

ENVIRONMENTAL MANAGEMENT SYSTEM ADOPTION BY AUSTRALASIAN ORGANISATIONS: PART 1: REASONS, BENEFITS AND IMPEDIMENTS

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Abstract

The decision to adopt Environmental Management System (EMS) and to develop effective implementation strategies has engrossed managers at all levels and in all types of organisations in recent years. Some organisations have claimed that environmental issues have been determining their bottom-line and business performance in the market place. This paper is first part in the series focussing on the reasons for EMS implementation and the benefits and impediments associated with the process. Measures commonly practised by organisations to overcome/address the impediments are also presented in this paper. The findings of this paper are based on a questionnaire survey mailed to Australasian organisations on their experiences with ISO 14001 implementation and certification.

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INTRODUCTION

The ISO 14000 series of standards or the International Standard for Environment was released in September 1996 and comprises of two main parts: (i) Specification with Guidance for Use and (ii) General Guidelines or Principles, Systems and supporting Techniques. Within the series only ISO 14001 (commonly referred to as the Environmental Management System – EMS) is the specification document, and the only one that organisations can certify themselves with. Other standards in the series such as ISO 14004, ISO 14011 and ISO 14012 are guiding documents, not mandatory for obtaining certification, nonetheless assist the organisations in satisfying the ISO 14001 criteria.

ISO 14000 standard series can be considered as a double-edged tool providing tangible and intangible benefits to both the government/regulatory agencies (such as the Environmental Protection Agency - EPA) and the organisations themselves. This can be stated as the standard aims to assist ISO itself and organisations in procuring objectives such as to (Sayre, 1996, p.100; Zuckerman, 1997, p.94):

- Reduce waste, resource depletion and environmental pollution
- Design products for minimising environmental impact in product use and disposal
- Control environmental impact of raw material sourcing and new product development
- Promote environmental awareness among employees and within the community
- Provide a platform for companies to demonstrate their commitment to environmental protection
- Help management pursue continual improvement in environmental performance
- Provide a world-wide focus on environmental management
- Promote a voluntary, consensus standard approach for environmental issues
- Harmonise national environmental rules, labels, and methods
- Demonstrate a commitment to moving beyond regulatory compliance
- Improve global environmental management and promote sustainable development through trade and minimise environmental trade barriers.

The ISO 14001 standard comprises of five main elements: Environmental policy; Planning; Implementation and Operation; Checking and Corrective action; and Management Review (see Figure 1). These elements are a prerequisite for an organisation to implement an effective EMS. In views of Hammerschmid and Uliana (1998, p.5) a fully implemented and certified EMS would effectively:

- Manage environmental issues worth millions of dollars
- Determine the organisation's success in maintaining the positive public and shareholder perception concerning the environment
- Reduce the risk of environmental incidents occurring
- Assist in demonstrating due diligence
- Over the long term, potentially reduce staff numbers by ensuring that only the right work is undertaken.

Insert Figure 1 About Here

In this paper we present the results of a questionnaire survey focusing on EMS/ISO14001 adoption by Australasian organisations. More specifically we focus on the drivers, benefits and impediments of EMS adoption. This survey is part of a large research project that is examining the role of employees and suppliers, as organisational stakeholders, during the successful adoption of an EMS. Successful adoption is defined as one being faster in implementation, accompanied with fewer impediments (such as resistance from stakeholders) and with quantifiable and non-quantifiable benefits. For this project the stakeholders includes only the organisations top management, employees and suppliers.

The remainder of this paper is structured as follows. The next section presents a review of the literature relating to drivers or reasons for EMS adoption, its benefits and impediments. This is followed by the section on research methodology. Next the findings from the survey are presented and discussed. The final sections of the paper presents a summary of the survey findings.

LITERATURE REVIEW

This section presents an overview of the literature pertaining to the drivers for organisations to implement and obtain certification to an EMS and the benefits received from its implementation. The literature relating to challenges or obstacles encountered during the EMS implementation and the measures taken to address the same are also reviewed.

Drivers for EMS Adoption

With the onset of globalisation, more and more organisations are being compelled to adopt new techniques and technologies to overcome the rigorous competition and issues of ‘environmental sustainability’. Besides influencing the political decision making process, environmental issues are also affecting the industrial sector. As noted in Figure 2, organisations are facing pressure from a number of sources to become ‘environment friendly’. These sources can be broadly classified under four main categories: the market (mainly the external forces directly impacting the competitiveness of the companies), social (which includes pressure from various groups, the public and the community at large), financial (this broadly encompasses pressure from the financial institutions and insurance companies, not forgetting the fines and legal liabilities resulting from non-compliance) and regulatory (pressure from the guidelines and regulations at both national/international levels to continue working of the organisations).

Insert Figure 2 About Here

In view of the various drivers, industries are currently facing a number of challenge(s) to maintain competitiveness and productivity while at the same time creating a minimal environmental impact. These challenges includes (Minner, 1997, p.41; Welford and Starkley, 1996, p.86; Melnyk et al, 1999, p.36):

- Increasing efficiency in use of materials and energy
- Minimising pollution from materials
- Minimising long-term effects on the environment by use of alternative product(s)
- Taking full account of the final disposal of a product
- Ensuring environmental friendly product use through packaging and appearance
- Minimising annoyances such as noise and smell
- Analysing and minimising potential safety standards
- Making the present business effective and its environmental impact acceptable
- Developing new business opportunities
- Providing fulfilling work for employees.

Responding to the above challenges, the ISO, in an attempt to standardize systems for EMS adoption and certification, resulted in the formulation of the ISO 14000 series of standards. Additionally the standard was also targeted to address and fulfil issues such as (Boiral and Sala, 1998, p.60; Boiral, 1998, p.38):

- The intrinsic worth of the internal management system, proposed by the standard (rigor, follow-up, effectiveness, and so on)
- Better control of human behaviour (eliciting greater compliance with work procedures and instructions), leading to improved relations with government

- Socio-economic spin-offs generated by implementing the new standard (such as an active approach to customer's future requirements), resulting in improved market and corporate image and breaking down of (inter)national trade barriers.

In response to the challenge(s) being faced by organisations, environmental issues are now being given top priority within organisational policies, programs and operational agendas. A survey conducted by Banerjee (1998) of 220 senior executives reflected that majority of them thought that environmental issues are 'extremely important' to their firm, [although] only 7 % claimed to have full understanding of the environmental risks being faced by their company. Nonetheless the importance of environmental issues and employee participation had been recognized even in the late 1980's and early 1990's respectively, after the Rio De Janerio Conference (where the term 'sustainable development' was introduced). Nonetheless the documented evidence of rising environmental awareness within the organisations can be traced back to 1992, in the survey findings of Fredrikson and Byron of 110 largest manufacturing firms in Minnesota, USA, as reported in Wilson and Sasseville (1999). The survey found that 65% of its respondent executives believed that the main driver behind compliance with the [environmental] regulations was the "possibility of damage to their company's public image [in case of non-compliance]" (Wilson and Sasseville, 1999, p.25). Furthermore, 53% of executives believed that addressing the environmental issues would give them a market and competitive advantage as compared to their competitors. At the same time they were also concerned about the association between 'employee dissatisfaction' and 'non-compliance', since un-happy employees can lead to careless mistakes being made and possible accidents.

Another survey carried out in the USA on ISO 14000 in 1997 (Saarelainen, 1997) revealed mixed attitudes of top management towards the implementation of the EMS, however most of them in its favour. Words such as *committed, involved, supportive, integrating, corporate goal, competitive advantage* formed part of the responses. At the same time, words such as *lengthy, superficial, expensive, very little case studies or documentation*, could also be found amongst the responses.

Environmental issues and concerns have thus become an indispensable part of an organisation's daily operations. Furthermore EMS of an organisation acts as an additional assurance for its stakeholders (both internal and external), being a reflector that (Chan, 1998, p.63):

- Environmental polices, objectives and stakeholder expectations are [being] addressed
- Regulatory compliance is a more integral part of the business operation
- Emphasis is placed [by the organisation] on prevention rather than cure
- There is a systematic approach to support and ensure continual improvement in environmental profitability performances
- [It] is a 'green passport' to a green market.

The results of an Australian survey conducted by Coopers and Lybrand (Melbourne) on public opinion revealed that an "increasing percentage of consumers wanted to buy environmental friendly products, and in some cases, [would be] willing to pay more for them" (Environmental Audits, 1995, p.179). Australia was ranked the "fifth largest contributor to greenhouse effect, measured in terms of carbon dioxide emission per capita" (Environmental Audit, 1995, p.177). The survey also ranked visual impact, industrial smog in Melbourne, water and beach pollution in Sydney and litter everywhere as main areas of public concern. Overall the survey agreeably depicted the position of the global environment and the communities concern for it.

An organisation that fails to recognize the above concerns/findings promptly and take appropriate action run the risk of being adversely affected in the long run as a result of a number of reasons including (Environmental Audits, 1995, p.179; Cato, 1995, p.13; Cichowicz, 1996, p.78; Sadgrone, 1992, p. 13; McManus, Pirnie and Shelley, 1996, p. 143):

- Losing market share to more environmentally friendly competitors
- Loss of public trust
- Loss of property value

- Demonstrations or boycott from customers nationally and / or internationally
- Missing new product [development] opportunities
- Being fined or restricted under new environmental legislation (this may include increased cost of compliance and even cost of non-compliance). This can be judged by looking at the compliance costs that have exceeded over \$1 trillion in the last 25 years. It has also been found that approximately \$120 billion are annually spent by organisations just for pollution abatement and control (Berry and Rondinelli, 1998, p.40).
- Facing substantial unplanned cost increases, including unpredicted, long-term economic costs, such as:
 - Delays in commencing an activity, caused by the necessity to obtain approvals from different levels of government
 - Opportunities lost because of those delays or in anticipation of further delays if an application is not advanced
 - The loss of future commercial activity through the permanent denial of access to unknown, but potentially valuable, land-based resources
 - Expensive environmental liability insurance costs
 - Indirect costs for the managers while working with the lawyers or responding to queries (may be for non-compliance or in case of an accident) can be excessive, gruelling and personally painful
 - Health insurance for employees
 - Reduced access to landfill sites.

