by the organisation's customers. This is particularly prevalent in the automotive industry, where the OEMs measure their suppliers on quality measurements such as reject rates and on-time deliveries. A breakdown in the QMS will surface as a failure to meet the customer's expectation, such as a reject part being delivered to the customer or a late delivery. In an EMS, the situation is little trickier, as suppliers are not likely to experience the same levels of scrutiny. When asked this question in the survey, D_{24}, no opinion could be gained. However, expanding on this "No Opinion" results showed that 48% of organisations felt customers would not pry into their EMS, while 37% felt they would. Similarly, the issue scrutiny from the regulators, such as municipalities or government agencies, D_{25}, also produced a no opinion result from the survey, with opinions being split down the middle with 44% of organisation believing they would have scrutiny from their regulators and 44% believing they would not. The concept of environmental management is still in its infancy and has a long way to go before it reaches the same levels of quality management, where customer satisfaction become intertwined with its KPAs. Keogh (2000, p5) found that in terms of scrutiny form regulators, the details required to monitor environmental performance outstripped their capacity to respond effectively. In terms of relationships between organisations and their regulators, organisations believed ISO 14001 would help improve these relationships, D_2. This relationship building was assisted by the fact that organisations had set environmental performance levels that were higher than the regulatory threshold, D_{20}.

6.3.3 Organisational Structure and Systems Integration

Jones (2001, pp5 – 6) found that the collective nature of an organisation is about individuals being able to focus on a narrow area of expertise, thus allowing them to become more skilled, or specialised, at what they do. Piasecki et al (1999, p11) identified an EMS specific phenomenon that they called the "Green Wall" and defined it as a point at which the overall organisation refuses to move forward with its

strategic environmental management programme, and the environmental initiatives become stalled. The reason for this stall lies in the fact that the core nature of the organisation is sliced from the environmental decision-making process, leaving a two-dimensional way of compliance, which lacks any strategic vision. Organisations need to take a holistic view of their organisation and its structure or face the risk of finding themselves in the situation where the organisation has become compartmentalised.

Compliance-oriented environmental management programmes have difficulty in finding an effective place in an organisation due to the fact that environmental management is neither an operations function nor a staff function. Integration with staff and operation business units is a major challenge for environmental management functions. However, the goal of these initiatives must be the integration of environmental management with other business functions and the building of a credible set of expectations regarding the potential contributions of these environmental initiatives.

The results of the survey showed that environmental management was the domain of other functional areas within the organisations, areas such as Health and Safety, Quality, and even Maintenance. None of the surveyed organisations had environmental managers solely dedicated to environmental management. For organisations with ISO 14001, Health and Safety was the main area of additional responsibility, with 73% of environmental managers being responsible for it. Quality followed behind, with 55%, as being another area of responsibility. Organisation in the process of ISO 14001 implementation showed a lower percentages, 55%, of environmental managers being responsible for Health and Safety and a higher percentage, 64%, being responsible for Quality. In this segment, the finding showed that environmental managers are responsible for Maintenance, 27%. This trend is possibly due to the fact that many organisations have concerns over technical changes to plant and equipment in order to achieve environmental compliance and subsequently have appointed the Plant Engineer, or Maintenance Manager, the duty of being the organisation's environmental representative. The organisations that are still debating ISO 14001 showed the trend that 50% of their environmental managers were responsible for Quality, Maintenance, Health and Safety. The explanation for this trend lies in the fact these organisations are generally small and subsequently

managers will be responsible for a wide variety of functions; in one of the survey organisation, the organisation employed 56 people and the proprietor was responsible for environmental management.

In order for environmental management functions to become effective, they are required to be both sufficiently represented at a corporate level, yet at the same time be autonomous enough to provide the independent perspective required for environmental quality assurance and enforcement. The results of the survey showed that organisation with ISO 14001 and organisations that are currently implementing the EMS both had the same statistics, that being 45% of the environmental managers / representatives were senior managers and 55% were middle managers. Organisations that were still debating ISO 14001 had much lower representation figures, with only 17% of the environmental managers being senior managers and 17% being middle managers. This low statistic is offset by the fact that many of the organisations, 67%, have yet to appoint an environmental manager.

There are two aspects to an environmental management system (EMS), such as ISO 14001: there is the aspect of system implementation, up to the point of certification and registration, and then there is the aspect of system maintenance and entrenchment, namely running the system. The results survey showed that people need to be solely dedicated to the implementation ISO 14001, and given the opportunity focus exclusively of the implementation process. However taking the strategic approach to the running the system, the need for integration with other business functions becomes apparent. Thus a trade off exists between individual specialisation, required for the implementation, and joint specialisation required for running the system. In order to achieve this, implementation through to system entrenchment, the whole process needs to be treated as a project and run using the appropriate methods. The most appropriate structure for running projects is a matrix organisational structure (Pearce, 2000, p404), (Jones, 2001, p118), (Smit et al, 1999, p223).

Pearce (2000, p404) found that the provision of skills and resources to where and when they are most vital is characteristic of matrix structure, while Jones (2001, p117) found that use of cross-functional teams, as found in matrix structures, reduced the functional barriers, overcame the problem of subunit orientation, and facilitated

adaptation and learning for the whole organisation. The matrix structure opens up communication between functional specialists, provides an opportunity for team members from different functions to learn from each other and develop their skills, while maximising the use of professionals (Jones, 2001, p118). However matrix structures lack the control structures that lead team members and develop stable expectations, subsequently loss of accountability is a concern (Pearce et al, 2000, p407). Donnelly et al (1990, p210) found that the success of matrix structures depended to a large extent on the authority given to project leader. Thus in order to avoid this deficiency, Pearce (2000, p408) recommended the use of a temporary matrix structure in order to simplify and amplify the focus of resources on a narrow but strategically important project, such as the ISO 14001 implementation.

6.4 Summary

Results of the survey showed that most organisations have implemented, or would implement, ISO 14001 because their customers required them to do so and most organisations viewed the satisfaction of customer demands as the main benefit of ISO 14001 certification, these findings agreed with the theory. The theory found that ISO 14001 has the capability, if used correctly, to not only improve the efficiency of the organisation by reducing costs, but also to improve its corporate image; these benefits were also listed by surveyed organisations.

The finances made available for the implementation of ISO 14001 are linked to the benefits derived from the system. The organisations that had not yet started the implementation process had not done so yet because they felt the financial outlay required for ISO 14001 implementation did warrant the benefits that could be accrued. The fact that ISO 14001 is a mandatory customer requirement has been highlighted as the major reason for its implementation and subsequently its importance is motivated through external demands, not internal demands such as cost savings, improved management controls or employee accountability.

The theory highlighted the point that implementation of ISO 14001 was at times resource hungry and many of the surveyed organisations concurred with this notion. This is further complicated by the potential lack of commitment from middle and junior management. The funds made available for the implementation of the system has a direct bearing of the resources made available, resources cost money and subsequently the greater the financial backing, the more resources will be available.

Environmental expertise in both legal and technical fields is an area that the theory highlighted as a critical to the implementation of ISO 14001 and predicted to be a point with which organisation have problems. The survey proved this to be the case with certain organisations, particularly those organisations that were not certified to ISO 14001. Through training an organisations can build its skills base and the theory identified training as one of the greatest challenges in ISO 14001 implementation. Although organisations identified skills deficiencies, they did not see a problem with training. However, organisations concurred with the fact that their employees needed more training as many did not know and understand the impact of their tasks on the environment and what was required to improve their environmental performance. Many of the organisations currently had organisational culture change programmes in place and these programmes provide the ideal vehicle to train employees.

A system is judged on its performance and subsequently the performance measures used by the organisation should be linked to the benefits of the system. Properly focused performance measurements provide the opportunity to blend environmental considerations with strategic indicators, and thus assist management in their task of formulating, implementing and monitoring their strategy.

The Management Manual is an integral part of the EMS as its guides the whole system. There was a discrepancy between surveyed organisations as those that had already gained certification that believed it to be a problematic area, while those who had yet to gain certification believed it to be easy. This discrepancy has the potential to delay the implementation process for those organisations that are still implementing the system. This delay could be further extended when the learning curve effects are taken into consideration

The theory proved that by auditing itself, the organisation could prevent significant errors occurring and predicted that implementing organisations would have problems with internal auditors. Some of the organisations felt they did not have competent internal auditors to effectively audit their management systems. Since these audits have strategic importance by highlighting potential weaknesses in the management system, it is important that senior management take note of these findings, and most organisations believed their management treated audit finds seriously.

By integrating its various management systems into one system, organisations can exploit efficiencies in management structures and other strategic benefits. The survey showed that organisations desired a high level of integration between their management systems. In addition none of the surveyed organisations had managers solely dedicated to environmental management, yet it was one area where some respondents felt that dedication of the role should be investigated in order to allow focus on the environmental aspects of the organisations activities and management thereof. The theory showed that the collective nature of an organisation is about individuals being able to focus on a narrow area of expertise, thus allow them to become more skilled, or specialised, at what they do. However integration takes time and ISO 14001 is not a 'one size fits all' system, but rather consists of a series of tailor made solutions that evolve around the organisation and its environment. Organisations must therefore be cautious of implementing and running a standalone system which is quicker and easier to implement, but defunct of any long term strategic benefits.

The issues raised and discussed in this chapter will be concluded in the next chapter and recommendations will be made.

CHAPTER 7

Overview, Conclusion and Recommendations

7.1 Introduction

In this Chapter, the issues discussed in the discussion will be concluded and recommendations will be made based on these conclusions.

7.2 Overview

The aim of the research was to explore and understand the complexities of the ISO 14001 implementation process with the objective of establishing the barriers that hamper its implementation, the determination of what factors influence these barriers and the investigation of possible recommendations on how organisations could overcome, or minimise, these barriers. To achieve this, a study was conducted on the Durban Automotive Cluster (DAC) investigating the following areas:

1. Determine the reasons for seeking ISO 14001 certification.
2. Determine what the organisations perceived and experienced as the barriers to implementation.
3. Determine the strategic implications of an Environmental Management System (EMS).

A theoretical basis of ISO 14001 and its implementation process was established by reviewing at previous research. This theoretical basis looked at the history of ISO 14001, the reasons for its implementation, the benefits organisations could accrue from its implementation, the implementation process and opposition to the standard.

The theory of strategic environmental management was investigated in order to establish the strategic implication of ISO 14001 and its implementation process. The

theory of strategic management, management systems and integration of environmental management with the strategic management model was investigated while considering the importance of the measurements, global and strategic environmental management and the incorporation of incorporating environmental management systems into strategic planning.

The DAC's members were surveyed through the use of a self administrated questionnaire. The questionnaire was divided into 6 sections (Sections A to F), each of which focused on different environmental management issues. Sections A and B consisted of a series of observational questions designed to gather specific data about the respondents, their organisations and environmentally related matters. Sections C, D and E predominantly used an itemised rating scale, where a number of direct questions were asked concerning the respondent's attitude to specific issues and points of interest. Section C focused on reasons for implementation, the benefits derived and the stages of the implementation process. Section D focused on more specific issues relating to the implementation process and the strategic implications of ISO 14001. Section E focused on opposition and criticism to ISO 14001. Section F was a non structured question where respondents were asked to provide any additional information that they thought would be pertinent to the research.

The responses were categorised into three different categories, namely those organisations who had already implemented ISO 14001 and achieved certification, those organisations that were in the process of implementing ISO 14001, and those organisations that had not yet started the process and were still debating whether to go ahead with the process or not. The data obtained from the survey was summarised in line with these three categories and where significant differences existed in the responses obtained, these differences were highlighted. The remaining data was summarised in order to ascertain an overall impression of the entire group.

The summarised results were then discussed and correlations drawn between these results, the theoretical basis and their implication. This discussion was broken down into two main areas of focus, the theory and implications of ISO 14001, and strategic environmental management. The first area was discussed by looking specifically at the reasons for implementing ISO 14001, the implementation process and its barriers.

The second area was discussed by looking at the strategic significance of ISO 14001, performance measurements, organisational structure and systems integration.

7.3 Conclusion

In order to conceptualise the problems associated with ISO 14001 implementation from a management perspective, the implementation process must be viewed from a holistic view point without becoming preoccupied with the technicalities of each phase in the implementation process or the exact details of the individual organisations.

7.3.1 Reasons for ISO 14001 Implementation and its Benefits

Organisations implement systems because these systems offer them benefits that they can capitalise on. Results of the survey agreed with the findings of the theory as most organisations have implemented, or would implement, ISO 14001 because their customers required them to do so. The theory listed a number of benefits that organisations could accrue through certification to ISO 14001, however, the findings again highlighted the fact most organisations viewed the satisfaction of customer demands as the main benefit of ISO 14001 certification. Based on this reasoning, the strategic significance of ISO 14001 to OEM suppliers was very high, failure to embrace the principles of the system and seek certification will have far reaching implications on the individual organisations in terms of their market standing and future viability.

7.3.2 Financial Implication of ISO 14001

The fact that ISO 14001 is a mandatory customer requirement has been highlighted as the major reason for its implementation and subsequently its importance is motivated through external demands, not internal demands such as cost savings, improved

management controls or employee accountability. In justifying costs involved with its implementation, organisations must look at the value of all current and future business with that customer, and future customers. The cost of implementation should be amortised and set off against the value of this business in perpetuity. In cases where ISO 14001 justification is based purely on internal motives, such as cost savings, improved management controls or employee accountability, organisations have the opportunity to implement a self-certified system, thus avoiding the cost of third party certification and registration by an accredited body, while still allowing the organisation to capitalise on the internal benefits offered by the standard.

Although it was not in the scope of this research to analyse cost involved with ISO 14001 implementation and compare it with turnover generated from new business, it should be an area for future research should this research be extended.

7.3.3 Resource Availability

Availability of resources to carry out the physical mechanics of the implementation process was an area highlighted by the theory as a point where organisations would have problems. The findings confirmed this to be the case in the organisations surveyed. Resource availability is explicitly tied to the funds available to the implementation as resources cost money and subsequently the greater the financial backing, the more resources will be available.

The potential lack of commitment from middle and junior management coupled with the high demands placed on resources by the implementation process calls for senior management to carefully examine the process and define the appropriate structures needed coupled with adequate resources to ensure its success.

7.3.4 Technical and Legal Expertise

Coupled with the potential of resources constraints, is the lack of expertise and environmental awareness among organisations. In the implementation of ISO 14001,

organisations will need to draw on environmental expertise and call on experts in both technical and legal fields. The findings of the research showed that organisations that had not yet certified to the standard, lacked this expertise and subsequently would need to rely of external sources. ISO 14001 certified organisations already had internal specialists in these fields and subsequently did not rely on external experts; however, no indication was given as to their reliance on external experts during their implementation of the standard.

Systemisation of tasks significantly reduces the possibility or errors occurring in the fulfilment of those tasks, however, a certain amount of mutual adjustment will always be required for any task in order to cover unforeseen circumstances. To cater for this mutual adjustment, employees need to have a basic environmental understanding of the impact their task has on the environment and thereby empowering them to make well informed decisions.

7.3.5 Environmental Awareness and Training

The theory identified training as one of the greatest challenges in ISO 14001 implementation, however, organisations did not see it as a problem. Many of the organisations currently had organisational culture change programmes in place and these programmes provide the ideal vehicle to train employees. This training should be used to communicate to all employees the environmental impacts of their activities, the organisation's environmental policy, roles, responsibilities, procedures, methods and actions required to meet the organisation's EMS. Organisations felt that their employees needed more training as many did not know and understand the impact of their tasks on the environment and what was required to improve its environmental performance.

7.3.6 Measurements, Feedback and Auditing

The value of the EMS should be quantified through performance measurements (Pawar, 2001, p14), and these performance measurements should be linked to benefits

of the systems, particularly those ones used to justify its implementation. These measurements must also be based on factors that are controllable by the organisation and its employees. Properly focused performance measurements provide the opportunity to blend environmental considerations with strategic indicators (Piasecki, 1999, p48), and thus assist management in their task formulating, implementing and monitoring their strategy.

The theory proved that by auditing itself, the organisation could prevent significant errors occurring, (Piasecki, 1999, p53) predicted that implementing organisations would have problems with internal auditors. Some of the organisations felt they did not have competent internal auditors to effectively audit their management systems, which coupled with the lack of environmental expertise among those organisation without ISO 14001 certification raised the issue of resources and training. Since these audits have strategic importance as they highlight potential weaknesses in the management systems, it is important that senior management take note of these findings.

7.3.7 Implementation Time

Organisations implementing ISO 14001 will be subjected to learning curve effects, in other words they will need to perform a task several times before getting it right or take a long time to perform it. This will slow their implementation down. Implementation will also be prolonged by resource constraints and lack of expertise. The use of outside consultants can reduce implementation time since these consultants not only bring with them additional resources, but also expertise. These consultants, however, normally come at a high price and may often attempt to sell the organisation a prewritten standalone system.

There is a trade off of implementation time versus systems integration. Although through the integration of the various management systems, efficiencies in management structures and strategic benefits may be obtained, this integration will come at the cost of time. Karapetrovic et al (2003, p452) found that the development on an IMS was in line with the general trend of going beyond the traditional meaning

of a management system in terms managing and achieving performance excellence, however, the creation an IMS was fraught with obstacles. ISO 14001 is not a 'one size fits all' system but rather consists of a series of tailor made solutions that evolve around the organisation and its environment, and thus in many ways will be unique to each organisation. Therefore organisations must be cautious of implementing and running a standalone system which is quicker and easier to implement, but defunct of any long term strategic benefits and having no alignment to existing management systems, thus creating compatibility problems.

7.3.8 Organisational Structure and Integrated Management Systems

The theory showed that the collective nature of an organisation is about individuals being able to focus on a narrow area of expertise, thus allowing them to become more skilled, or specialised, at what they do. None of the surveyed organisations had managers solely dedicated to environmental management, yet it was one area where some respondents felt that dedication of the role should be investigated in order to allow focus on the environmental aspects of the organisations activities and management thereof. However, the theory suggested that a more integrated approach should be taken, and the organisations surveyed stated that they would like to see a high level of integration between their management systems.

7.4 Recommendations

In order to accommodate the problems and trade-offs listed in the previous section, the conclusion, organisations should look at the fundamental differences between the implementation of the systems and running the system.

The implementation of ISO 14001 requires the following:

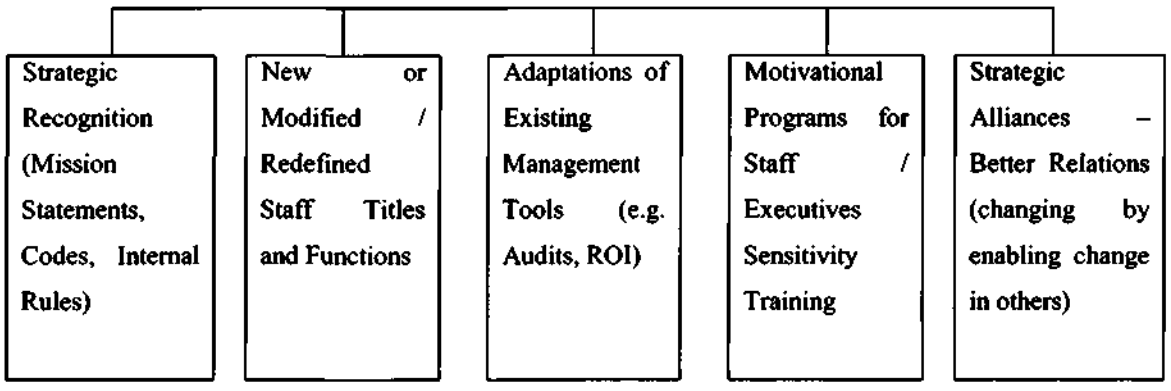
1. Management focus
2. Finance
3. Resources
4. Expertise
5. Time

To run ISO 14001 the following is required:

1. Management focus
2. Trained and environmentally aware employees
3. Properly focused measurement systems
4. Trained Auditors
5. Integration with other management systems

Piasecki et al (1999, p104) identified five factors, as shown in Figure 7.1, that a strategy is required to address in order for a proactive management system to be developed and maintained. Each of these factors represents the core set of concerns that should be folded into any strategy. In order to the identified characteristics required to implement and run ISO 14001, the five factors identified by Piasecki et al (199, p104) should be taken into consideration.

Figure 7.1 The Five Recurrent Elements for Success



Source: Piasecki et al, 1999, p104

7.4.1 Strategic Recognition

Organisations need to recognise the strategic importance of an environmental management system. ISO 14001 is rapidly becoming a prerequisite requirement for trading in many industries Keogh (2000, p1), Bondi et al (2000, p5), Tibor et al (1996, p6), Murray (1999, p45), Munilla et al (1998, p60) and Yadav (1996, p18). In addition, Porter et al (1995, p130) recognised that environmental management could be a source of competitive advantage. The research demonstrated the strategic importance of ISO 14001, as it is a de facto requirement of the industry. Organisations need to disseminate this importance throughout the organisation, everyone in the organisation needs to know the importance of ISO 14001 certification, as without it, the organisation will be unable to continue servicing its current customers and its business will cease. Management needs to take the lead in this recognition and establish mission statements, codes and internal rules that portray the importance of ISO 14001. However, in addition to the satisfaction of customer demands, ISO 14001, as a management system, offers organisation a number of other benefits that will assist the organisation in building a competitive advantage by becoming more efficient. Not only does the system provide tools for the optimisation of its raw material usage, but also tools to assist the organisation to reduce their liability, in terms of legal compliance, and enhance management control. Organisation must acknowledge the strategic importance of these facts as well.

Once the strategic importance of ISO 14001 has been established, solutions to many of the other challenges will fall into place. With senior management and shareholders having acknowledged this strategic importance and given it due recognition, financial constraints should be addressed, which will have a direct bearing on resource allocation and the approval to utilise external expertise to supplement internal deficiencies. This acknowledgement of the strategic importance will create management focus, as not only will they understand the impact certification will have on the organisation's long term viability, but also they will have the wherewithal's, such as resources and finance, to implement and run the system.

7.4.2 Staff Titles and Functions

A management system cannot run on its own without any resources. To implement a system, resources are required carryout the various stages of implementation process. To run a system, resources are required for administration, monitoring and control. The implementation of the system requires a different structure to the running of the system.

The organisation should manage the implementation process as a project. A temporary matrix structure will allow the provision of skills to where and when they are required (Pearce, 2000, p404). The process will draw upon a variety of resources with different expertise, both internally and externally. The project leader should be person who will ultimately run the system, namely the environmental manager. The project leader should be given the necessary authority to control all the resources required for the implementation, yet be held accountable. By having the said environmental manager as the project leader, there will be a transfer of knowledge from the implementation team to the department who will ultimately run the system. The size of this department will be dependent on the nature of the organisation and its environmental impact.

Organisations need to look at their staff and either modify or redefine their titles and functions in order to empower them to carry out their tasks in terms of the newly defined procedures.