The community's expectations of information regarding environmental disclosure is not restricted only to organisations, moreover includes even the retailers. This became clear from a 1995 market research report released by the Co-operative Wholesale Society in the UK (Hutchinson and Hutchinson, 1997, p.60). The report, based on a survey of 30,000 people, found that approximately 70% of the respondent's buying decisions had been impacted by attitudes of wholesalers/retailers towards environmental issues. Furthermore, 80% of the respondents believed that it was the retailers duty to provide information on how their products impact on the environment.

The society/community perceptions are also greatly influenced from the various sources of media. The evidence of media as an environmental issues information source can be seen from the findings of the 'Ecolabeling Study' conducted in UK in 1991 (Taylor et al, 1994, p.18). The study found that about 92% of the respondents learnt about 'environment' from television documentaries and news programs followed by print media such as the newspapers and magazine articles (68% and 52% respectively). Other information sources included radio programs, leaflets delivered at home and in supermarkets, family and friends.

Benefits of ISO 14000

The increasing success of ISO 14000 can be attributed to both tangible and intangible benefits offered by it. This has been supported by a number of managers and EMS practitioners including David Terry, the environmental business service manager with Groundwork (Mortiner, 2000, p.42). According to Terry "there are tangible and significant ongoing commercial benefits to be gained by implementing and gaining certification of an EMS" (Mortimer, 2000, p.42). Many articles, case studies and texts have been devoted to highlight the benefits accompanied by EMS implementation. Appendix 1 presents a detailed review of the literature on benefits of EMS. These are summarised as follows:

- Cost reductions and savings resulting from waste minimisation, recycling, and savings from reduction in usage of electricity, water, gas and raw materials
- Improvement in operational processes resulting in both savings made from usage of raw materials and increased safety. This can also result in increased motivation amongst the employees
- Improved communication across the organisation due to the usage of the same EMS related terminology
- Improved corporate image resulting from 'environmental-friendly organisation' image, leading to improved and better relations with customers, community and other stakeholders
- Increased insurance from the financial institutions
- Improved long-term relationship with the suppliers/contractors and sub-contractors

- Reduction in fines due to compliance with legislation, regulations and guidelines

These benefits are driving organisations to adopt EMS as a part of their operations. However, as with any other system, EMS is also accompanied with many obstacles, which have been briefly overviewed below.

Obstacles/Challenges/Impediments with/in ISO 14000

The main drawbacks highlighted by the critics of ISO 14000 are due to lack of understanding of the standard and the broad, ambiguous scope of the standard. Many organisations are unsure how some aspects of the standard could be interpreted by the auditors. As ISO 14000 underlines the minimum requirements for the organisations, according to Pullin (1998, p.28), it thus “blocks the way for other routes that might deliver real performance improvements and sustainable industrial development”. Also many organisations consider ISO 14001 less rigorous and stringent than its counterparts like Responsible Care and EMAS. Pullin (1998, p.28) highlighting the same from Krut and Gleckman’s book (1998), comments that EMAS on the one hand stresses on “policy and action in relation to the environment and sustainable development ... to prevent, reduce, and as far as possible eliminate waste”. In contrast, ISO 14001 talks about “standardization in the field of environmental management tools and systems” (Pullin, 1998, p.28). The same was also supported by Glenn Hammer, V.P/EHS Manager of Ashland Specialty Chemicals. While comparing ISO 14001 with Responsible Care, Glenn commented that, “ISO is process oriented while Responsible Care is performance driven. ISO 14001 is [thus] kind of hollow” (Sissell, 2000, p. 43).

Post and Altman (1994) have broadly categorized the barriers experienced by organisations during environmental management process as (a) Industrial barriers (for instance technical information, capital costs, configuration of current operations, competitive pressures and industry regulations) and (b) Organisational barriers (for instance employee attitude, poor communication, past practice and inadequate top management leadership). Appendix 2 presents a detailed review of the literature relating to impediments. These are summarised as follows:

- Costs (training, auditor fees, audits) required in addition to implementation and certification of EMS and its maintenance
- Lack of support and resources available for SMEs
- Unclear guidelines for EMS implementation for organisations with mobile workforce, such as the construction sector
- Lack of set guidelines for setting of objectives and targets and extent of involvement of employees, suppliers and other stakeholders
- Lack of guidelines on how to accomplish ‘continuous improvement’ element of the standard
- Interpretation of terms present within the standard.

RESEARCH METHODOLOGY

Data for this paper was collected during mid-2000 by means of a questionnaire survey mailed to 286 organisations in Australia and New Zealand that were certified to ISO 14001 and were listed on the register of JAS-ANZ as on February 2000. The questionnaire survey was the second stage of the research, the first stage being case studies based on semi-structured, exploratory interviews with nine environmental managers from various industrial sectors and organisational sizes (results of this phase of this study are presented in Zutshi and Sohal (2002)). The issues raised from the interviews, along with the literature review resulted in the content for the development of the questionnaire. Input for improving the content, wording and structure of the questionnaire was also sought and received from the Victorian Environmental Protection Agency (EPA), experts from Quality Assurance Services (QAS), a subsidiary of Standards Australia, and industrial practitioners and managers from organisations such as DuPont and Boral to name a few. A number of experienced researchers at Monash University also provided input into the development of the questionnaire. Since EMS experts and practitioners were involved in the development of the questionnaire, it was considered to be a part of the pilot-testing and accordingly a formal pilot test of the questionnaire was not carried out.

A pre-notification letter summarising the aim and objectives of the study was mailed to the prospective respondents approximately a week before the actual mail-out of the questionnaire. Of the initial mail out to 286 organisations in June 2000, nine questionnaires were returned undelivered because either the addressee had moved to another organisation or the mailing address was incomplete or incorrect. A follow-up letter requesting the respondents to complete the questionnaire was mailed approximately five weeks after the mail-out of the questionnaire. By the cut-off date (approximately six weeks after the mail out of the questionnaire) a total of 134 responses were received, giving a response rate of 48.4%. Another six questionnaires were received after the cut-off date, representing a total response rate of 50.5%. Jobber (1989, p.134) defines response rate as “the percentage of total questionnaires mailed (and not returned by the postal service as undelivered) that were returned by respondents”. The six questionnaires received after the cut-off date were not included in the final analysis. Furthermore, two (one each from the State of Victoria, Australia and New Zealand) of the 134 questionnaires received were incomplete and were not included in the final analysis. Hence the analysis presented in the following section is accordingly based on 132 responses.

The responses received were coded and entered into the SPSS database and analysed using the mean, Anova, t-tests, and Correlation functions. A number of studies have been reported in the literature, including Davies (1997); Sharma and Fisher (1997); Davenport, Grimes and Davies (1997); Brown, Millen and Wiele (1997); Preston and Saunders (1995); Brown (1995); and Vargus and Cabanas (1995), that supports the use of means, frequency and percentages to be used as part of the analysis especially for exploratory studies.

For most of the questions, respondents were asked to give their answer on a five-point Likert scale, where 1 = ‘not at all’ and 5 = ‘to a very large extent’. Usage of a five-point Likert scale has been supported by a number of researchers such as Hua, et al (2000); Cox, et al (1997); Rao, Solis and Raghunathan (1997); Quaddus, Klass and Souza (1997); Jantan, Ali and Tan (1997); Child, Faulkner and Pitkethly (1997); Rao, Raghunathan and Solis (1996); and Terziowski, Samson and Dow (1995) when conducting their research into various areas of management including quality, safety, attribution studies and conflict. These researchers also used Anova and t-tests as a means for analysing their data.

The questionnaire explored benefits and impediments on two time scales – before (ie, during planning) and (during and-) after the implementation of the EMS. Earlier studies focussing in internal customer satisfaction (Yung and Chuek, 1997); business partnerships (Davenport, Grimes and Davies, 1997); and ISO 9000 certification (Brown, 1995) have successfully used these time scales. The time scales were considered to be both significant and appropriate in our study as we wanted to examine the impact on the organisation in various stages of EMS adoption.

FINDINGS AND DISCUSSION:

Industry Sector

Manufacturing sector (43%) represented the largest respondent group followed by the construction and utility sectors, each accounting for 13% of the sample (see Table 1). Because of the small number of respondents from other sectors listed in the questionnaire, responses were grouped together into two categories namely manufacturing (56.1%) and non-manufacturing (43.9%) (see Table 1). The manufacturing group, included organisations identifying themselves as both manufacturing and construction sectors. Similar approach of combining manufacturing and construction sectors under one category was also pursued by Sohal, Moss and Ng (2001, p.34) when comparing IT performance between manufacturing and service sectors.

Table 1: Sample Classified by Industrial Sector

Organisational Sector	Frequency	Valid %age	Cumulative %age
Manufacturing	57	43.8	79.2
Construction	18	13.8	13.8
Utility	17	13.1	26.9
Government	10	7.7	34.6
Retail	01	0.8	35.4
Military / Defence	01	0.8	80.0
Other	26	20.0	100.0
Sectors used for the analysis			
Manufacturing	74	56.1	56.1
Non-Manufacturing	58	43.9	100.0

Respondents State/Country of Origin

One-half of the responding organisations are based in Victoria (27.3%) and New South Wales (22.7%) and nearly one-fifth (18.9%) of the sample was represented by organisations based in New Zealand (see Table 2). The remainder of the sample comprised of organisations based in other Australian states and territories with significant numbers located in Western Australia, Tasmania and South Australia. From the responding organisations, just over one-half (59.8%) of the sample is made up of Australian and New Zealand owned companies representing both the public and private sectors, the rest (40.2%) representing foreign-owned businesses.