7.4.3 Existing Management Tools

The strategic importance of integrating ISO 14001 with other management systems was established in the research. Gilbert (1993, p91) recognised that an EMS provides an opportunity to integrate environmental considerations at all levels of the organisation, while Karapetrovic et al (2003, p457) concluded that the integration of function-specific management systems was rapidly becoming a necessity for many organisation. Thus in order to facilitate this integration, an organisation should look at their existing management tools, such as audits and business analysis techniques, so as to adapt them to be congruent with the new defined business policies. By using the

same tools, organisations will not only prevent duplication of measurements systems, but also will have a common measurements that cut across the different aspects of the various management systems thereby creating the a holistic view of the entire organisation. With this holistic viewpoint, management will be better positioned, in terms of overall strategic analysis of their organisations, as they will be able to focus on the overall organisational performance, namely the 'big picture'.

7.4.4 Training and Motivation

ISO 14001 was shown by the research to have an impact on all employees in the organisation. The organisation will have to change the way it operates, and without 'buy-in' from all parties involved, it will be a rough road to travel. Organisations need to prepare their staff for the changes it is going to experience. Biondi et al (2000, p58) identified that organisations need to bridge a cultural gap with regards to environmental matters, while Welford (1995, p43) highlight attitudinal changes as being the greatest barrier to achieving a change. Graves (2003, p66) recommended training as one of the solutions to initiating a change process, as training could be used to involve all parties in the change process. Cultural change programmes are aimed at changing the nature of the organisation's command and control systems from a top down system to a bottom up system, employees are made to become part of the change process, subsequently take ownership of the change process and thus become more motivated about the change. Welford (1995, p203) recommended that a systematic management process must be at the heart of any culture change programme.

ISO 14001 requires expertise for both implementing and running the system. Biondi et al (2000, p56) found that an environmental management system often required a considerable effort in terms of human, financial and technical resources. During the implementation process, internal skills deficiencies may be supplemented by using external experts, such as consultants. However in order to be able to truly entrench and run the system, organisations need to take total control of it themselves, and build their internal expertise to the levels required. Not only does ISO 14001 require all employees to be aware of the environmental aspects of their tasks, but also the

organisation needs to be able to effectively audit itself. To build this skills base training becomes critical.

7.4.5 Co-operative Learning and Strategic Alliances

The implementation of ISO 14001 is subjected to learning curve effects. Due to the financial constraints, many organisations, particularly the smaller ones, will choose to 'go-it-alone' when implementing the system. Many organisations have already implemented the system and have subsequently been through the learning curve. BM Analysts (August 2003, p8) suggested that co-operative learning is required if organisations wish to reduce costs and achieve the goals set on them by their customers. Shared knowledge and collaborative learning among firms could also assist them achieving improved efficiency of implementation, reduced costs and shorten the time for system implementation. However, Welford (1995, p43) found that the very nature of contemporary capitalist structure, which stresses competition, the maximisation of profits, and the reduction of costs, acted as a fundamental barrier to the adoption of ethical practices in business. In the South African automotive industry, from a supplier's perspective, the major competitive threat is not coming from domestic based organisations, but rather from international organisations. One of the principle reasons for creating clusters of organisations, such as the Durban Automotive Cluster, is to create an environment that facilitates co-operative learning in order to raise the competitive standing of its members and thereby making the entire domestic industry more competitive. As a result of these clusters, organisations are inclined to view their previous domestic competitors as partners and subsequently are more inclined to work together.

By working together and creating strategic alliances, organisations can capitalise on other organisation experiences and learning curve effects in order to improve and optimise their implementation process. In addition, through strategic alliances, organisations, particularly smaller ones, can share critical resources required for both the implementing and running the system, such as internal auditors.

7.4.6 The Implementation Process

In the framework provided by Piasecki et al (1999, p104), the majority of the issues surrounding the implementation and maintenance of ISO 14001 were addressed. However implementation time has become a critical issue for many organisations as the certification deadline looms. Sasseville et al (1997, p58) concluded that organisations cannot implement an all encompassing EMS from day one. Time will play a critical role as to how an organisation chooses to implements the system. Finances and resource availability are finite in any organisation, and although these two factors have a direct impact on the implementation time, organisation still need to be cautious as spending too much on implementing ISO 14001 could have equally disastrous consequences as not certifying. Organisation will thus need to balance implementation time versus cost.

The establishment of an integrated management system will take time and although the time scale may be shorted by increasing resources, organisations could end up with two problems. Firstly having increased the resources, the costs involved may have been excessive and thus put additional financial strain on the organisation. Secondly, in an attempt to shorten the implementation process, the integration process may have been rushed thus creating discontinuities in the new IMS. These discontinuities will not only create confusion in the system and staff alike, but may also leave the system void of any strategic significance.

In order to satisfy these requirements, the organisation should look at one of two implementation strategies, either a quick, yet expensive, certification process or the slower, and less costly, implementation process. The key difference is certification versus implementation.

The Quick Certification Process

This is a process that will be adopted by organisations that urgently require third party ISO 14001certification in order to meet external requirements, such as customer demands. These will be organisations that have not monitored their external environment and reacted quickly enough, and thus left it till the last moment. The

costs involved in this process will be dictated by the extent to which the organisations rely on external expertise and the number of resources it makes available.

The basic motivation behind this process is that organisations will achieve ISO 14001 certification in a relatively short time while placing a minimal demand on its current resource base, however the system will be a standalone system. Once certification has been achieved, the organisation should set about merging their new EMS with their other management systems in order to create an IMS. This merging process can happen over an extended period of time. The steps involved will be as follows:

1. Obtain financial support from shareholders on the basis of the strategic significance of satisfying external demands.
2. Set up a temporary matrix structure involving key personnel, dedicated staff members and external experts.
3. Establish a standalone ISO 14001 EMS.
4. Obtain certification from an accredited third party certification body.
5. Satisfy external demands.
6. Progressively migrate, superimpose, merge and harmonise the standalone EMS with the organisation's IMS while insuring the new IMS conforms to the requirements of ISO 14001 and the current EMS. Still maintain the current EMS.
7. Have new the IMS audited and certified to conform to ISO 14001.
8. Audit the organisations against the IMS and obtain new ISO 14001 certification.
9. Abandon old EMS.

The problem with this implementation method is that it becomes a top down system, namely management step in, put the system in place and 'force' it down on all the employees, thereby creating problems with employee 'buy-in'. There may also be significant duplication of work required in the establishment of standalone systems and the integrated system. Duplication of structures and procedures in the EMS and other systems will also be problematic. Thus organisations should attempt to integrate their system as soon as economically and physically possible in order to truly benefit from ISO 14001.

The Slow Implementation Process

This process will be adopted by those organisations that have either read the trends of the external environment well in advance thus allowing a proactive response, or those organisations that are looking to capitalise on certain internal benefits and standards it has to offer and are not being forced into certification by external parties. Subsequently these organisations will have the critical advantage of time.

The basic philosophy of this process is in continuous improvement and incremental compliance with the objective of eventual certification.

1. Obtain financial support from shareholders on the basis of internal motives or potential external motives.
2. Set up a matrix structure involving key personnel and possibly dedicated staff members.
3. Establish a temporary standalone EMS.
4. Self certify the EMS to ISO 14001.
5. Gradually migrate, superimpose and harmonise the standalone EMS across to the organisation's IMS, starting with shared requirements and ending with contrasting requirements. During the process insure the new IMS conforms to the requirements of ISO 14001 and the current EMS. Still maintain the current EMS.
6. Have new IMS audited and certified to conform to ISO 14001 and the old EMS.
7. Audit the organisations against the IMS and obtain new ISO 14001 certification.
8. Obtain certification from an accredited third party certification body.
9. Abandon old temporary standalone EMS.

This implementation method has the advantage of potentially being a bottom up system, namely the employees embrace, take ownership of the system and drive it from the bottom of the organisation up. However top management still needs to initiate it and control it to make sure it remains on track.

Having the advantage of time, organisations can concentrate on the integration process and creating a harmony between their EMS, QMS and any other management systems they have in place. By harmonising their management systems, duplication of systems and procedures can be minimised. Due to the different objectives of the various management systems, a certain amount of duplication can be expected.

7.5 Summary

The aim of the research was to explore and understand the complexities of the ISO 14001 implementation process with the objective of establishing the barriers that hamper its implementation, the determination of what factors influence these barriers and the investigation of possible recommendations on how organisations could overcome, or minimise, the barriers.

The majority of organisations implemented ISO 14001 because their customers required them to do so. Many organisations saw lack of finance as a barrier to implementation. Money is required for the implementation of ISO 14001, be it for the purchase of new environmentally friendly technologies, for the hiring of additional resources, for the payment of consultancy fees to experts, or to fund the training and awareness programmes. Thus in order to get financial approval for the implementation process, the recognition of the strategic importance of ISO 14001 becomes critical to the success of its implementation. The whole implementation process must be driven by its importance and the organisation must at the outset of the implementation process conceptualise how ISO 14001 fits into their organisation and it make part of their future strategies.

Many organisations had left the implementation of ISO 14001 to the last minute, and subsequently, in order to avoid being disqualified from current business, are forced to take drastic steps and are subsequently tempted into adopting a standalone system devoid of any long term strategic benefits. The whole implementation process would become a 'window dressing' exercise and organisations would be left with a system that would not allow them to capitalise on its additional benefits, such as cost savings

and liability reduction, which would allow them to build a competitive advantage. Be this as it may, these standalone systems can provide the organisation with a base point from which to start a progressive process of systems integration. An integrated system would allow an organisation to incorporate the management principles and tools of ISO 14001 into their current management system and thereby truly benefit from the environmental management system.

By the time this research was published, many organisations in the DAC should have already gained their certification to ISO 14001. However many of the principles established in this research could be applied to the implementation of any management system. For example the strategic significance of the management system should be taken into consideration when the implementation costs are debated and justified. Organisations should also investigate the resources required, the impact the system will have on its corporate culture, and what implementation strategy should be adopted.

In the final chapter the caveats, lessons learnt and suggestions for further research will be dealt with.

CHAPTER 8

Caveats and Suggestions for Further Research

8.1 Introduction

In this Chapter the caveats and suggestions for further research, which stemmed from the discussion of the findings in Chapter 7, will be dealt with.

8.2 Caveats and Lessons Learnt

8.2.1 Caveats

Population Sampling
The population was restricted to the Durban Automotive Cluster (DAC) and thus restricted to organisations operating in the province of Kwa-Zulu Natal. Thus a possible limitation of restricting the survey to the DAC only, is that inter-regional variables within South Africa were not focused upon.

Kruskal-Wallis Test
The Kruskal-Wallis Test tends to have problems where there are a number of tied results, as was the case in this research, and thus the power of the test would be relatively low. However, in the context of this research, the test was only used to flag results for descriptive purposes without making use of its inferential powers.

Questionnaire Design
The same questionnaire was given to all the organisations and subsequently compromises had to be made in terms of the question structure. The research should possibly have involved a two stage process, in the first stage a very short, 1 page, questionnaire should have been sent out to all organisations. The purpose of this questionnaire would have been the collection of initial data for categorisation

purposes. Based on the outcome of the first questionnaire, three different questionnaires should have been compiled around specific questions for each of the three segments and then sent exclusively to the member of each segment thereby getting a response pertinent to each segment in particular.

Missing Information

In the Discussion, Chapter 6, the issue of first versus second tier suppliers and its implications on the requirements to become certified to ISO 14001 was discussed. However at the time of compiling the questionnaire, the importance of this information was overlooked and subsequently the organisations were not asked to what tier of the supply chain they belonged.

8.2.2 Lessons Learnt

For Sections C4, D and E the same scale should have been used, namely all Strongly Disagree to Strongly Agree, and not used the different one used in C4. The questions in C4 should have been worded differently so as to accommodate the Strongly Disagree to Strongly Agree scale.

The importance of establishing a rapport with the respondents, though making personal contact with them through a phone call or a visit, is critical when conducting research of this nature, namely in a business to business environment. It is important that researchers should take special note of this fact. This personal contact not only increases the response rate, but could also improve the accuracy of the data obtained due to the respondents being more tentative.

8.3 Suggestions for Further Research

Although it was not within the scope of this research, an analysis of the costs involved with ISO 14001 implementation and the comparison with turnover generated from new business would be an area for further research should this research be extended.

With more and more South African organisations competing in the global area, certification to various management systems is becoming increasingly important. Speculation among many of the DAC members is that a Health and Safety Management System, such as OHSA 18000, will become the next de facto requirement in the industry. Research could be conducted, along the same lines as this research, into the implication of implementing a Health and Safety Management System.

Much has been spoken about the integration of management systems in this research. An integrated management system has the potential to allow an organisation to build a competitive advantage. The application of integrated management systems to small and medium sized enterprises could also be an area for further research. The potential researcher could look at the models and methodologies outlined by Karapetrovic et al (2003, pp451 – 459) as a starting point.

CHAPTER 9

Bibliography

9.1 Books

1. Allison, B., 1996. *Research Skills for Students*, London: Kogan Page Ltd.

2. Anon, 2002, *Handbook for Implementing and Maintaining ISO/TS 16949:2002 Quality System*, Durban: Plexus Corporation, 46p.

3. Bansal, P., Howard, E., 1997, *Business and the Natural Environment*, Oxford: Butterworth – Heinemann, 277p.

4. Bennet, M., James, P., 1998, *Environment Under the Spotlight – Current Practice and Future Trends in Environmental – Related Performance Measurements for Business*, London: The Association of Chartered Certified Accountants, 143p.

5. Campbell, A., Luchs, K., S., 1997, *Core Competency Based Strategy*, London: International Thomson Business Press, 327p.

6. Cooper, D. R, Schindler, P. S., 2001, *Business Research Methods Seventh Edition*, Singapore, McGraw-Hill Irwin, 798p.

7. Dane, Francis C. 1990, *Research Methods*, Pacific Grove California: Brooks/Cole Publishing Company, 348p.

8. Donnelly, J. H., Gibson, J. L., Ivancevich, J. M., 1990, *Fundamentals of Management 7th Edition*, Homewood IL: Richard D. Irwin Inc, 828p.

9. Emblemsvag, J., Bras, B., 2001, *Activity-based Cost and Environmental Management: a Different Approach to ISO 14000 Compliance*, Boston Massachusetts: Kluwer Academic, 317p.

10. Fahey, L., Randall, R. M., 2001, *The Portable MBA in Strategy 2nd Edition*, New York: John Wiley and Sons Inc, 414p.

11. Hill, C., 2002, *International Business Competing in the Global Marketplace*, New York: M^{c}Graw-Hill Irwin, 692p

12. Gilbert, M.J., 1993, *Achieving Environmental Management Standards: A Step-by-Step Guide to Meeting BS7750*, London: Pitman Publishing, 234p

13. Jones, Gareth B, 2001, *Organisational Theory Text and Cases 3rd Edition*, Upper Saddle River New Jersey: Prentice-Hall Inc, 599p.

14. Levin, Richard I, Rubin, David S, 1998, *Statistics for Management 7th Edition*, Upper Saddle River New Jersey: Prentice-Hall Inc, 1026p.

15. Naveh, E., Marcus, A., Allen, G., Moon, H. K. 1999. *ISO 9000 Survey '99 – An Analytical Tool To Assess The Cost, Benefits and Savings of ISO 9000 Registration*, New York: M^{c}Graw Hill, 301p.

16. Ohmae, K., 1983, *The Mind of the Strategist: Business Planning for Competitive Advantage, the Art of Japanese Business*, Harrison, Virginia: McGraw Hill, 283p.

17. Parasuraman, A., 1991, *Marketing Research 2nd Edition*, Reading Massachusetts: Addison-Wesley Publishing Company, 898p.

18. Peace, J. A., Robinson, R. B., 2000, *Strategic Management 7th Edition*, Singapore: Irwin M^{c}Graw-Hill, 468p.

19. Piasecki, Bruce, W., Fletcher, Kevin, A., Mendelson, Frank, J., 1999, *Environmental Management and Business Strategy*, New York: John Wiley & Sons, 348p.

20. Quinn, J. B., 1980, *Strategies for Change: Logical Incrementalism*, United States of America: Richard D Irwin INC, 233p

21. Sasseville, D. R, Wilson, W. G., Lawson, R, 1997, *ISO 14000 Answer Book*, London: John Wiley & Sons Inc, 297p.

22. Sayre, Don, 1996, *Inside ISO 14000 The Competitive Advantage of Environmental Management*, Delray Beach Florida: St. Lucie Press, 232p.

23. Sexton, K., Marcus, A., Easter, K, Burkhardt, T, 1999, *Better Environmental Decision – Strategies for Governments, Businesses, and Communities*, Washington D.C.: Island Press, 475p.

24. Smit, P. J., De J Cronje, G. J., 1999, *Management Principles 2nd Edition*, Cape Town: Juta, 519p.

25. Tibor, T Feldman, I, 1996, *ISO 14000 A Guide to the New Environmental Management Standarads*, Chicago: Irwin Professional Publishing, 237p.

26. Welford, Richard, 1995. *Enviromental Strategy and Sustainable Development*, London: Routledge, 217p.

9.2 Journals

27. Alberti, M, Caini, L, Calabrese, A, Rossi, D, 2000, Evaluation of the costs and benefits of an environmental management system, *International Journal of Production Research* 2000 Vol 38 No 17, p4455 – 4467.

28. Biondi, Vittorio, Frey, Marco, Iraldo, Fabio, 2000, Environmental Management Systems and SMEs., *Greener Management International; Spring2000 No 29*, p55 – 69.

29. Bronn, P. G., Bronn, C., 2002, Issues Management as a Basis for Strategic Orientation, *Journal of Public Affairs Nov 2002, Vol 2. No 4*, p247 – p258

30. Cochran, Craig, 1999, Managing ISO certification, *IIE Solution; Apr99, Vol. 31 No 4*, p35 – 38.

31. Crognale, Grabriele, 2002, Harvesting Value from EMSs: A View from the Field, *Pollution Engineering May 2002*, p33 – 35.

32. Forsyth Alexander, 1996, ISO 14001 What Does It Mean of IE, *IIE Solutions; Jan96, Vol. 28 No 1*, p14 – 18.

33. Gimenez, F. A. P., Pelisson, C., Kuger, E. G. S., Haysahi, P., 2000, Small Firm's Owner-Managers Construction of Competition, *Journal of Enterprising Culture, Vol. 8 No 4*, p361 – p379

34. Gottlieb, D, W, 1996, ISO 14000 Standards: Ready for Launching, *Purchasing; 7/11/96, Vol. 120 No 11*, p78 – 81.

35. Graves, Beverly, A., 2003, ISO 14000: Environmental Management, *Products Finishing; Nov 2003, Vol. 68 No 2*, p62 – 68.

36. Keshav, L. V., 1999, ISO 14000 – A systematic approach to meet environmental challenges of the future, *Chemical Business: Sep99, Vol. 13 No 9*, p115 – 117.

37. Karapetrovic, S., Jonker, J., 2003, Integration of Standardized Management Systems: Searching for a Recipe and Ingredients, *Total Quality Management, Vol. 14 No 4*, p451 – 459.

38. Miles, Morgan P., Russell, Gregory R., 1997, ISO 14000 Total Quality Environmental Management: The Integration of Environmental Marketing, Total Quality Management, and Corporate Environmental Policy, *Journal of Quality Management: Vol.2 No 1*, p151 – 168.

39. Mullin, Rick, 1996, Merging Business and Environment, *Chemical Week 10/09/96 Vol 158 No 38*, p52 – 53.

40. Munilla, Linda S., Bleicken, Linda M., Miles, Morgan P., 1998, Social Responsibility and AACSB Accreditation Standards: How ISO 14000 can Integrate Environmental Issues into the Marketing Curriculm, *Education Review, Fall 98, Vol. 8 No 3*, p57 – 65.

41. Murray, P. C., 1999, Inching Towards Environmental Regulator Reform – ISO 14000: Much Ado About Nothing or a Reinvention Tool?, *American Business Law Journal; Fall 99, Vol. 37 No 1*, p35 – 81.

42. Pawar, Michelle Wyman, Risseto, Christopher, Dec2001, A Tool for Improvement: Environmental Management Systems, *Public Management (US), Vol. 83 No 11*, p10 – 16.

43. Porter, M. E., Van Der Linde, C.,1995, Green and Competitive: Ending the Stalemate, *Harvard Business Review; September – October 1995, Vol. 73*, p120 – 134.

44. Roosen, Christine, Meisner, 2001, Environmental Strategy and Competitive Advantage: an Introduction, *California Management Review, Spring 2001, Vol 43, No 3*, p8 – 14.

45. Sissell, Kara, Mullin, Rick, 1995, Fitting in ISO 14000, *Chemical Week 11/08/95 Vol 157 No 17*, p39 – 41.

46. Smith, Kennedy, 2002, ISO Considers Corporate Social Responsibility Standards, *Journal for Quality & Participation, Fall 2002, Vol. 25 No 3*, p42.

47. Trienekens, J. H., Beulens, A. J. M., 2001, Views on Inter-Enterprise Relationships, *Production Planning & Control Jul 2001, Vol. 12, No 5*, p466 – p477

48. Yadav, G. D., 1996, ISO 1400: The Cost and Benefits, *Chemical Business, Mar 96, Vol. 9 No 8*, p17 – 18.

9.3 Newspapers, Newsletters and Reports

49. B&M Analysts, 2003, KwaZulu-Natal Benchmarking Club Newsletter, Vol 6, No 8. August 2003, p1 – 9.

50. ISO, 2003, *The ISO Survey of ISO 9000 and ISO 14001 Certificates 12th Cycle* – Abridged Version, International Organization for Standardization, p1 – 19. available online at http://www.iso.ch

51. NPI, 2002, Workplace Challenge Report 1995 – 2002, National Productivity Institute, p1 – 36.

9.4 Workshops and Meeting Proceedings

52. Barkett, B. 1999. *ISO 14001 Environmental Management Systems and Public Policy*, Proceedings of a Workshop held July 29, 1999 Oaklands California. Pacific Institute for Studies in Development, Environment, and Security. Available online http://www.pacinst.org/

53. H & M Associates SA, 2004, *ISO 14001 Environmental Management Systems.*

54. Mayer, J. 1999. *ISO 14001 Environmental Management Systems and Public Policy*, Proceedings of a Workshop held July 29, 1999 Oaklands California. Pacific Institute for Studies in Development, Environment, and Security. Available online http://www.pacinst.org/

55. Morrison, J., Speir, J., Barkett, B., Stephens, R., Mayer, J. 1999. *ISO 14001 Environmental Management Systems and Public Policy*, Proceedings of a Workshop held July 29, 1999 Oaklands California. Pacific Institute for Studies

in Development, Environment, and Security. Available online http://www.pacinst.org/

56. QSI-Afrocare, 2003. *5-Day Foundation Course in Environmental Auditing.*

57. Speir, J. 1999. *ISO 14001 Environmental Management Systems and Public Policy*, Proceedings of a Workshop held July 29, 1999 Oaklands California. Pacific Institute for Studies in Development, Environment, and Security. Available online http://www.pacinst.org/

58. Stephens, R. 1999. *ISO 14001 Environmental Management Systems and Public Policy*, Proceedings of a Workshop held July 29, 1999 Oaklands California. Pacific Institute for Studies in Development, Environment, and Security. Available online http://www.pacinst.org/

9.5 Previous Theses and Dissertations

59. Keogh, M., 2000, *The promise and pitfalls of ISO 1400 : a South African perspective, MPhil (Environmental Science)*, University of Cape Town, 42p.