Table 2: Sample Classified by State of Origin

State/Country of the Respondents	Frequency	Valid %age	Cumulative %age
ACT	02	1.5	1.5
New South Wales	30	22.7	24.2
Northern Territory	01	0.8	25.0
Queensland	15	11.4	36.4
South Australia	07	5.3	41.7
Tasmania	08	6.1	47.7
Victoria	36	27.3	75.0
Western Australia	06	4.5	79.5
New Zealand	25	18.9	98.5
Other	02	1.5	100.0

Organisational Size

Classification of organisational size based on number of employees was adopted from the empirical research done by Lee (1995, p.8), where small sized-organisations had 0 to 500 employees, medium- 501 to 1000 and large- more than 1000 employees (see Table 3). The categorisation system used by Lee (1995) was adopted for this study as this was seen as more in alignment with other studies reported in the literature including Rao, Ragunathan and Solis (1996, p.18) and Solis and Rao (1996, p.162).

Table 3: Sample Classified by Size (Number of Employees)

Organisational Sizes	Number of Employees	Responding Org. Employees at the site	Total no. of employees in Australia/NZ	Total no. of employees Worldwide
Small	0 - 500	114 (86.36)	53 (40.15)	12 (9.09)
Medium	501 – 1000	07 (5.30)	17 (12.87)	05 (3.78)
Large	>1000	05 (3.78)	26 (19.69)	30 (22.72)
Classification based on ABS System				
Small	0 - 19	14 (21.5)	05 (6.5)	02 (4.3)
Medium	20 – 199	03 (4.6)	03 (3.9)	0
Large	>200	48 (73.8)	69 (89.6)	44 (95.7)

Note: The values outside the brackets represent frequency of responding organisations and those within the brackets (in bold) represents the percentages. This was an open-ended question asking respondents to identify the number of employees.

Though the survey was conducted in Australia and New Zealand, the ABS (Australian Bureau of Statistics) system of classification was not used for calculating the organisational size. According to the ABS system of classification (see bottom-half of Table 3), small organisations have 0-19 employees, medium- 20 to 199 and large- more than 200 employees working for them. Lee's (1995) classification is considered to be more appropriate for any future comparisons being undertaken regardless of the geographical location.

Management Systems

Section one of the questionnaire asked respondents to indicate the various management systems implemented and certified within their organisations. Overall the manufacturing sector and Australasian-owned companies were found to be dominating over the service sector and foreign-owned companies in their adoption of the various management systems (see Table 4). Approximately 93% of responding organisations had implemented ISO 14001, as compared to 80% of the sample having ISO 9000, the Quality Management System (QMS) in place. This finding is surprising since ISO 9000 was released more than a decade ago (in 1987) and is perceived to have become a pre-requisite to do business regardless of the industrial sector or ownership, the chi square values supporting the same.

Table 4: Extent of Usage of Environmental and Quality Systems

Management system (implemented and certified)	Industry Sector			Business Ownership		
	Manuf.	Non-Manuf.	Chi Sq. Sig. Value	Australasian	Foreign	Chi Sq. Sig. Value
ISO 14001	68 (51.51)	55 (41.66)	0.101	74 (56.06)	49 (37.12)	0.974
Other EMS	02 (1.5)	01 (0.75)	0.907	02 (1.5)	01 (0.75)	0.248
ISO 9000	65 (49.24)	41 (31.06)	0.001	61 (46.21)	45 (34.09)	0.265
Other QMS	09 (6.81)	02 (1.5)	0.087	05 (3.78)	06 (4.54)	0.308
WMS	03 (2.27)	03 (2.27)	0.197	05 (3.78)	01 (0.75)	0.463
Other	05 (3.78)	10 (7.57)	0.147	05 (3.78)	04 (3.03)	0.504

Note: The values outside the brackets represent frequency of responding organisations and those within the brackets (in bold) represents the percentages.

As indicated earlier, the questionnaire was mailed to organisations listed on the JAS-ANZ database and certified to ISO 14001. However, the responses show that at the time of completing the questionnaire, not all organisations were certified to ISO 14001 and thus the numbers in table do not add up to 100%.

The chi square values (see Table 4) shows that ISO 9000 and QMS adoption have a significant relationship with the industrial sector. However no significant relationship was found between the ISO 14001, EMS, WMS (Waste Management System) or other internal management systems with either the industrial sector or business ownership.

Reasons for Adopting EMS

In the 21st century organisations compete not only for a market share, however also aim to have a profitable bottom-line with good corporate reputation within the community. By regularly re-visiting and improving their operations, products and services, organisations can enhance their competitive edge. Adopting globally recognized systems and standards could sometimes also positively impact an organisation's market share, in both tangible and intangible ways. On the same lines the questionnaire respondents were asked to indicate on a five point Likert scale, where 1 = 'not at all' and 5 = 'to a very large extent', both quantifiable and non-quantifiable reasons which led to their adoption of an EMS.

Table 5: Reasons for Adopting EMS

Reason for Adoption	N (valid)	Mean statistic	Std. deviation
High waste disposal costs	127	2.13	1.12
International trade barriers	127	1.39	0.85
To comply with existing regulatory requirements	128	3.45	1.31
Pressure from the customers	127	2.35	2.21
Pressure from the suppliers	126	1.28	0.56
Pressure from the employees	127	1.71	0.78
Pressure from the community	128	2.24	1.29
To identify potential areas for improvement	129	3.74	0.90
To monitor set targets	129	3.07	1.08
To benchmark with other organisations	128	2.72	1.20
To satisfy insurance, finance and other lending criteria	128	1.73	1.03
To explore market for 'green' products	128	2.12	1.16
Improved corporate image	130	4.04	0.86
To avoid liability costs from spills	128	2.81	1.37
To ensure continual identification and implementation of cleaner production opportunities	128	3.29	1.26

Means based on five point Likert scale, where 1= not at all and 5= to a very large extent.

Table 5 presents the mean and standard deviation of the responses received. Respondents identified 'improved corporate image' (mean 4.04) (an intangible benefit) as the most important reason for adopting EMS, followed by another intangible reason, 'to identify potential areas for improvement' (mean 3.74). 'To ensure continual identification and implementation of cleaner production opportunities' (mean 3.29) and 'to monitor set targets' (mean 3.07), were also rated highly by the respondents. To 'comply with existing regulatory requirements' with a mean of 3.45 is also rated quite high and can be associated with the reason 'avoidance of liability costs from spills' that has a mean of 2.81. This is because non-compliance with the regulations would result in fines from the regulatory bodies such as the EPA and 'spills' is categorised as non-compliance by the law. Frequent fines and complaints by customers or the local community (for instance due to smoke or offensive smell) could directly impact on the image of the organisation.

As local markets saturate, organisations are finding ways to reduce trade barriers and reach international markets. It was expected that the adoption of EMS would be considered significant in this respect. However, 'international trade barriers' (mean 1.39) and to 'explore market for green products' (mean 2.12) were rated low as reasons for EMS adoption. It can be argued that before entering any market, whether national or international, an organisation would first carry out an exhaustive market research and identify its target customers. Only on obtaining this information would managers consider ways to facilitate trade across borders. Since most organisations had adopted an EMS very recently, its impact in entering global/new markets may not have been a consideration.

In addition to the options listed in the questionnaire, following were some other reasons given by the respondents for EMS adoption:

- To improve local environment
- Corporate policy
- Pressure/image with shareholders
- Demonstrate due diligence
- Marketing tool
- Influence from the shareholders
- To explore nature of ISO 14000
- Continuous improvement

Source of EMS Information

Respondents were also asked to indicate the sources used by them to obtain information regarding EMS. A number of possible sources were listed in the questionnaire and multiple responses were allowed. Overall the ISO 14000 series standard itself (66.4%) and external consultants (38.9%) were the two most commonly used sources for obtaining EMS information. Table 6 presents the breakdown of the EMS information sources listed in the questionnaire against the industrial sector and business ownership. Only about one-fifth of the companies used in-house consultants and around 15.3% of the companies learnt about EMS at seminars, which was also the only source having a significant chi square value (see Table 6). Employees (about 7.6%) as an information source was not found to have a significant association with respect to either the industrial sector or ownership. EPA was also found to be used as an information source, though did not show any significant relationship with either the industrial sector or ownership. Suppliers (just one respondent) were not found to be significant as an EMS information source and none of the companies obtained any information from the media. Some of the other information sources identified in the questionnaire included: student's projects, secondary literature (such as books), certification bodies, external auditors and the Internet.

Table 6: Sources of EMS Information

Source of EMS Information	Industry Sector			Business Ownership		
	Manuf.	Non-Manuf.	Chi Sq. Sig. Value	Australasian	Foreign	Chi Sq. Sig. Value
EPA	05 (3.78)	06 (4.54)	0.441	05 (3.78)	06 (4.54)	0.293
Media	0	0	N/A	0	0	N/A
In-house consultants	12 (9.09)	13 (9.84)	0.341	18 (13.63)	07 (5.3)	0.184
Employees	05 (3.78)	05 (3.78)	0.667	07 (5.3)	03 (2.27)	0.514
Suppliers	0	01 (0.75)	0.253	01 (0.75)	0	0.415
External consultants	27 (20.45)	24 (18.18)	0.513	34 (25.75)	17 (12.87)	0.235
Seminars	17 (12.87)	03 (2.27)	0.012	12 (.09)	08 (6.06)	0.718
Universities	01 (0.75)	01 (0.75)	0.852	01 (0.75)	01 (0.75)	0.764
ISO 14001 Standard	52 (39.39)	35 (26.51)	0.287	47 (35.60)	40 (30.30)	0.924

Note: The values outside the brackets represent frequency of responding organisations and those within the brackets (in bold) represents the percentages. Multiple responses were allowed in the questionnaire.

As indicated earlier, majority of the respondents chose the ISO 14000 standard series itself as their main source of information about EMS. This could be because in order to comply with various regulations and guidelines, organisations need to keep themselves updated with the upcoming standards; especially those applicable in their industry. Since ISO 14001 standard is not industry or organisation specific and can be implemented by any organisation, its release is known in most of the industrial sectors. Consequently to gain benefits from its adoption, organisations have consulted the standard itself.

Sources for Identifying Improvements

Organisational structure and culture tends to direct the delegation of responsibility and decision making autonomy within an organisation. Employee loyalty and commitment to the workplace is dependent on the extent of trust present between them and the management. It is also true that being in contact with the organisation's day-to-day operations and procedures, employees are in an advantageous position than management when it comes to making suggestions to implement changes, whether they be in raw materials usage or implementation of a new system and work procedures. In this respect, the questionnaire survey

explored the main source of identifying improvement areas within the organisation and the results are presented in Table 7 with respect to industrial sector and business ownership.

Table 7: Sources of Identifying Potential Improvement Areas

Source of Identification	Industry Sector			Business Ownership		
	Manuf.	Non-Manuf.	Chi Sq. Sig.	Australasian	Foreign	Chi Sq. Sig.
Internal	71 (53.78)	54 (40.90)	0.470	75 (56.81)	50 (37.87)	0.881
Suppliers	03 (2.27)	06 (4.54)	0.155	06 (4.54)	03 (2.27)	0.666
Customers	15 (11.36)	15 (11.36)	0.472	20 (15.15)	10 (7.57)	0.417
External	57 (43.18)	47 (35.60)	0.576	60 (45.45)	44 (33.33)	0.330

Note: The values outside the brackets represent frequency of responding organisations and those within the brackets (in bold) represents the percentages. Multiple responses were allowed in the questionnaire.

Overall, internal (including both the shop-floor employees and managers) sources are used primarily for identifying improvement areas (94% of the sample) followed by external sources or consultants (79% of the sample). The same trends of high involvement of internal sources and external consultants could also be seen in the case of Australasian owned and manufacturing organisations, as compared to foreign-owned and non-manufacturing organisations. Less than one-tenth (about 6%) of the sample had identified their suppliers as a source for improving their processes. This was especially the case if the suppliers were working in collaboration or IN partnership with the organisation. None of the sources were found to be significant with respect to either the industrial sector or ownership of the organisation when chi square significance values were calculated.

Responsibility for EMS Programs

Respondents were asked to identify the person within their organisation who held the primary responsibility for the implementation of the EMS. In just over one-half (68%) of the sampled companies either the top managers or middle managers held the primary responsibility for the implementation of EMS. This demonstrates the strategic importance placed on EMS within the organisations. Overall the results show that middle managers in nearly one-third (31%) of the sample and top managers in one-fifth (20%) of the sample (see Table 8) held primary responsibility for the planning, implementation and maintenance of the EMS. The line managers and facility managers were given this responsibility in 25% and 19% of the organisations respectively. It is understandable that shop-floor employees would not carry this responsibility in most organisations, however, the results do show that in 6% of the sample this was the case.

Table 8: Responsibility for EMS Program Implementation

Primary Resp. for EMS Programs	Industry Sector			Business Ownership		
	Manuf.	Non-Manuf.	Chi Sq. sig.	Australasian	Foreign	Chi Sq. sig.
Board of Directors	13 (9.84)	14 (10.60)	0.327	13 (9.84)	14 (10.60)	0.147
Middle management	25 (18.93)	16 (12.12)	0.484	26 (19.69)	15 (11.36)	0.623
Facility management	16 (12.12)	10 (7.57)	0.562	11 (8.33)	15 (11.36)	0.036
Production management	07 (5.30)	07 (5.30)	0.604	09 (6.81)	05 (3.78)	0.747
Line management	17 (12.87)	17 (12.87)	0.375	22 (16.66)	12 (9.09)	0.542
Shop floor employees	02 (1.5)	06 (4.54)	0.126	06 (4.54)	02 (1.5)	0.324

Note: The values outside the brackets represent frequency of responding organisations and those within the brackets (in bold) represents the percentages. Multiple responses were allowed in the questionnaire.

Table 8 also shows responsibility for EMS implementation with respect to industrial sector and ownership. The chi square values suggest that only in the case of business ownership, the facility managers' role was found to be significant when implementing the EMS programs. Some of the other individuals or groups

identified in the survey as having the responsibility for EMS adoption included environmental committees, senior management team, operations director and even the general manager in one instance.

Costs and Savings Associated with EMS Implementation

EMS development and implementation costs (including buying of new equipment, software), auditors fees, surveillance audit fees and expenses for training employees are some of the costs associated with the EMS adoption and certification. These costs form one of the major criticisms of the standard (see Table 9). Survey responses showed that about one-third (32.57%) of the sample spent between \$20,000-\$50,000 to implement EMS within their respective organisations. About the same percentage of the surveyed organisations had spent between \$5,000-\$10,000 (15.15%) and \$10,000-\$20,000 (16.66%). Nonetheless the size of the organisation and maturity of the existing system influence these costs directly and managers should thus take this into consideration.

Table 9: EMS Development Costs

EMS Development Cost (\$)	Industry Sector		Business Ownership		Total Frequency
	Manufac.	Non-Manufac.	Australasian	Foreign	
0 – 1,000	01 (0.75)	0	0	01 (0.75)	01 (0.75)
1,000 – 5,000	01 (0.75)	64 (48.48)	04 (3.03)	01 (0.75)	05 (3.78)
5,000 – 10,000	13 (9.84)	07 (5.30)	10 (7.57)	10 (7.57)	20 (15.15)
10,000 – 20,000	15 (11.36)	07 (5.30)	14 (10.60)	08 (6.06)	22 (16.66)
20,000 – 50,000	25 (18.39)	18 (13.63)	26 (19.69)	17 (12.87)	43 (32.57)
50,000 – 100,000	09 (6.81)	08 (6.06)	10 (7.57)	07 (5.30)	17 (12.87)
Over 100,000	08 (6.06)	09 (6.81)	11 (8.33)	06 (4.54)	17 (12.87)
Other	02 (1.5)	0	02 (1.5)	0	02 (1.5)
Chi Square sig. value	0.379		0.685		

Note: The values outside the brackets represent frequency of responding organisations and those within the brackets (in bold) represents the percentages.

When responding to the economic returns or savings (see Table 10) experienced following the implementation and/or certification to EMS, many respondents indicated that benefits such as improved corporate image, better workplace environment and increase in employees morale, were intangible and thus difficult to be quantified by giving a dollar value. The respondents also highlighted that due to the recent release of the EMS standard and adoption of the EMS in majority of the organisations, full benefits were yet to be realised by them. Nearly one-quarter (22.72%) of the sampled organisations had experienced tangible benefits or costs savings from EMS implementation of between \$5,000-\$20,000. A similar proportion of the sample (22.72%) reported savings of between \$20,000-\$100,000 and about 21.21% reported savings of less than \$5,000 from their EMS implementation.

Table10: Savings Resulting from EMS Adoption

Economic Savings (\$)	Industry Sector		Business Ownership		Total Frequency
	Manufac.	Non-Manufac.	Australasian	Foreign	
0 – 5,000	15 (11.36)	13 (9.84)	17 (12.87)	11 (8.33)	28 (21.21)
5,000 – 20,000	20 (15.15)	10 (7.57)	15 (11.36)	15 (11.36)	30 (22.72)
20,000 – 100,000	18 (13.63)	02 (1.5)	16 (12.12)	14 (10.60)	30 (22.72)
100,000 – 500,000	04 (3.03)	05 (3.78)	06 (4.54)	03 (2.27)	09 (6.81)
500,000 – 1,000,000	02 (1.5)	03 (2.27)	03 (2.27)	02 (1.5)	05 (3.78)
Over 1,000,000	06 (4.54)	0	03 (2.27)	03 (2.27)	06 (4.54)
Other	03 (2.27)	04 (3.03)	06 (4.54)	01 (0.75)	07 (5.30)
Chi Square sig. value	0.273		0.709		

Note: The values outside the brackets represent frequency of responding organisations and those within the brackets (in bold) represents the percentages.

Benefits Expected and Achieved from EMS

The reason for the adoption of a system or standard by an organisation possibly cannot be segregated from any advantages or benefits anticipated from its implementation and practice. Organisations expect both quantifiable and un-quantifiable benefits from EMS implementation and certification. The questionnaire respondents were thus asked to reflect back on the various benefits expected (before the EMS adoption) and actually procured by them (following the EMS implementation). These benefits could voluntarily drive the organisations or pressure them, depending on the nature of their business and stakeholders, to implement new systems and standards. Respondents were asked to rate each benefit listed in the questionnaire on a five point Likert scale where 1 = 'not at all' and 5 = 'to a very large extent'. From the responses obtained, the means and standard deviation were calculated and the results are presented in Table 11.

Table 11: Benefits Resulting from EMS Adoption

Benefit	Benefits Expected			Benefits Achieved		
	N statistic	Mean statistic	Std. deviation	N statistic	Mean statistic	Std. deviation
Waste reduction	127	2.86	1.00	130	2.83	1.06
Cost savings from waste reduction/disposal	131	2.63	1.10	128	2.54	1.07
Protection from prosecutions, fines and legal fees	131	3.02	1.33	125	3.20	4.83
Reduction in clean up costs	129	2.15	1.09	123	2.15	1.11
Establish and monitor cleaner production / eco-efficiency	130	3.05	1.12	127	2.91	0.99
Leniency in international trade barriers	130	1.26	0.71	125	1.18	0.51
Reduction in org. risks (health, safety (envi.))	132	3.92	0.85	130	3.99	3.62
Decrease in insurance costs	128	1.78	1.06	124	1.69	1.24
Compliance to legislation	132	3.95	1.19	131	3.78	1.05
Market and competitive advantage	130	3.02	1.34	127	2.57	1.28
Fulfilling of customer expectation	131	2.78	1.32	127	2.73	1.29
Good-will from the customers and community	132	3.23	1.10	129	2.98	1.11
Morale building within the org.	132	3.02	1.05	131	2.95	1.07

Means based on five point Likert scale, where 1= not at all and 5= to a very large extent.