60. Köhne, K., 2002. *An Assessment of the Awareness of Environmental Standards in the Timber Industry in KwaZulu-Natal, BCom Honours (Marketing),* University of Natal Pietermaritzburg, 92p.

61. Nyambe, N., 2001. *Integrating Environmental Management Systems into Corporate Management: A Case Study of Hullet Aluminum, M.Env.Dev,* University of Natal Pietermaritzburg, 131p.

62. Moodely, B., 2003. *An Analysis of the South African Textile Industry at Macro and Micro Levels, MBA,* University of Natal Pietermaritzburg, 92p.

9.6 Internet

63. http://www.iso.ch, 04/09/2003.

64. ISO, 2002, *ISO and The Environment*, Environmental Management, 04/09/2003.

65. http://www.iso.org, 08/10/2004.

66. Lowry, 2004, http://faculty.vassar.edu/lowry/ch14a.html, 09/10/2004

67. http://www.le.ac.uk/biology/gat/virtualfc/Stats/kruskal.html, 10/10/2004

68. http://www.stat.ufl.edu/~sali/L16-3024-4ppg.pdf, 10/10/2004, 11p

69. www.itl.nist.gov/div898/software/dataplot/refman1/auxillar/kruskwal.htm, 21/10/04

9.7 Manuals and Codes

70. Environmental Technology Best Practice Programme, 1999, Environmental Management for Engineering Manufactures, Crown, 4P. available online at http://www.etsu.com/etbpp

71. Environmental Technology Best Practice Programme, 2000, Environmental Management for the Plastics Industries, Crown, 4P. available online at http://www.etsu.com/etbpp

72. ISO, 1996, ISO 14001:1996, The South African Bureau of Standards: Pretoria, p1 – 14.

73. ISO, 1996, ISO 14004:1996, The South African Bureau of Standards: Pretoria, p1 – 31.

CHAPTER 10

Appendices

Appendix 1

Kruskal-Wallis Test - Results

The output form the statistical analysis package used, SPSS V11.5.1 for Windows are presented in this appendix.

Kruskal-Wallis Test

Ranks

	ISO Certification Status	N	Mean Rank
C4(1):-Obtaining commitment from top management.	WIthout ISO 14001 - Not Started	6	15.67
	Without ISO 14001 - Started	10	13.80
	ISO 14001 Certified	11	13.27
	Total	27	
C4(2):-Obtaining commitment from middle and lower management.	WIthout ISO 14001 - Not Started	6	16.33
	Without ISO 14001 - Started	10	13.30
	ISO 14001 Certified	11	13.36
	Total	27	
C4(3):-Conducting the Initial Environmental Review.	WIthout ISO 14001 - Not Started	6	16.17
	Without ISO 14001 - Started	10	12.20
	ISO 14001 Certified	11	14.45
	Total	27	
C4(4):-Preparing the company's Environmental Policy.	WIthout ISO 14001 - Not Started	6	13.33
	Without ISO 14001 - Started	10	14.90
	ISO 14001 Certified	11	13.55
	Total	27	
C4(5):-Listing of environmental aspects and impacts.	WIthout ISO 14001 - Not Started	6	12.33
	Without ISO 14001 - Started	10	12.60
	ISO 14001 Certified	11	16.18
	Total	27	
C4(6):-Establishing a register of all pertinent legislation.	WIthout ISO 14001 - Not Started	6	16.17
	Without ISO 14001 - Started	10	13.35
	ISO 14001 Certified	11	13.41
	Total	27	
C4(7):-Setting environmental objectives and targets.	WIthout ISO 14001 - Not Started	6	15.00
	Without ISO 14001 - Started	10	10.80
	ISO 14001 Certified	11	16.36
	Total	27	
C4(8):-Establishing the management programme and structure.	WIthout ISO 14001 - Not Started	6	14.33
	Without ISO 14001 - Started	10	13.85
	ISO 14001 Certified	11	13.95
	Total	27	
C4(9):-Writing the management manual.	WIthout ISO 14001 - Not Started	6	16.17
	Without ISO 14001 - Started	10	9.40
	ISO 14001 Certified	11	17.00
	Total	27	

Ranks

	ISO Certification Status	N	Mean Rank
C4(10):-Establishing the operational controls and procedures.	Without ISO 14001 - Not Started	6	13.25
	Without ISO 14001 - Started	10	14.65
	ISO 14001 Certified	11	13.82
	Total	27	
C4(11):-Environmental training of company personnel.	Without ISO 14001 - Not Started	6	14.75
	Without ISO 14001 - Started	10	14.90
	ISO 14001 Certified	11	12.77
	Total	27	
C4(12):-Internal auditing of the company against ISO 14001.	Without ISO 14001 - Not Started	6	13.67
	Without ISO 14001 - Started	10	15.15
	ISO 14001 Certified	11	13.14
	Total	27	
D(1):-ISO 14001 will have severe cost implications to the company's current production processes and practices.	Without ISO 14001 - Not Started	6	18.83
	Without ISO 14001 - Started	10	13.60
	ISO 14001 Certified	11	11.73
	Total	27	
D(2):-Relationships with regulators are likely to improve.	Without ISO 14001 - Not Started	6	16.33
	Without ISO 14001 - Started	10	12.85
	ISO 14001 Certified	11	13.77
	Total	27	
D(3):-The emphasis is placed on short term financial gains is in line with strategies for sustainable growth.	Without ISO 14001 - Not Started	6	18.75
	Without ISO 14001 - Started	10	13.05
	ISO 14001 Certified	11	12.27
	Total	27	
D(4):-There will be a high level of integration between the company's various management systems.	Without ISO 14001 - Not Started	6	13.75
	Without ISO 14001 - Started	10	14.80
	ISO 14001 Certified	11	13.41
	Total	27	
D(5):-The people responsible for compiling the management manual have an intimate knowledge of how the company functions, its strategic direction and a	Without ISO 14001 - Not Started	6	11.83
	Without ISO 14001 - Started	10	12.55
	ISO 14001 Certified	11	16.50
	Total	27	
D(6):-Each employee knows exactly how to contribute to environmental improvements.	Without ISO 14001 - Not Started	6	9.50
	Without ISO 14001 - Started	10	12.95
	ISO 14001 Certified	11	17.41
	Total	27	
D(7):-The number of people that have been dedicated to ISO 14001 implementation is sufficient.	Without ISO 14001 - Not Started	6	11.92
	Without ISO 14001 - Started	10	14.80
	ISO 14001 Certified	11	14.41
	Total	27	

Ranks

	ISO Certification Status	N	Mean Rank
D(8):-The company has a very good technical knowledge of environmental issues.	Without ISO 14001 - Not Started	6	10.08
	Without ISO 14001 - Started	10	11.55
	ISO 14001 Certified	11	18.36
	Total	27	
D(9):-The financial resources for the implementation of ISO 14001 is, or was, sufficient to cover all costs incurred.	Without ISO 14001 - Not Started	6	5.33
	Without ISO 14001 - Started	10	12.60
	ISO 14001 Certified	11	20.00
	Total	27	
D(10):-Sound environmental management lowers the cost of doing business.	Without ISO 14001 - Not Started	6	12.33
	Without ISO 14001 - Started	10	14.10
	ISO 14001 Certified	11	14.82
	Total	27	
D(11):-The ISO 14001 implementation process will be put on hold should the company be faced with a severe financial crisis.	Without ISO 14001 - Not Started	6	16.33
	Without ISO 14001 - Started	10	14.35
	ISO 14001 Certified	11	12.41
	Total	27	
D(12):-Environmental management concentrates on the issue of sustainability and subsequently brings with it factors that raise the costs of production.	Without ISO 14001 - Not Started	6	14.42
	Without ISO 14001 - Started	10	14.80
	ISO 14001 Certified	11	13.05
	Total	27	
D(13):-Employee conduct in respect of environmental issues is likely to improve, or did improve, due to ISO 14001.	Without ISO 14001 - Not Started	6	12.92
	Without ISO 14001 - Started	10	12.35
	ISO 14001 Certified	11	16.09
	Total	27	
D(14):-The company's culture is conducive to sincere environmental management.	Without ISO 14001 - Not Started	6	11.17
	Without ISO 14001 - Started	10	14.50
	ISO 14001 Certified	11	15.09
	Total	27	
D(15):-The company will have to rely extensively on external technical experts in the determination of its aspects and impacts.	Without ISO 14001 - Not Started	6	18.92
	Without ISO 14001 - Started	10	16.05
	ISO 14001 Certified	11	9.45
	Total	27	
D(16):-The expectations of what an environmental management system can deliver are unrealistic or exceptionally high.	Without ISO 14001 - Not Started	6	21.00
	Without ISO 14001 - Started	10	11.60
	ISO 14001 Certified	11	12.36
	Total	27	
D(17):-The company has a high level of compliance to its regulatory and legal requirements.	Without ISO 14001 - Not Started	6	11.25
	Without ISO 14001 - Started	10	13.05
	ISO 14001 Certified	11	16.36
	Total	27	

Ranks

	ISO Certification Status	N	Mean Rank
D(18):-Legal issues are dealt with by people within the company.	Without ISO 14001 - Not Started	6	10.92
	Without ISO 14001 - Started	10	13.75
	ISO 14001 Certified	11	15.91
	Total	27	
D(19):-The parties (internal or external) that are responsible for legal requirements are capable of interpreting them into solutions that are practically applicable to	Without ISO 14001 - Not Started	6	11.75
	Without ISO 14001 - Started	10	12.20
	ISO 14001 Certified	11	16.86
	Total	27	
D(20):-The company has set performance levels that are well in excess of the regulatory threshold.	Without ISO 14001 - Not Started	6	13.25
	Without ISO 14001 - Started	10	11.90
	ISO 14001 Certified	11	16.32
	Total	27	
D(21):-Environmental regulations in South Africa are more relaxed than the global average and subsequently legal compliance is less costly.	Without ISO 14001 - Not Started	6	11.67
	Without ISO 14001 - Started	10	12.95
	ISO 14001 Certified	11	16.23
	Total	27	
D(22):-The company has sufficient internal auditors to effectively audit all its management systems.	Without ISO 14001 - Not Started	6	12.42
	Without ISO 14001 - Started	10	11.40
	ISO 14001 Certified	11	17.23
	Total	27	
D(23):-Some of the internal auditors have the necessary environmental and management systems knowledge to effectively conduct environmental audits.	Without ISO 14001 - Not Started	6	11.33
	Without ISO 14001 - Started	10	10.10
	ISO 14001 Certified	11	19.00
	Total	27	
D(24):-Customers often scrutinize and audit the company's environmental management system.	Without ISO 14001 - Not Started	6	17.33
	Without ISO 14001 - Started	10	11.10
	ISO 14001 Certified	11	14.82
	Total	27	
D(25):-Regulators, such as the Municipality or government departments, often scrutinize and audit the company.	Without ISO 14001 - Not Started	6	14.00
	Without ISO 14001 - Started	10	11.75
	ISO 14001 Certified	11	16.05
	Total	27	
D(26):-Management responds seriously to internal audit findings.	Without ISO 14001 - Not Started	6	15.58
	Without ISO 14001 - Started	10	13.00
	ISO 14001 Certified	11	14.05
	Total	27	
E(1):-ISO 14001 is criticized because companies are reluctant to comply with environmental best practices and seek certification.	Without ISO 14001 - Not Started	6	15.33
	Without ISO 14001 - Started	10	11.10
	ISO 14001 Certified	11	15.91
	Total	27	