Once EMS was implemented, the organisations did seem to enjoy both tangible and in-tangible benefits. Depending on the size of the site/organisation certified and maturity of the existing system, organisations in general saved between \$5,000 to \$100,000. Many respondents also commented in the questionnaire that since the EMS was recently implemented, the full benefits were yet to be realised.

Generally, it was found that the level of benefits expected was slightly higher than that actually achieved. Only for two of the benefits listed, namely 'protection from prosecutions, fines and legal fees' (mean 3.20) and 'reduction in organisational risks (health, safety and environment)' (mean 3.99), the actual benefits were higher than expected. The two above-mentioned benefits in addition to the 'compliance to legislation' (mean 3.78) were rated as the top three benefits identified by respondents. Other main benefits expected by the organisations included: 'goodwill from customers and community' (mean 3.23), 'establishment and monitoring of cleaner production/eco-efficiency targets' (mean 3.05), and 'morale building within the organisation' (mean 3.02). These benefits are nevertheless interrelated with one another, for instance 'good-will from the customers and community' and 'protection from prosecution, fines and legal fees' could be

achieved only if organisations monitor their waste disposal and discharge levels regularly. Also by using new, innovative methodologies and technologies to further improve their disposal and discharge levels, organisations would not only be compliant to the legal requirements, additionally would also improve their image with their stakeholders, including their community, as being ‘environmentally friendly’.

The results also show that except for the ‘establishment and monitoring of cleaner production/eco-efficiency targets’, all the other benefits expected by organisations were primarily achieved by them. The results also shows that responding organisations experienced increased level of ‘protection from prosecutions, fines and legal fees’ following the EMS implementation, as compared to ‘market and competitive advantage’ and ‘good-will from the customers and community’ which failed to fulfil their expectation from the EMS implementation. ‘Decrease in insurance costs’ and ‘leniency in international trade barriers’ were the two benefits least expected and achieved by the sampled organisations from the EMS adoption. This could be because to date not all insurance companies give extra credit for implementing environmental technologies or taking proactive measures. However, the safeguard taken by organisations does make them less hazardous for having accidents and also provides them due-diligence.

None of the benefits achieved were found to be significant with respect to business ownership and industry sector and only three expected benefits had some significant value. These are:

- Waste reduction (for all sectors and ownership types)
- Cost savings from waste reduction/disposal (for all sectors and ownership types)
- Establishment and monitoring of cleaner production /eco-efficiency (for all ownership types).

The respondents also seemed to have gained reduction in organisational risks, involving health, safety and environmental and compliance with legislation as their two main benefits (see Table 11). Due to the closeness of the aspects and impacts, achieving of both environmental and health and safety benefits is not surprising. The findings also revealed that as opposed to the common notion/perception decrease in insurance costs and leniency in international trade barriers were the two benefits least experienced by the respondents. The reasons for this are unclear, though one reason could be that many organisations consider ISO 14001 as a minimal environmental system in place as compared to other systems such as Eco-Management Audit Scheme (EMAS) or Responsible Care.

Impediments Expected and Experienced

[Note: Organisations use the words impediments, obstacles, barriers and problems interchangeably; similarly they would also be used interchangeably during this discussion.]

The acceptance and uptake of any system within an organisation is dependent upon the support it receives both from internal and external stakeholders. As no process is without challenges or obstacles, the survey accordingly asked respondents to identify the expected and actual impediments experienced during EMS process. Respondents were asked to rate each listed impediment on a five point Likert scale where 1 = ‘not at all’ and 5 = ‘to a very large extent’. From the responses obtained, the mean value and standard deviation were calculated and the results are presented in Table 12.

Table 12: Impediments Expected and Experienced during EMS Adoption Process

Impediment	During Planning			During Implementation		
	N statistic	Mean statistic	Std. deviation	N statistic	Mean statistic	Std. deviation
Documentation (costs, time for preparation)	131	2.98	0.99	131	3.14	1.07
External auditors/consultants costs	130	2.80	1.08	130	2.79	1.22
Training of employees	132	2.75	0.93	131	2.73	1.00
Internal audit costs	130	2.48	1.02	129	2.66	2.09
Communicating envi. issues to contractors	130	2.32	0.97	130	2.63	2.04
Training of contractors	131	2.47	1.01	130	2.58	1.13
Resistance from the employees due to changes in operating procedures	132	2.52	1.02	131	2.34	1.08
Internal audit costs	130	2.48	1.02			
Time lost by employees	130	2.44	0.87	129	2.42	1.01
Communicating envi. issues to contractors	130	2.32	0.97			
Resistance from the employees	131	2.25	0.97	130	2.19	1.06
Resistance from the suppliers due to lack of information regarding EMS	128	1.68	0.83	128	1.73	0.92
Disclosure of confidential information to a third party	131	1.69	0.90	130	1.67	1.15

Means based on five point Likert scale, where 1= not at all and 5= to a very large extent.

No benefit is without costs, and the costs/ impediments (see Table 12) attached with the EMS implementation and certification, as reported by the respondents related to costs and time. Organisations had spent resources (both dollars and time) initially to train their personnel and suppliers in a few instances in the new system. Once the system was put in place, resources were then spent to conduct full third party audit (which also included external auditors fees) and surveillance audits twice a year to comply with the standard requirements. These costs also surfaced in the literature as one of the barriers, especially to EMS certification. The expected cost involved and the time needed to prepare documentation was rated highly by the respondents with a mean score of 2.98. However, the actual cost and time needed to prepare documentation was found to be higher than expected with a mean of 3.14.

Cost relating to conducting internal audits and external audits were also identified as impediments. Audits are a mandatory requirement of ISO 14001 certification with surveillance audits required twice a year and re-certification by a third party required every three years. 'Resistance from suppliers' due to lack of information regarding EMS and 'disclosure of confidential information to a third party' were not very highly rated as impediments by the respondents. Other impediments identified related to training of employees (expected mean 2.75 and actual mean 2.73) and resistance from employees due to changes in operating procedures (expected mean 2.52 and actual mean 2.34). Communicating environmental issues to contractors (actual mean 2.63) and their training (actual mean 2.58) were also identified as challenges by the organisations.

Table 12 also shows that the least concern for organisations with EMS process is the commonly perceived reason, i.e. disclosure of organisations confidential information to a third party. The general view accompanied with organisations documentation is that once they become public, they could be used against the organisation itself. However, by taking adequate legal measures, this fear could be addressed. The organisation's also did not seem to have much reluctance from majority of their suppliers to conform to their

EMS requirements. This could be due to both increased awareness within the suppliers and pressure (from the customers, legal requirements) of the EMS. As indicated by the questionnaire respondents, absence of any noticeable resistance from the suppliers during their customer organisations EMS planning stages can be argued on the fact that by this stage, neither of the parties are sure of the final outcome and hence any resistance from suppliers side would only result in conflict. The suppliers thus prefer to adopt the ‘wait and see’ approach before making any final decision or taking any action.

Measures to Overcome Impediments

Table 13 shows the mean and standard deviations for the measures taken by respondents in overcoming impediments during the planning and implementation stages. Responses were given on a five-point Likert where 1 = ‘not at all’ and 5 = ‘to a very large extent’. It is interesting to note that the mean value calculated for all six measures undertaken is significantly higher during implementation than during the planning stage. This is particularly the case for measures undertaken to overcome impediments relating to employees. For example, ‘communicating EMS aims, objectives and benefits to employees’ became considerably more important with the mean value increasing from 3.40 during planning to 3.62 during implementation. Similarly, the mean increased from 3.24 to 3.59 for ‘training of employees’.

Table 13: Measures Undertaken to Overcome EMS Impediments

Measures Undertaken	During Planning			During Implementation		
	N statistic	Mean statistic	Std. deviation	N statistic	Mean statistic	Std. deviation
Communicating EMS aims, objectives and benefits to employees	128	3.40	1.02	129	3.62	0.99
Training of employees	127	3.24	1.04	128	3.59	0.98
Taking suggestions and feedback from the employees	127	3.20	1.05	127	3.43	1.07
Communicating EMS aims, objectives and benefits to the suppliers	125	2.06	1.37	125	2.14	1.18
Face-to-face meeting with the suppliers	125	1.84	0.95	125	1.92	1.01
Taking suggestion and feedback from suppliers	124	1.72	0.86	124	1.81	0.94

Means based on five point Likert scale, where 1= not at all and 5= to a very large extent.

The higher mean values of the methods to address impediments during implementation than during planning is not arguable. As changes in operating system are made during the implementation stage, the expertise and knowledge of employees is used in strategic decision-making, paperwork and negotiations during the planning stages. Nonetheless communicating EMS aims, objectives and benefits along with relevant training of employees for better understanding of EMS process were the first steps undertaken by organisations to reduce resistance even during the planning stage, followed by feedback from their employees on the overall process.

Face-to-face communication with the suppliers to inform them of the EMS aims, objectives and benefits accompanied by EMS, in addition to taking suggestions and feedback from them were the methods used by the respondents to overcome obstacles encountered with their suppliers.

SUMMARY

The survey results provide an overview of the status of EMS/ISO 14001 adoption within Australasian organisations. Not pertaining to any industrial sector, the survey attempted to identify practice or trends within the organisations with respect to EMS adoption and certification.

The results show that the manufacturing sector is leading the service sector in both the implementation and certification of ISO 14001. The standard itself along with the external consultants are the two main sources used by organisations for gaining information about the EMS. The least used source identified was the suppliers. It was surprising to find that none of the organisations learnt about the EMS from the media, a source, which is the first one to report environmental accidents and disasters. This reflects that media needs to become more proactive in its approach towards communicating the message of becoming environmentally friendly and green. It thus needs to form strategic alliances with industry association or organisations themselves in both educating them on environmental issues and further communicating possible solutions identified from other parts of the world.

The results also found that organisations generally preferred to obtain third-party certification with the standard(s) than to simply implement these. This preference could be attributed to the perceived stakeholder benefits. From the organisations' viewpoint, EMS related tangible and intangible benefits could only be achieved by obtaining certification by a third party. Nonetheless the literature also shows that some organisations believe that the costs of certification outweighed its benefits and hence only their implementation is suffix. Also, especially in the case of the SMEs, the resources (time, human, dollars) required for maintenance and periodic auditing of systems was found to be much higher than the benefits achieved from certification and thus organisations only prefer to implement the systems.

Responses from the survey also showed that as the plans, programs and changes were being implemented the responsibility of overseeing the processes and operations took a bottom-up approach, with the employees dominating the process. The external sources in many instances also assisted the organisations in identifying the improvement areas. The reasons for this is unclear, however can be due to the 'outside/fresh' outlook which the external sources can provide. Not being a part of the organisation, the external sources, for example the consultants, are able to holistically look at the organisation's system and discuss their findings both from the 'adviser' and 'devils advocate' perspective, depending on the nature of the task that they are hired for. However middle managers and in many instances the top managers of the organisation had the responsibility of reviewing the internal audit results and progress of the various programs being implemented. This could be attributed to the growing penalties in case of an accident both to the organisations, its top management and the individual responsible. Another reason could be that top management's commitment, leadership, vision and motivation is required to successfully implement and maintain any system, including the EMS.

'Improving corporate image', or being seen as a good corporate citizen is the main reason why EMS is implemented by organisations. However, making improvements to internal processes and complying with regulatory requirements are also significant drivers for many organisations to implement EMS. Reduction/removal of 'international trade barriers' and 'pressure from suppliers' were not identified as important reasons for EMS adoption.

Achievement of benefits from EMS implementation could lead to improved reputation for the organisation, resulting in increased market share; thus directly relating to the main reason for EMS adoption. 'Leniency in international trade barriers' and 'decrease in insurance costs' were the two benefits least expected and achieved by the respondents.

As evident from the findings, most of the impediments when implementing EMS were associated with spending of dollars on updating or changing systems, training, auditors fees, etc. 'Resistance from suppliers due to lack of information regarding EMS' and 'disclosure of confidential information to a third party' were the two impediments least expected and experienced by the respondents. Training and communication are the two methods generally practiced by the organisations to address the impediments encountered during the EMS implementation. These methods were similarly used in case of both the employees and suppliers.

The findings can be briefly summarised in the following points:

- The majority of the organisations having EMS in place had used the ISO 14000 standard itself to gain information about EMS.
- Employees and in-house consultants are the main source for identifying potential improvement areas.
- The main reason for EMS adoption was to obtain an improved corporate image.
- Compliance to legislation and reduction in organisational risks (health, safety and environmental) were the two main benefits expected and achieved by organisations.
- One of the major impediments associated with ISO 14001 was the high dollar costs associated with actual implementation and external auditors fees.

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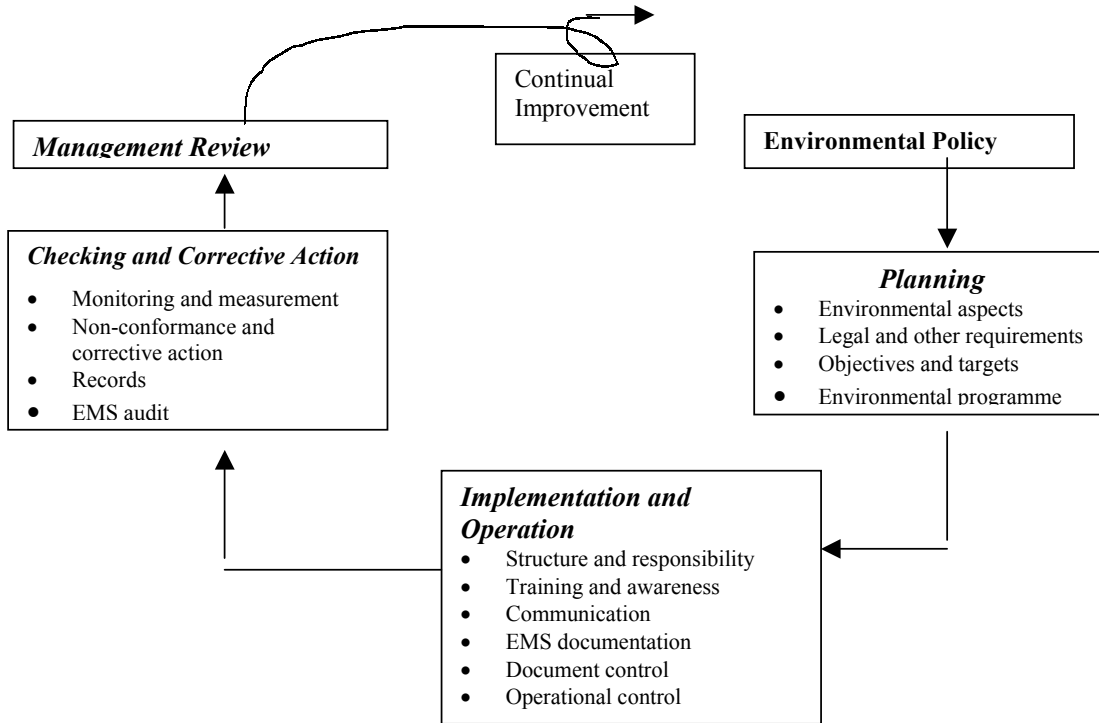
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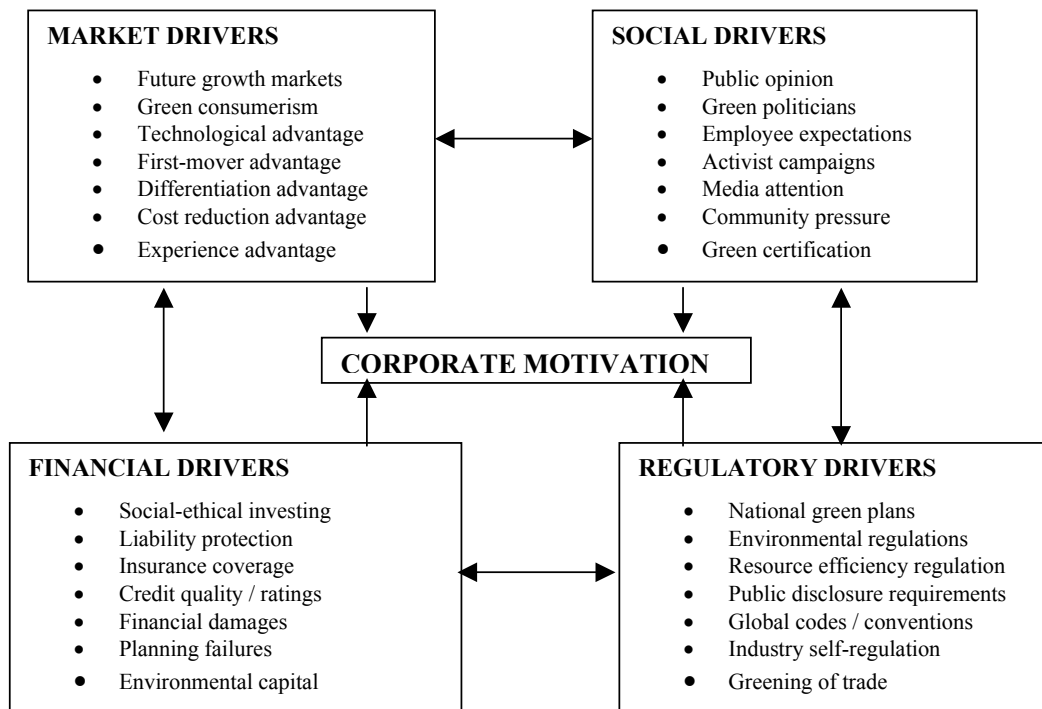
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Figure 1: The Five Elements of ISO 14001



(AS/NZS, 1996, p. vi and Sadgrone, 1997, p.174)

Figure 2: Drivers for Sustainable Development



(Bansal and Howard, 1997, p.222)