Ranks

	ISO Certification Status	N	Mean Rank
E(2):-ISO 14001 places high demands on a company's resources	Without ISO 14001 - Not Started	6	18.00
	Without ISO 14001 - Started	10	14.25
	ISO 14001 Certified	11	11.59
	Total	27	
E(3):-The ends do not justify the means.	Without ISO 14001 - Not Started	6	20.50
	Without ISO 14001 - Started	10	13.75
	ISO 14001 Certified	11	10.68
	Total	27	
E(4):-Management is too busy doing business to worry about environmental considerations.	Without ISO 14001 - Not Started	6	18.42
	Without ISO 14001 - Started	10	14.05
	ISO 14001 Certified	11	11.55
	Total	27	
E(5):-ISO 14001 will not materially alter the quality of the company's products.	Without ISO 14001 - Not Started	6	16.17
	Without ISO 14001 - Started	10	12.40
	ISO 14001 Certified	11	14.27
	Total	27	
E(6):-ISO 14001 does not necessarily guarantee improvements in environmental performance and regulatory compliance.	Without ISO 14001 - Not Started	6	15.33
	Without ISO 14001 - Started	10	15.20
	ISO 14001 Certified	11	12.18
	Total	27	
E(7):-The current system of environmental regulations does nothing to encourage companies to do more than merely comply with minimum regulatory requirements.	Without ISO 14001 - Not Started	6	18.42
	Without ISO 14001 - Started	10	11.90
	ISO 14001 Certified	11	13.50
	Total	27	
E(8):-Maintaining continuous compliance with environmental legislation is problematic and requires serious managerial effort.	Without ISO 14001 - Not Started	6	17.58
	Without ISO 14001 - Started	10	10.60
	ISO 14001 Certified	11	15.14
	Total	27	
E(9):-Information uncovered by the environmental management system can be used as a roadmap for prosecution.	Without ISO 14001 - Not Started	6	15.92
	Without ISO 14001 - Started	10	15.30
	ISO 14001 Certified	11	11.77
	Total	27	
E(10):-If companies improve their environmental performance substantially, regulators will just impose more stringent regulations.	Without ISO 14001 - Not Started	6	20.25
	Without ISO 14001 - Started	10	12.95
	ISO 14001 Certified	11	11.55
	Total	27	
E(11):-Environmental regulations erode competitiveness.	Without ISO 14001 - Not Started	6	13.50
	Without ISO 14001 - Started	10	16.00
	ISO 14001 Certified	11	12.45
	Total	27	

Test Statistics[a,b]

	C4(1):-Obtaining commitment from top management.	C4(2):-Obtaining commitment from middle and lower management.	C4(3):-Conducting the Initial Environmental Review.	C4(4):-Preparing the company's Environmental Policy.
Chi-Square	.693	.858	1.350	.395
df	2	2	2	2
Asymp. Sig.	.707	.651	.509	.821

Test Statistics[a,b]

	C4(5):-Listing of environmental aspects and impacts.	C4(6):-Establishing a register of all pertinent legislation.	C4(7):-Setting environmental objectives and targets.	C4(8):-Establishing the management programme and structure.
Chi-Square	1.746	.848	3.539	.019
df	2	2	2	2
Asymp. Sig.	.418	.655	.170	.991

Test Statistics[a,b]

	C4(9):-Writing the management manual.	C4(10):-Establishing the operational controls and procedures.	C4(11):-Environmental training of company personnel.	C4(12):-Internal auditing of the company against ISO 14001.
Chi-Square	6.436	.151	.533	.454
df	2	2	2	2
Asymp. Sig.	.040	.927	.766	.797

Test Statistics[a,b]

	D(1):-ISO 14001 will have severe cost implications to the company's current production processes and practices.	D(2):-Relationships with regulators are likely to improve.	D(3):-The emphasis is placed on short term financial gains is in line with strategies for sustainable growth.	D(4):-There will be a high level of integration between the company's various management systems.
Chi-Square	4.082	1.087	3.191	.216
df	2	2	2	2
Asymp. Sig.	.130	.581	.203	.897

Test Statistics[a,b]

	D(5):-The people responsible for compiling the management manual have an intimate knowledge of how the company functions, its strategic direction and a good sound environmental understanding.	D(6):-Each employee knows exactly how to contribute to environmental improvements.	D(7):-The number of people that have been dedicated to ISO 14001 implementation is sufficient.	D(8):-The company has a very good technical knowledge of environmental issues.
Chi-Square	4.102	6.017	.653	7.162
df	2	2	2	2
Asymp. Sig.	.129	.049	.721	.028

Test Statistics[a,b]

	D(9):-The financial resources for the implementation of ISO 14001 is, or was, sufficient to cover all costs incurred.	D(10):-Sound environmental management lowers the cost of doing business.	D(11):-The ISO 14001 implementation process will be put on hold should the company be faced with a severe financial crisis.	D(12):-Environmental management concentrates on the issue of sustainability and subsequently brings with it factors that raise the costs of production.
Chi-Square	16.250	.439	1.149	.314
df	2	2	2	2
Asymp. Sig.	.000	.803	.563	.855

Test Statistics[a,b]

	D(13):-Employee conduct in respect of environmental issues is likely to improve, or did improve, due to ISO 14001.	D(14):-The company's culture is conducive to sincere environmental management.	D(15):-The company will have to rely extensively on external technical experts in the determination of its aspects and impacts.	D(16):-The expectations of what an environmental management system can deliver are unrealistic or exceptionally high.
Chi-Square	2.217	1.716	7.806	7.506
df	2	2	2	2
Asymp. Sig.	.330	.424	.020	.023

Test Statistics[a,b]

	D(17):-The company has a high level of compliance to its regulatory and legal requirements.	D(18):-Legal issues are dealt with by people within the company.	D(19):-The parties (internal or external) that are responsible for legal requirements are capable of interpreting them into solutions that are practically applicable to your company in particular.	D(20):-The company has set performance levels that are well in excess of the regulatory threshold.
Chi-Square	3.130	1.780	3.788	1.955
df	2	2	2	2
Asymp. Sig.	.209	.411	.150	.376

Test Statistics[a,b]

	D(21):-Environmental regulations in South Africa are more relaxed than the global average and subsequently legal compliance is less costly.	D(22):-The company has sufficient internal auditors to effectively audit all its management systems.	D(23):-Some of the internal auditors have the necessary environmental and management systems knowledge to effectively conduct environmental audits.	D(24):-Customers often scrutinize and audit the company's environmental management system.
Chi-Square	1.769	3.716	9.306	3.004
df	2	2	2	2
Asymp. Sig.	.413	.156	.010	.223

Test Statistics[a,b]

	D(25):-Regulators, such as the Municipality or government departments, often scrutinize and audit the company.	D(26):-Management responds seriously to internal audit findings.	E(1):-ISO 14001 is criticized because companies are reluctant to comply with environmental best practices and seek certification.	E(2):-ISO 14001 places high demands on a company's resources
Chi-Square	1.861	.621	2.656	3.371
df	2	2	2	2
Asymp. Sig.	.394	.733	.265	.185

Test Statistics[a,b]

	E(3):-The ends do not justify the means.	E(4):-Management is too busy doing business to worry about environmental considerations.	E(5):-ISO 14001 will not materially alter the quality of the company's products.	E(6):-ISO 14001 does not necessarily guarantee improvements in environmental performance and regulatory compliance.
Chi-Square	7.070	3.492	1.344	1.152
df	2	2	2	2
Asymp. Sig.	.029	.174	.511	.562

Test Statistics[a,b]

	E(7):-The current system of environmental regulations does nothing to encourage companies to do more than merely comply with minimum regulatory requirements.	E(8):-Maintaining continuous compliance with environmental legislation is problematic and requires serious managerial effort.	E(9):-Information uncovered by the environmental management system can be used as a roadmap for prosecution.
Chi-Square	3.250	3.897	1.673
df	2	2	2
Asymp. Sig.	.197	.142	.433

Test Statistics[a,b]

	E(10):-If companies improve their environmental performance substantially, regulators will just impose more stringent regulations.	E(11):-Environmental regulations erode competitiveness.
Chi-Square	6.711	1.456
df	2	2
Asymp. Sig.	.035	.483

a. Kruskal Wallis Test

b. Grouping Variable: ISO Certification Status

APPENDIX 2

Questionnaire

13 November 2004

Dear Sir or Madam:

The researcher, in partial fulfillment towards an MBA, has formulated this questionnaire/survey document. The subject under review is barriers to implementation of ISO 14001 with reference to the Durban Automotive Cluster.

Suppliers to the Automotive Industry are coming under more and more pressure to become certified to ISO 14001. ISO 14001 is set to become a de-facto requirement for doing business with all the OEMs. A lot of companies, particularly the smaller ones, are finding the process of gaining certification problematic. The aim of this research will be to look at these problems and see what needs to be done to address them. Although most members would have become certified by the time the research has been completed, the objective would be to come up with a model that could be applied to other management systems, such as OSHAS 18000 and thus create a useful reference document for the future.

The researcher would like your cooperation in filling out the questionnaire in its entirety. This will aid the researcher in the correlation and analysis of the responses. When completing the questionnaire, if you have already have ISO 14001 certification, please answer questions on what your experiences were; if you are in the process of gaining certification, or about to embark on a certification program, please answer the questions on what you perceive your experience to be.

The questionnaire is divided into 6 sections (A – F). In each of the sections, please follow the instructions given in the beginning of the section. It should take you about

15 to 20 minutes to complete the questionnaire. Once completed, please return the questionnaire via fax or e-mail. In exchange for participating in the survey you may receive a copy of the finalised research. Please indicate if do want a copy when asked so in Section A.

In answering the questions, there is no right or wrong answer, all the researcher is trying to ascertain is opinions on certain issues. All information collected will be treated as confidential and the research findings will be summarized aggregatively in order to make the identification of individual firms impossible.

Should you have any queries or comments please feel free to contact me.

Contact Details

Tel (w):	033 – 387 1575	Tel (h):	033 – 347 0075
Cell:	082 – 378 2298	Fax:	033 – 387 4535
E-Mail:	andrew@ramsay.co.za		

Thank you in advance for your kind cooperation

Regards,

Andrew Turner

ISO 14001 SURVEY RETURN COVER PAGE

TO:

ATTENTION:	**ANDREW TURNER**
FAX NUMBER:	**033 – 387 4535**
E-MAIL:	**andrew@ramsay.co.za**
PHONE NUMBER:	**033 – 387 1575**
CELL NUMBER:	**082 – 378 2298**
REFERENCE:	**ISO 14001 SURVEY**

FROM:

NAME: _____

COMPANY: _____

FAX NUMBER: _____

PHONE NUMBER: _____

THANK YOU FOR YOUR COOPERATION

Section A: Company Details

The data obtained from this section will be used primarily to categorize the company for analysis purposes. If you are unable to provide any of the information, such as the percentages in Question 4, please leave it blank.

Name of Person Completing Questionnaire: _____

Position: _____ E-mail: _____

Tel No: _____ Fax No: _____

Would you like to receive a copy of the finalized research: Yes ☐ No ☐

Name of Company: _____

Physical Address: _____

_____

_____ Code: _____

1. How many people are employed by the company: _____
2. What management systems does the company currently have in place, who was the registrar and when were they implemented?