APPENDIX 1: BENEFITS FROM EMS IMPLEMENTATION

Table 1: Benefits from EMS Implementation and Certification

No.	Benefit from EMS	Researchers
1	<p>Cost reduction and thus savings, as the money spent on implementing an EMS results in waste (for instance in water, electricity, raw materials,) and liabilities reduction including minimisation or prevention of pollution. This was supported by Jeff Dowson, environmental standard auditor at SGS (Camberley, UK – Scott, 1999, p.83). US postal service is a live example of this, who saved more than \$300,000 in 1996 (even before the formal release of ISO 14001) by replacing its exit lights with energy-efficient alternatives (Nolan, 1999, p.9). Formosa Plastics Corporation, also in US have saved more than \$750,000 resulting from the implementation in its environmental performance (Levy, 2000, p.16). The savings thus made can directly affect the organisations bottom-line.</p>	<p>Maxwell et al, 1997, p.118; Hanna et al, 2000, p.158; Nattrass and Altmore, 1999, p.170; Lally, 1998, p.515; Fielding, 1998, p.27; Thornton, 2000, p.108; Scheck, 1998, p. 46; Sadgrone, 1992, p.10; Chandrashekar, Douglas, and Avery, 1999, p.124; Chattopadhyay, 1999, p.196; Canning, 1999; Koechlin and Muller, 1993, p.34; Nolan, 1999, p.9; Beamon, 1999, p.337; Quazi, 1999, p.306; Darnall et al., 2000, p.3; Steger, 2000, p.23; Hogarth, 1999, p.124; Hasek, 1998, p.42; Cochran, 1999, p.35; Rondinelli and Berry, 2000, p.74; Kuhre, 1995, p.15; Wilson, 2000a, p.33; Anonymous, 2000, p.1; Stenzen, 2000, p.273; Briggs, Nestel, Westons, 1996, p.3., p.1; Shin and Chen, 2000, p.80; Proto and Supino, 2000, p.S769; Ahmed, Montagno and Firenze, 1998, p.60</p>
2	<p>The above benefits can be linked with waste reduction, however in this case due to improved processes and use of better methods and technologies, once again leading to cost saving for organisations as waste could “cost more than 20 times its disposal costs” (Mortimer, 2000, p.44). Reduced waste is furthermore beneficial for the ecological environment. The benefits from improved technologies was found by Marinova and Altham (2000) in their case study research of 26 companies in Western Australia.</p>	<p>Hanna et al, 2000, p.158; Nattrass and Altmore, 1999, p.170; Hemenway, 1995, p.5; Chattopadhyay, 1999, p.196; Hasek, 1998, p.42; Haugan, 1999, p.S4; Cochram, 1999, p.35; Chandrashekar, Douglass and Avery, 1999, p.139; Rondinelli and Berry, 2000, p.74; Paul, 1995; Moretz, 2000, p.84; Zingale and Himes, 1999, p.34; Briggs, Nestel and Weston, 1996, p.3; McManua, Pirnie and Shelley, 1996, p.143; Proto and Supino, 2000, p.S769</p>
3	<p>Improvement and reduction in operational process, (many a times leading to continual improvement) including identification of environmental aspects and impacts, resulting in increased efficiency and effectiveness of the system, in addition to better quality with little or no waste. ‘Continuous improvement’ is required for setting up of new goals and targets after completing the old ones.</p>	<p>Maxwell et al, 1997, p.118; Hanna et al, 2000, p.158; Sissell, 1998, p.46; Hillary, 2000, p.53; Schaarsmith, 2000, p.12; Canning, 1999; Koechlin and Muller, 1993, p.34; Welford and Gouldson, 1993, p.11; Wilson, 1997, p.38; Hillary, 2000, p.53; Beamon, 1999, p.337; Haugan, 1999, p.S4; Darnall et. al, 2000, p.8; Rondinelli and Berry, 2000, p.74; Clements, 1996, p.25; Wilson, 2000a, p.33; Schiffman et al, 1997, p.41; Zingale and Himes, 1999, p.34; Noeke, 2001, p.242; Fielding, 2000, p.141</p>
4	<p>According to Elf Atochem’s Associate Director/EHS, Dick Pastor (Sissell, 1998, p.46) the above benefit, that is improvements in organisational processes directly motivates the employees to find new ways to further increase efficiency and effectiveness of the process and completing</p>	<p>Hanna et al, 2000, p.158; Sissell, 1998, p.46; Hillary, 2000, p.53; Koechlin and Muller, 1993, p.161; Welford and Gouldson, 1993, p.11; Wilson, 1997, p.38; Hemenway, 1995, p.5; Chin and Pun, 1999; Hogarth, 1999, p.123; Hillary, 2000, p.53; Sissell, 1998, p.46; Russo and Fouts, 1997, p.539; Rondinelli and Berry, 2000, p.74;</p>

	company targets and deadlines in addition to attracting potential employees. A survey of 403 senior executives globally in 1991 found that about 68% agreed that “organisations with a poor environmental record will find it increasingly difficult to recruit and retain high calibre staff” (Russo and Fouts, 1997, p.539).	West and Manta, 1996, p.554; Schiffman et al, 1997, p.41; Cumming, 1997, p.21; Noeke, 2001, p.242
5	ISO 14000 requires a common terminology , which improves the communication of goals, procedures, impacts and solutions within the organisation. Improved communications can mean greater efficiency in decision-making. For example, the severity of an environmental impact can increase with time, so an efficient notification system can reduce the time it takes to respond, and thus the impact, risk and liability to the organisation. EMS implementation has also shown to improve communication between different levels of the organisational members, including between the employees, regardless of the type of employment (part-full time or contract or casual), they hold. This also contributed towards reduction in employee health insurance costs (McManus, Pirmie and Shelley, 1996, p.144).	Harding, 1999; Ruddell and Stevens, 1998, p.24; Wilson, 1997, p.38; Sissell, 2000, p. 42; Clements, 1996, p. 26; Thornton, 2000, p.108; Zingale and Himes, 1999, p.34; Fielding, 2000, p.141
6	Hanna et al, (2000) highlights ‘improved process safety ’ as another benefit associated with EMS implementation due to improved company operations and usage of improved, better, safer technologies. The improved workplace safety condition and decrease in incidents and accidents (of the employees and on-site third parties) can also be contributed due to writing of the safety and emergency procedures, as a requirement for the ISO 14000 implementation and certification.	Thornton, 2000, p.109; Sadgrone, 1992, p.10; Darnall et al, 2000, p.3; Nolan, 1999, p.9; Schaarsmith, 2000, p.12; Beamon, 1999, p.337; Hogarth, 1999, p.123; Sissell, 2000, p.42; Darnall et. al, 2000, p.3; Clements, 1996, p.27; Kuhre, 1995, p.16; Moretz, 2000, p.85; Schiffman et al, 1997, p.41
7	Increased customer satisfaction , is both a tangible and intangible benefit enjoyed by companies who have implemented EMS. This is because customers now perceive the organisation to be environment friendly by producing and dumping less waste. This can result in increased sales for the company, along with other benefits such as increased market share and profits.	Hanna et al, 2000, p.158; Quazi, 1999, p.306; Lally, 1998, p.515; Hillary, 2000, p.53; Ruddell and Stevens, 1998, p.24; Haugan, 1999, p.S4; Hasbach, 1998, p.64; Rondinelli and Berry, 2000, p.74; Sissell, 2000, p.42; Darnall et al, 2000, p.3; McIntyre et al, 1998, p.150; Russo and Fouts, 1997, p.539; Clements, 1996, p.24; West and Manta, 1996, p.51; Paul, 1995; Kuhre, 1995, p.17; Schiffman et al, 1997, p.41; Wilson, 2000a, p.33; Sadgrone, 1992, p.10; Darnall et al, 2000, p.3
8	An intangible and in some instances an indirect advantage of EMS is the improved relations with community , shareholders and other stakeholders.	Hanna et al, 2000, p. 158; Nattrass and Altmore, 1999, p.170; Lally, 1998, p.515; Fielding, 1998, p.27; Sadgrone, 1992, p.10; Forte and Lamont, 1998, p.89; Hemenway, 1995, p.5; Chattopadhyay, 1999, p.196; Welford and Gouldson, 1993, p.11; Rondinelli and Berry,

		2000, p.74; Hillary, 2000, p.53; Sissell, 1998, p.46; Quazi, 1999, p.307; Jackson and Monclani, 1998, p.29; Hasbash, 1998, p.64; Haugan, 1999, p.54; Clements, 1996, p.27; West and Manta, 1996, p.51; Begley, 1996, p.298A; Schiffman et al, 1997, p.41; Moretz, 2000, p.83; Wilson, 2000a, p.33; Zingale and Himes, 1999, p.34; Noeke, 2001, p.242
9	Improved corporate image due to the perception of the concern for the ecological environment, as a part of doing business, not only making profits.	Maxwell et al, 1997, p.118; Hanna et al, 2000, p.158; Quazi, 1999; Natrass and Altmore, 1999, p.170; Fielding, 1998, p.27; Hillary, 2000, p.53; Sadgrone, 1992, p.10; Chandrashekar, Douglas, and Avery, 1999, p.126; Chin and Pun, 1999; Wilson, 1997, p.38; Boiral, 1998, p.38; Ruddell and Stevens, 1998, p.19; Nolan, 1999, p.9; Wilks, 1999, p.42; McIntyre et al, 1998, p.150; Quazi, 1999, p.307; Haugan, 1999, p.54; Darnall et al, 2000, p.6; Hillary, 2000, p.53; Paul, 1995; Kuhre, 1995, p.16; Stenzen, 2000, p.270; Anonymous, 2000, p.1; Cumming, 1997, p.21; Cascio and Hale, 1998, p.4; Hammerschmid and Uliana, 1998, p.5
10	National and international regulations and compliance with laws sometimes may pressure organisations to adopt EMS. However, once a part of the system, EMS can act as a tool and assist organisations to remain in compliance with regulations, providing both due-diligence and removing trade barriers (since systems such as ISO 14000 are accepted internationally). Additionally compliance with a standard would also reduce the possible numbers of audits for an organisation from its customers, suppliers, regulators or registrars.	Hanna et al, 2000, p.158; Quazi, 1999; Rezaee and Elam, 2000, p.64; Natrass and Altmore, 1999, p.170; Lally, 1998, p.517; Murray, 1999, p.40; Kirschner, 1995, p.13; Hillary, 2000, p.53; Ruddell and Stevens, 1998, p.24; Sadgrone, 1992, p.10; Darnall et al, 2000, p.3; Forte and Lamont, 1998, p.89; Nolan, 1999, p.9; Chin and Pun, 1999; Wilson, 1997, p.38; Hemenway, 1995, p.5; Chattopadhyay, 1999, p.196; Boiral and Sala, 1998, p.58; Welford and Gouldson, 1993, p.11; Rondinelli and Berry, 2000, p.74; Jackson and Mondani, 1998, p.29; Nolan, 1999, p.9; Quazi, 1999, p.307; Wilks, 1999, p.52; Hogarth, 1999, p.123; Cochran, 1999, p.35; Steger, 2000, p.2327; Darnall et al, 2000, p.3; Hillary, 2000, p.53; Clements, 1996, p.24; West and Manta, 1996, p.51; Kuhre, 1995, p.18; Schiffman et al, 1997, p.41; Stenzen, 2000, p.264; Wilson, 2000a, p.33; Munn, 1998, p.1; Boiral, 1998, p.37; Rezaee, 2000, p.58
11	Attracting financial investment companies and reducing insurance premiums can also prove as an attractive point of EMS, as the financial investors and lenders are more satisfied and sure when investing in an organisation having EMS. This can be supported from the results obtained from ICF Kaiser International study done to show the relationship between the companies (public) environmental practices and stockholder relationship. The study revealed, “when public companies improve their environmental practices, they are able to increase shareholder wealth by up to 5%.	Quazi, 1999; Rezaee and Elam, 2000, p.64; Lally, 1998, p.517; Sadgrone, 1992, p.10; Welford and Gouldson, 1993, p.10; Hemenway, 1995, p.5; Rondinelli and Berry, 2000, p.74; Hassle and Lidsle, 1998, p.66; Jackson and Mondani, 1998, p.29; Nolan, 1999, p.9; Quazi, 1999, p.307; Clements, 1996, p.24; Stenzen, 2000, p.272; Anonymous, 2000, p.1; Cascio and Hale, 1998, p.4; Hammerschmid and Uliana, 1998, p.5

	[Furthermore the study also showed that when] the environmental risks were reduced, the company becomes a more attractive investment to potential and current stockholders” (Harding, 1999, p.3). However a recent survey in UK done by Business in the Environment (BiE) showed that financial institutions themselves are not getting / adopting EMS or other system to “manage their own environmental impacts” (Anonymous, 1996/97, p. 6).	
12	EMS in addition to the above attractions, in some cases has also provided a competitive or market edge to the companies, assisting them in winning tenders and projects that otherwise they may not have got. Additionally it may also assist companies to do business in European and some Asian countries which require ISO 14001 certification.	Thornton, 2000, p.109; Hillary, 2000, p.53; Wilson, Aug. 2000, p. 33; Moretz, 2000, p.83; Schiffman et al, 1997, p 41
13	Development of greener products or processes, has also benefited the organisations and their businesses, in getting a higher market share, as in some cases, it became their ‘selling point’. This was reflected in research done by Russo and Fouts (1997), of approximately 243 firms over a period of two years (1991-92) to find out the relationship (if any) between the ‘environmental and economic performance’ of an organisation.	Sadgrone, 1992, p.10; Berry and Rondinelli, 1998, p.43; Briggs, Nestel and Weston, 1996, p.3
14	Updating and maintenance of current, legitimate documents detailing all the policies and procedures, an area overlooked by most of the organisations, due to the amount of resources used by the regular checking, review and updating of the documents, has improved by coming of the EMS. This is because a prerequisite for EMS, is complete documentation and paperwork of each and every process, operation and anything to do with the business. This also forces the organisations to keep themselves informed of the various legal issues, in addition to environmental aspects and impacts.	Hillary, 2000, p.53; Cumming, 1997, p.21
15	With the trend of suppliers certification, as the companies no longer want to work with suppliers using environmentally unfriendly raw materials or processes, has in few cases in fact resulted in better and faster distribution and relationship of the organisation with its retailers and customers. Consequently a company who is a supplier of goods and services can assure minimum standard requirements to their customers by	Sadgrone, 1992, p.10; Nolan, 1999, p.9; Hammerschmid and Uliana, 1998, p.5

	having EMS in place.	
16	Literature has suggested that companies having a working EMS in place would also result in better recruitment of employees , as it would attract the best of the potential human resource.	Forte and Lamont, 1998, p.89; Sadgrone, 1992, p.11
17	Gain benefits from cleaner production methods implementation and practice that provides a competitive edge to business by bringing economic, personal and environmental benefits.	Carbon, 1995
18	Adoption of ISO 14001 makes organisations follow suit with the 'continuous improvement' element of the standard making them innovative and creative to find cost effective solutions.	Shin and Chen, 2000, p.81

APPENDIX 2: IMPEDIMENTS ACCOMPANIED WITH EMS IMPLEMENTATION

Table 2: Challenges/Impediments/ Obstacles Encountered as a Part of EMS Implementation

No.	Challenges/Impediments/Obstacles	Researchers
1	ISO 14000 implementation and certification could be a tedious and expensive process (since the cost of certification with ISO 14000 could be upto 30% higher than ISO 9000). Cost and constraints are dictated by the implementation of the standard and the certification process. Costs are generated by the auditors work, the time required for documentation, and efforts to comply with specifications areas such as training and communication. According to some managers, these expenses will not necessarily mean less pollution, a better corporate image, or new contact.	Schiffman et al, 1997, p.41; Chalfant, 2000, p.65; Stenzen, 2000, p.273; Florida, 1996, p.22; Dufresne, 2000, p.1; Cascio and Hale, 1998, p.1; Post and Altman, 1994, p.69
2	Especially in the case of SME's , who lack adequate resources to continuously update themselves with the new rules and regulations, even unintentional non-compliance could be very expensive. This is because according to the law businesses have the duty to “find out what regulations apply to their industry and comply with them” (Shi and Kane, 1996, p.70). Also going through EMS process could be costly (as installation of energy efficient equipment, recycling steps may be required which involve spending of dollars) and time consuming for SME's. Moreover many companies are still not fully convinced of the benefits resulting from going through the EMS implementation process and making any investments in this area. Montabon et al (2000, p. 6) citing Hamner (1996) comments that the “real test of the standards can be measured by adoption rates among [SME's] which typically need the most direction in these issues”.	Shi and Kane, 1996, p.70; Levy, 2000, p.16; Mortimer, 2000, p.44; Epstein and Roy, 2000, p.39; Montabon et al, 2000, p.6; Shaper and Raar, 2001, p.40; Arriaza, 1997, p.305; Ahmed, Montagro and Firenze, 1998, p.60.
3	Since companies set their own environmental objectives and targets , it is up to them to perform as much or as little as they wish to improve over a period of time, as the standard requires them to show ‘continuous improvement’, however does not specify any minimum levels. This many a times leads to the contradiction of distinguishing companies with different environmental performance levels, though all certified with ISO 14001.	Munn, 1998, p.4; Stenzen, 2000, p.284
4	Unlike other regulatory standards, ISO	Sissell, 1998, p.46

	14001 does not set ceilings or mandatory targets ; instead, in keeping with the ISO 9000 philosophy, it focuses on means. Nonetheless, if ISO is used as a tool to drive or measure compliance, many organisations are concerned that steadily the standard may become mandatory, as opposed to voluntary.	
5	The main source of resistance has to do with the potentially cumbersome red tape . The core of the standard consists of an extensively documented system; inevitably, preparing and updating the required documents implies a certain degree of bureaucracy – setting down impersonal, formal, written rules with which all employees are obliged to comply. This was similarly highlighted by Welford (1996) stating that internal political systems can greatly impact the organisations. These views are also supported by Cascio and Hale (1998, p.3) who comment that many organisations view ISO 14001 primarily “as a bureaucratic exercise requiring more paperwork and red tape without demonstrated payback”.	Welford, 1996; Cascio and Hale, 1998, p.3
6	Nowhere does ISO 14001 encourage corporations to promote employee involvement or consult workers on environmental issues – despite the fact that contemporary corporate management ... is moving toward individual empowerment and flexible structures that allow firms to secure employee commitment and profit from their workers intelligence.	Stenzen, 2000, p.283
7	The standard requires regular monitoring, review and documentation of organisations significant aspects and impact; however does not mandates the reporting of the findings . According to Pullin (1998, p. 28), restricting oneself to ISO 14001 guidelines and defined levels, sometimes “blocks the way for other routes that might deliver real performance improvements and sustainable industrial development”. This was also supported by Murray (1999, p. 49) according to whom the standard sets minimum level of compliance and performance and does not give any incentives for organisations that may outperform them.	Pullin, 1998, p.28; Murray, 1999, p.49
8	High implementation costs of the ISO 14001 system which may include consulting, training and registration fees in addition to annual auditors fees can act as	Hasek, 1998, p.44

	a barrier for organisations, when especially certifying with the standard. Suzan L. Jackson, Business Development Manager at Excel Partnership Incs. have similar views on high costs associated with the standard (Hasek, 1998, p. 44).	
9	The auditing process of the EMS tends to audit the system than the actual environmental performance levels and this has been a pitfall of the EMS. This becomes more of an important issue as the audit process and findings are dependent on the qualifications and integrity of the auditor.	Stenzen, 2000, p.285
10	In a few instances it has been found that documents , policies, procedures and performance levels as a part of EMS can be harmful for the organisations, as a government agency or a third party could support an alleged violation by using the same documents.	West and Manta, 1996, p.23
11	Some companies, including Maxwell Corporation of America have found the 'continuous improvement' element of the standard as difficult and challenging to fulfill over a period of time.	Quinn, 2000b, p.25
12	The standard does not lay foundations or models for organisations that may have mobile workforce , as in case of construction or sales sectors. Bears Construction Company, Atlanta, found this as a challenge when going through its EMS process as most of its employees were mobile and fluctuating (Quinn, 2000a, p.41). Similar concerns were also expressed by organisations who were the initiator of EMS / certification within their facilities of the company, as in the case of Ford, Lima Engine Plant in Lima, Ohio, (Moretz, 2000, p. 841).	Quinn, 2000a, p.41; Moretz, 2000, p.841
13	Literature and company case studies have highlighted the ambiguity of words or terms present in the standard to be confusing and their interpretation at the discretion of the reader or auditor or consultants.	Ritzert, 2000, p.68, 69; Wilson, 2000, p.33; Edur, 2000, p. 17;
14	Certification to EMS, even though labelling an organisation as 'green' or 'environmental friendly' in no way proves it to be 'clean' too. According to Thomas Ott, the Corporate manager for Environmental Safety and Industrial Hygiene (Motorola Corporation) and US Chairperson of ISO working group, "having a [ISO 14001] certification doesn't mean you have a clean company	Stenzen, 2000, p.285

	... The bad guys who pollute today will still do it, and they will have a certificate” (Stenzen, 2000, p. 285).	
15	Certification to ISO 14001 does not guarantee compliance with other environmental management standards also, such as EMAS, Responsible Care, CMA CARE Program, and others.	Stenzen, 2000, p.286