Example:	*ISO/TS 16949*	*SABS*	*2002*

3. What is the nature of your core business? (for example Automotive Parts Manufacture)

_____

_____

4. What the main manufacturing process that are carried out by the company and the approximate relative proportions thereof?

Example:	*Metal Pressing*	*25%*

Section B: Environmental Related Matters

In this Section the researcher wishes to determine how management and environmental matters are interlinked. Please tick the appropriate box and where required provide additional information.

1. Is your company currently certified to ISO 14001:

   Yes ☐ No ☐

   If yes, when did you gain certification? _____

   If no, when did you start your certification program? _____

   and by when do you expect to become certificated? _____

   how far are you towards achieving certification (%)? _____

2. Who does the Environmental Manager report to? _____

3. Is the Environmental Manager responsible for other areas?

   Yes ☐ No ☐

   If yes, please list: _____

   _____

4. Do you believe ISO 14001 will have an impact of your management structure?

   Yes ☐ No ☐

   Please justify: _____

   _____

   _____

5. Is your company part of the Work Place Challenge or any other similar cultural change initiatives? If other, please specify.

   No ☐ W.P.C ☐ Other ☐ _____

   If so since when: _____

6. Have people been dedicated to the implementation and maintenance of ISO 14001?

Yes ☐ No ☐ If yes, how many: _____

7. Has your company set key environmental performance areas?

Yes ☐ No ☐

If yes, please elaborate: _____

_____

_____

Section C: Motivation for and Barriers to Implementing ISO 14001

In this section the researcher wishes to ascertain why companies have chosen to implement ISO 14001 and what they see, or experienced to be, the major barriers to successful implementation.

1. Which of the following statements best describes your company's reasoning to seek ISO 14001 certification? Please tick the appropriate box, one only.

   1. Your customers required you to certify to ISO 14001 in order to get new business or keep current business. ☐
   2. ISO 14001 offered the company a management system that would facilitate management compliance with all the laws and regulations. ☐
   3. ISO 14001 offered the company a management system that would improve its environmental performance. ☐
   4. Other, please specify: _____

      _____

      _____

      _____

2. ISO 14001 certification has a number of benefits to the company. Please rank the top 3 benefits that you believe applies to your company in particular, 1 being the most attractive benefit and 3 being the least attractive benefit of the top 3.

1. Certification would enhance the company's corporate image which may allow some special considerations when dealing with public stakeholders. ___
2. Certification may help to insulate the company against claims of environmental negligence. ___
3. Certification results in the adoption of sound environmental practices that will lead to cost savings. ___
4. Certification provides a systematic structure for complying with environmental regulations. ___
5. Certification results in better management controls and more clearly defined targets and responsibilities. ___
6. Certification results in improves employee awareness, empowerment, communication and accountability. ___
7. Certification provides a systematic plan-do-check-act continual improvement model that will improve the company's efficiency and effectiveness. ___
8. Certification is a mandatory customer requirement of existing customers and is thus required in order to protect current business. ___
9. Certification opens up new opportunities for new business. ___
10. Certification can be used to differentiate the company's product offering and thus allow it to charge more for its products. ___
11. Certification increases the barriers to entry and thus resulting in less competition. ___

3. Are there any other benefits that ISO14001 would give an organisation that have not been listed above, and if so how would you rate them in accordance with the above mentioned benefits?: _____

_____

_____

_____

4. During the implementation of ISO 14001, a company has to follow a number of steps. Please tick in the appropriate box indicating one of the five categories depending on how you rate the level of difficulty your company experienced, or is likely to experience, while carrying out the following steps.

		Difficulty				
		Very Easy	Easy	No Opinion	Difficult	Very Difficult
1.	Obtaining commitment from top management.	☐	☐	☐	☐	☐
2.	Obtaining commitment from middle and lower management.	☐	☐	☐	☐	☐
3.	Conducting the Initial Environmental Review.	☐	☐	☐	☐	☐
4.	Preparing the company's Environmental Policy.	☐	☐	☐	☐	☐
5.	Listing of environmental aspects and impacts.	☐	☐	☐	☐	☐
6.	Establishing a register of all pertinent legislation.	☐	☐	☐	☐	☐
7.	Setting environmental objectives and targets.	☐	☐	☐	☐	☐
8.	Establishing the management programme and structure.	☐	☐	☐	☐	☐
9.	Writing the management manual.	☐	☐	☐	☐	☐
10.	Establishing the operational controls and procedures.	☐	☐	☐	☐	☐
11.	Environmental training of company personnel.	☐	☐	☐	☐	☐
12.	Internal auditing of the company against ISO 14001.	☐	☐	☐	☐	☐

Section D: Opinions of ISO 14001 Issues

The following series of questions is designed to determine opinions on various issues related to ISO 14001. Please tick in the appropriate box indicating one of the five categories depending on how strongly you feel the statement applies to your company.

		Opinion				
		Strongly Disagree	Disagree	No Opinion	Agree	Strongly Agree
1.	ISO 14001 will have severe cost implications to the company's current production processes and practices.	☐	☐	☐	☐	☐
2.	Relationships with regulators are likely to improve.	☐	☐	☐	☐	☐
3.	The emphasis is placed on short term financial gains is in line with strategies for sustainable growth.	☐	☐	☐	☐	☐
4.	There will be a high level of integration between the company's various management systems.	☐	☐	☐	☐	☐

Opinions of ISO 14001 Issues continued ...

	Opinion				
	Strongly Disagree	Disagree	No Opinion	Agree	Strongly Agree
5. The people responsible for compiling the management manual have an intimate knowledge of how the company functions, its strategic direction and a good sound environmental understanding.	☐	☐	☐	☐	☐
6. Each employee knows exactly how to contribute to environmental improvements.	☐	☐	☐	☐	☐
7. The number of people that have been dedicated to ISO 14001 implementation is sufficient.	☐	☐	☐	☐	☐
8. The company has a very good technical knowledge of environmental issues.	☐	☐	☐	☐	☐
9. The financial resources for the implementation of ISO 14001 is, or was, sufficient to cover all costs incurred.	☐	☐	☐	☐	☐
10. Sound environmental management lowers the cost of doing business.	☐	☐	☐	☐	☐
11. The ISO 14001 implementation process will be put on hold should the company be faced with a severe financial crisis.	☐	☐	☐	☐	☐
12. Environmental management concentrates on the issue of sustainability and subsequently brings with it factors that raise the costs of production.	☐	☐	☐	☐	☐
13. Employee conduct in respect of environmental issues is likely to improve, or did improve, due to ISO 14001.	☐	☐	☐	☐	☐
14. The company's culture is conducive to sincere environmental management.	☐	☐	☐	☐	☐
15. The company will have to rely extensively on external technical experts in the determination of its aspects and impacts.	☐	☐	☐	☐	☐
16. The expectations of what an environmental management system can deliver are unrealistic or exceptionally high.	☐	☐	☐	☐	☐
17. The company has a high level of compliance to its regulatory and legal requirements.	☐	☐	☐	☐	☐

Opinions of ISO 14001 Issues continued ...

	Opinion				
	Strongly Disagree	Disagree	No Opinion	Agree	Strongly Agree
18. Legal issues are dealt with by people within the company.	☐	☐	☐	☐	☐
19. The parties (internal or external) that are responsible for legal requirements are capable of interpreting them into solutions that are practically applicable to your company in particular.	☐	☐	☐	☐	☐
20. The company has set performance levels that are well in excess of the regulatory threshold.	☐	☐	☐	☐	☐
21. Environmental regulations in South Africa are more relaxed than the global average and subsequently legal compliance is less costly.	☐	☐	☐	☐	☐
22. The company has sufficient internal auditors to effectively audit all its management systems.	☐	☐	☐	☐	☐
23. Some of the internal auditors have the necessary environmental and management systems knowledge to effectively conduct environmental audits.	☐	☐	☐	☐	☐
24. Customers often scrutinize and audit the company's environmental management system.	☐	☐	☐	☐	☐
25. Regulators, such as the Municipality or government departments, often scrutinize and audit the company.	☐	☐	☐	☐	☐
26. Management responds seriously to internal audit findings.	☐	☐	☐	☐	☐

Section E: Criticism of ISO 14001

The following series of questions are designed to determine criticism of ISO 14001 and environmental management. Please tick one of the five categories depending on how strongly you feel the statement applies to your industry in general.

	Opinion				
	Strongly Disagree	Disagree	No Opinion	Agree	Strongly Agree
1. ISO 14001 is criticized because companies are reluctant to comply with environmental best practices and seek certification.	☐	☐	☐	☐	☐

Criticism of ISO 14001 continued...

	Opinion				
	Strongly Disagree	Disagree	No Opinion	Agree	Strongly Agree
2. ISO 14001 places high demands on a company's resources	☐	☐	☐	☐	☐
3. The ends do not justify the means.	☐	☐	☐	☐	☐
4. Management is too busy doing business to worry about environmental considerations.	☐	☐	☐	☐	☐
5. ISO 14001 will not materially alter the quality of the company's products.	☐	☐	☐	☐	☐
6. ISO 14001 does not necessarily guarantee improvements in environmental performance and regulatory compliance.	☐	☐	☐	☐	☐
7. The current system of environmental regulations does nothing to encourage companies to do more than merely comply with minimum regulatory requirements.	☐	☐	☐	☐	☐
8. Maintaining continuous compliance with environmental legislation is problematic and requires serious managerial effort.	☐	☐	☐	☐	☐
9. Information uncovered by the environmental management system can be used as a roadmap for prosecution.	☐	☐	☐	☐	☐
10. If companies improve their environmental performance substantially, regulators will just impose more stringent regulations.	☐	☐	☐	☐	☐
11. Environmental regulations erode competitiveness.	☐	☐	☐	☐	☐

Section F (Optional)

In this section please supply any additional information or raise any topic that you feel will be pertinent to the research that has not been raised by the other questions. Should you require more space, please use a separate page.

Summary of ISO 14001 Survey Results Section C4: Barriers to Implementing ISO 14001 Difficulty of implementation steps: (1 - V Easy - 5 V Difficult)	All Responses					ISO 14001 Certified					Non ISO 14001 Certified Started Implementation					Non ISO 14001 Certified Not Started Implementation				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
1. Obtaining commitment from top management.	30%	48%	4%	15%	4%	45%	36%	9%	9%	0%	20%	60%	0%	20%	0%	30%	48%	4%	15%	4%
2. Obtaining commitment from middle and lower management.	4%	44%	4%	41%	7%	9%	45%	0%	45%	0%	0%	50%	10%	30%	10%	4%	44%	4%	41%	7%
3. Conducting the Initial Environmental Review.	4%	59%	19%	19%	0%	9%	45%	36%	9%	0%	0%	80%	0%	20%	0%	4%	59%	19%	19%	0%
4. Preparing the company's Environmental Policy.	4%	74%	4%	19%	0%	0%	82%	0%	18%	0%	10%	60%	10%	20%	0%	4%	74%	4%	19%	0%
5. Listing of environmental aspects and impacts.	4%	52%	19%	26%	0%	9%	36%	9%	45%	0%	0%	60%	30%	10%	0%	4%	52%	19%	26%	0%
6. Establishing a register of all pertinent legislation.	0%	30%	4%	48%	19%	0%	36%	0%	36%	27%	0%	30%	10%	50%	10%	0%	30%	4%	48%	19%
7. Setting environmental objectives and targets.	4%	52%	4%	41%	0%	9%	27%	9%	55%	0%	0%	80%	0%	20%	0%	4%	52%	4%	41%	0%
8. Establishing the management programme and structure.	4%	22%	15%	56%	4%	9%	9%	27%	55%	0%	0%	30%	10%	60%	0%	4%	22%	15%	56%	4%
9. Writing the management manual.	4%	44%	15%	37%	0%	9%	18%	18%	55%	0%	0%	80%	10%	10%	0%	4%	44%	15%	37%	0%
10. Establishing the operational controls and procedures.	0%	37%	15%	44%	4%	0%	36%	18%	45%	0%	0%	30%	20%	50%	0%	0%	37%	15%	44%	4%
11. Environmental training of company personnel.	4%	44%	15%	30%	7%	9%	45%	18%	27%	0%	0%	40%	20%	30%	10%	4%	44%	15%	30%	7%
12. Internal auditing of the company against ISO 14001.	4%	56%	15%	22%	4%	9%	55%	18%	18%	0%	0%	50%	20%	20%	10%	4%	56%	15%	22%	4%

Footnote:

This table shows, in percentage, the number of surveyed organizations that opted for each of the various options:

1 = Very Easy
2 = Easy
3 = No Opinion
4 = Difficult
5 = Very Difficult

Summary of ISO 14001 Survey Results

Section D: Opinions of ISO 14001 Issues

Agreement of Statements (1 Disagree - 5 Agree)

	All Responses					ISO 14001 Certified					Non ISO 14001 Certified Started Implementation					Non ISO 14001 Certified Not Started Implementation				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
1. ISO 14001 will have severe cost implications to the company's current production processes and practices.	4%	2%	15%	31%	2%	9%	0%	18%	27%	5%	0%	5%	15%	30%	0%	0%	0%	8%	42%	0%
2. Relationships with regulators are likely to improve.	0%	4%	30%	63%	4%	0%	0%	36%	55%	9%	0%	10%	30%	60%	0%	0%	0%	17%	83%	0%
3. The emphasis is placed on short term financial gains is in line with strategies for sustainable growth.	7%	22%	41%	26%	4%	0%	36%	45%	18%	0%	20%	20%	30%	20%	10%	0%	0%	50%	50%	0%
4. There will be a high level of integration between the company's various management systems.	0%	37%	7%	52%	4%	0%	45%	0%	45%	9%	0%	30%	10%	60%	0%	0%	33%	17%	50%	0%
5. The people responsible for compiling the management manual have an intimate knowledge of how the company functions, its strategic direction and a good sound environmental understanding.	0%	15%	4%	63%	19%	0%	0%	0%	73%	27%	0%	20%	10%	50%	20%	0%	33%	0%	67%	0%
6. Each employee knows exactly how to contribute to environmental improvements.	7%	59%	11%	22%	0%	9%	36%	9%	45%	0%	10%	60%	20%	10%	0%	0%	100%	0%	0%	0%
7. The number of people that have been dedicated to ISO 14001 implementation is sufficient.	15%	37%	22%	26%	0%	18%	36%	9%	36%	0%	10%	30%	40%	20%	0%	17%	50%	17%	17%	0%

Footnote:

This table shows, in parentage, the number of surveyed organisations that opted for each of the various options:

1 = Strongly Disagree
2 = Disagree
3 = No Opinion
4 = Agree
5 = Strongly Agree

Summary of ISO 14001 Survey Results Section D: Opinions of ISO 14001 Issues Agreement of Statements (1 Disagree - 5 Agree)	All Responses					ISO 14001 Certified					Non ISO 14001 Certified Started Implementation					Non ISO 14001 Certified Not Started Implementation				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
8. The company has a very good technical knowledge of environmental issues.	0%	44%	7%	48%	0%	0%	18%	0%	82%	0%	0%	60%	10%	30%	0%	0%	67%	17%	17%	0%
9. The financial resources for the implementation of ISO 14001 is, or was, sufficient to cover all costs incurred.	4%	15%	33%	48%	0%	0%	0%	9%	91%	0%	0%	10%	60%	30%	0%	17%	50%	33%	0%	0%
10. Sound environmental management lowers the cost of doing business.	4%	19%	37%	37%	4%	9%	9%	36%	36%	9%	0%	20%	40%	40%	0%	0%	33%	33%	33%	0%
11. The ISO 14001 implementation process will be put on hold should the company be faced with a severe financial crisis.	11%	11%	30%	44%	4%	18%	9%	36%	36%	0%	10%	10%	30%	40%	10%	0%	17%	17%	67%	0%
12. Environmental management concentrates on the issue of sustainability and subsequently brings with it factors that raise the costs of production.	0%	26%	37%	37%	0%	0%	36%	27%	36%	0%	0%	20%	40%	40%	0%	0%	17%	50%	33%	0%
13. Employee conduct in respect of environmental issues is likely to improve, or did improve, due to ISO 14001.	4%	7%	15%	74%	0%	9%	0%	0%	91%	0%	0%	10%	30%	60%	0%	0%	17%	17%	67%	0%
14. The company's culture is conducive to sincere environmental management.	4%	7%	15%	74%	0%	9%	0%	9%	82%	0%	0%	20%	0%	80%	0%	0%	17%	33%	50%	0%

Footnote:

This table shows, in parentage, the number of surveyed organisations that opted for each of the various options:

1 = Strongly Disagree
2 = Disagree
3 = No Opinion
4 = Agree
5 = Strongly Agree

Summary of ISO 14001 Survey Results Section D: Opinions of ISO 14001 Issues Agreement of Statements (1 Disagree - 5 Agree)	All Responses					ISO 14001 Certified					Non ISO 14001 Certified Started Implementation					Non ISO 14001 Certified Not Started Implementation				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
15. The company will have to rely extensively on external technical experts in the determination of its aspects and impacts.	7%	37%	11%	44%	0%	9%	55%	27%	9%	0%	10%	20%	10%	60%	0%	0%	17%	0%	83%	0%
16. The expectations of what an environmental management system can deliver are unrealistic or exceptionally high.	15%	41%	19%	22%	4%	27%	45%	0%	18%	9%	10%	60%	20%	10%	0%	0%	0%	50%	50%	0%
17. The company has a high level of compliance to its regulatory and legal requirements.	0%	7%	19%	70%	4%	0%	0%	9%	82%	9%	0%	20%	10%	70%	0%	0%	0%	50%	50%	0%
18. Legal issues are dealt with by people within the company.	4%	33%	22%	41%	0%	0%	18%	36%	45%	0%	0%	50%	0%	50%	0%	17%	33%	33%	17%	0%
19. The parties (internal or external) that are responsible for legal requirements are capable of interpreting them into solutions that are practically applicable to your company in particular.	0%	7%	22%	67%	4%	0%	0%	9%	82%	9%	0%	20%	20%	60%	0%	0%	0%	50%	50%	0%
20. The company has set performance levels that are well in excess of the regulatory threshold.	0%	22%	33%	41%	4%	0%	18%	18%	64%	0%	0%	30%	40%	20%	10%	0%	17%	50%	33%	0%
21. Environmental regulations in South Africa are more relaxed than the global average and subsequently legal compliance is less costly.	7%	22%	30%	37%	4%	9%	9%	27%	55%	0%	10%	20%	40%	20%	10%	0%	50%	17%	33%	0%

Footnote:

This table shows, in parentage, the number of surveyed organisations that opted for each of the various options:

1 = Strongly Disagree
2 = Disagree
3 = No Opinion
4 = Agree
5 = Strongly Agree

Summary of ISO 14001 Survey Results Section D: Opinions of ISO 14001 Issues Agreement of Statements (1 Disagree - 5 Agree)	All Responses					ISO 14001 Certified					Non ISO 14001 Certified Started Implementation					Non ISO 14001 Certified Not Started Implementation				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
22. The company has sufficient internal auditors to effectively audit all its management systems.	4%	37%	15%	41%	4%	0%	18%	18%	55%	9%	10%	50%	10%	30%	0%	0%	50%	17%	33%	0%
23. Some of the internal auditors have the necessary environmental and management systems knowledge to effectively conduct environmental audits.	0%	44%	7%	37%	11%	0%	9%	9%	64%	18%	0%	70%	10%	10%	10%	0%	67%	0%	33%	0%
24. Customers often scrutinize and audit the company's environmental management system.	4%	44%	15%	26%	11%	0%	45%	9%	18%	27%	0%	60%	30%	10%	0%	17%	17%	0%	67%	0%
25. Regulators, such as the Municipality or government departments, often scrutinize and audit the company.	7%	37%	11%	22%	22%	9%	18%	18%	27%	27%	0%	60%	10%	20%	10%	17%	33%	0%	17%	33%
26. Management responds seriously to internal audit findings.	0%	22%	7%	52%	19%	0%	27%	0%	36%	36%	0%	20%	20%	50%	10%	0%	17%	0%	83%	0%

Footnote:

This table shows, in parentage, the number of surveyed organisations that opted for each of the various options:

1 = Strongly Disagree
2 = Disagree
3 = No Opinion
4 = Agree
5 = Strongly Agree

Summary of ISO 14001 Survey Results Section E: Criticism of ISO 14001 Criticism of ISO 14001 and environmental management: (1 Dissagree - 5 Agree)	All Responses					ISO 14001 Certified					Non ISO 14001 Certified Started Implementation					Non ISO 14001 Certified Not Started Implementation				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
1. ISO 14001 is criticized because companies are reluctant to comply with environmental best practices and seek certification.	0%	19%	26%	48%	7%	0%	18%	9%	55%	18%	0%	20%	50%	30%	0%	0%	17%	17%	67%	0%
2. ISO 14001 places high demands on a company's resources	0%	33%	7%	52%	7%	0%	55%	0%	36%	9%	0%	30%	10%	50%	10%	0%	0%	17%	83%	0%
3. The ends do not justify the means.	7%	37%	41%	15%	0%	9%	45%	36%	9%	0%	10%	40%	30%	20%	0%	0%	0%	67%	33%	0%
4. Management is too busy doing business to worry about environmental considerations.	4%	48%	26%	22%	0%	9%	64%	9%	18%	0%	0%	50%	30%	20%	0%	0%	17%	50%	33%	0%
5. ISO 14001 will not materially alter the quality of the company's products.	7%	11%	11%	67%	4%	9%	9%	9%	73%	0%	10%	20%	10%	60%	0%	0%	0%	17%	67%	17%
6. ISO 14001 does not necessarily guarantee improvements in environmental performance and regulatory compliance.	19%	30%	19%	33%	0%	18%	45%	9%	27%	0%	20%	20%	20%	40%	0%	17%	17%	33%	33%	0%
7. The current system of environmental regulations does nothing to encourage companies to do more than merely comply with minimum regulatory requirements.	7%	22%	15%	52%	4%	0%	36%	9%	45%	9%	20%	20%	20%	40%	0%	0%	0%	17%	83%	0%
8. Maintaining continuous compliance with environmental legislation is problematic and requires serious managerial effort.	4%	37%	15%	41%	4%	0%	36%	9%	45%	9%	10%	50%	20%	20%	0%	0%	17%	17%	67%	0%
9. Information uncovered by the environmental management system can be used as a roadmap for prosecution.	7%	26%	37%	26%	4%	18%	36%	18%	18%	9%	0%	20%	50%	30%	0%	0%	17%	50%	33%	0%
10. If companies improve their environmental performance substantially, regulators will just impose more stringent regulations.	7%	56%	22%	15%	0%	9%	73%	9%	9%	0%	10%	60%	20%	10%	0%	0%	17%	50%	33%	0%
11. Environmental regulations erode competitiveness.	11%	52%	19%	19%	0%	9%	64%	18%	9%	0%	20%	30%	20%	30%	0%	0%	67%	17%	17%	0%

Footnote:

This table shows, in parentage, the number of surveyed organisations that opted for each of the various options:

1 = Strongly Disagree
2 = Disagree
3 = No Opinion
4 = Agree
5 = Strongly Agree