

## **CONFRONTING THE INEVITABLE: ISO 14001 IMPLEMENTATION AND THE DURBAN AUTOMOTIVE CLUSTER**

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### **ABSTRACT**

The aim of the article is to explore the complexities of the ISO 14001 implementation process, with the objective of identifying the barriers to its implementation, the factors that influence these barriers, and finding possible solutions to address these barriers. The theoretical basis of ISO 14001, the implementation process, and its strategic implications were established by reviewing previous research. Based on this theoretical review, a self-administered questionnaire was designed to serve as a measuring instrument for the empirical research conducted among members of the Durban Automotive Cluster (DAC). The specific objectives of the empirical study were: to determine the reasons for seeking ISO 14001 certification, to determine the perceived and experienced barriers to its implementation, and to investigate the strategic implications of an Environmental Management System (EMS) such as ISO 14001. Finally, the findings, recommendations, caveats, and suggestions for further research are summarised.

### **OPSOMMING**

Die oogmerk van hierdie artikel is om die kompleksiteit van die ISO 14001 implementeringsproses te ondersoek met die doel om die hindernisse wat implementering belemmer en die faktore wat hierdie hindernisse beïnvloed vas te stel, en moontlike oplossings te vind. Die teoretiese grondslag van ISO 14001, die implementeringsproses, en die strategiese implikasies is op 'n oorsig van bestaande navorsing gebaseer. Gegrand op hierdie teoretiese oorsig is 'n selfgeadministreerde vraelys opgestel om as metingsinstrument te dien vir die empiriese navorsing wat onder lede van die "Durban Automotive Cluster (DAC)" uitgevoer is. Die spesifieke doelstellings van die empiriese studie was: om die redes waarom ISO 14001 sertifisering nagestreef is te bepaal; om die persepsies van en werklike hindernisse ten opsigte van implementering te bepaal; en om die strategiese implikasies van 'n Omgewingsbestuursisteam soos ISO 14001 te ondersoek. Die bevindings, aanbevelings, tekortkominge, en voorstelle vir verdere navorsing word ten slotte in die artikel saamgevat.

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## 1. INTRODUCTION

The re-emergence of South Africa into the global automotive market after 1994 has had a major impact on domestically-based Original Equipment Manufacturers (OEMs) and their component suppliers. While South Africa's increased 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.

The notion of protecting the environment has been noticeable since the 1960s, but it only gained prominent international acknowledgement at the 1992 Earth Summit in Rio de Janeiro, when Agenda 21 was adopted. This document encouraged businesses to adopt codes that establish "best environmental practice" [1]. During this period, the establishment of the Strategic Action Group on the Environment (SAGE) by the International Organisation for Standardisation (ISO) in 1991 and the Eco-Management and Audit Scheme (EMAS) by the European Union in 1993, added additional prominence to efforts to establish an improved international standard for environmental management. In 1993 ISO formed the Technical Committee (ISO/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 [1].

A comprehensive set of ISO 14000 standards, guides, and reports was established. ISO 14001, a specific standard in the ISO 14000 series, can be regarded as the cornerstone 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 organisation can become certified. ISO 14001 can also be used as the starting point for organisations that use other environmental management tools developed by ISO/TC 207 [2].

QSI-Afrocare stated that the basic philosophy behind the ISO 14001 standard centred on the environmental management of all processes and activities, the management of the infrastructure addressing environmental issues, and the application of ISO 14001 to all industry and organisational sectors in a country [3].

In this article the complexities of the ISO 14001 implementation process are explored with the aim of gaining a better understanding of them. An overview of the implementation process and its strategic implications is provided in the literature review, while the empirical dimension of the research is based on a survey conducted among the members of the DAC, in which the objective was to determine:

1. The reasons for seeking ISO 14001.
2. The perceived and experienced barriers to its implementation.
3. The strategic implications of an Environmental Management System (EMS).

To end, the findings, summary, recommendation, caveats, and suggestions for further research are dealt with.

## 2. LITERATURE REVIEW

The literature review will address issues regarding the rationale for implementing ISO 14001 and its potential benefits, as well as the implementation process and its barriers. Some strategic issues and international trends will also be dealt with.

### 2.1 Reasons for implementing ISO 14001

According to South African research conducted by Keogh [4], the main reasons for implementing ISO 14001 were business conditions, public pressure, and government regulations. This was similar to findings in Europe that identified the main reasons as being increasing legal requirements, the desire for a competitive advantage, and the need to satisfy customer requirements [5]. Tibor and Feldman found that the implementation of an ISO 14001-compliant EMS and achieving third-party certification could become a *de facto* requirement for conducting business [6]. Yadav drew a similar conclusion, emphasizing the influence of customer demands with respect to environmentalism [7]. In this regard, the desire to satisfy customer requirements – the pressure from major customers to deal only with ISO 14001 certified companies – can be regarded as the major driving force behind the DAC's attempt to gain ISO 14001 certification. Murray found internationally that more and more companies were becoming certified to ISO 14001, as it has become a precondition for doing business [1]. Since the 1990s environmental regulations have begun to move away from the penalty-driven approach, towards incentive-driven voluntary self-regulation [4]. Care has to be taken not to lose sight of customer pressure when considering this observation.

### 2.2 Benefits of ISO 14001

While some critics may question the monetary advantages of gaining ISO 14001 certification, others claim that the potential benefits outweigh the cost in the long-term. Miles and Russell identified seven potential benefits of ISO 14001 certification, including the ability to increase price due to differentiation, to use certification as a barrier to entry for potential competitors, to enhance corporate image, to gain protection against claims of environmental negligence, to pre-empt government regulations, and to have opportunities to make an input on standards [8]. Sissell and Mullin regarded the most important value of ISO 14001 as its ability to promote better management controls and more clearly defined targets [9]. Cochran identified focus and discipline that could result in cost savings, as well as the provision of a systematic structure to comply with environmental regulations as the main advantages of ISO 14001 [10]. Morrison *et al* regarded the systematic structure of ISO 14001 as a platform for continuous improvement in organisations [11]. Curkovic *et al* listed factors such as improved environmental performance and management methods, and the gaining of competitive advantages, as some of the likely benefits [12]. Alberti *et al* identified two broad categories of benefits that could be achieved from an effective environmental management system such as ISO 14001: Economically Quantifiable Benefits, and Economically Non-Quantifiable Benefits [13], as shown in Table 1.

Economic	Non-economic
<ul style="list-style-type: none"> <li>• Raw materials savings</li> <li>• Energy savings</li> <li>• Improvement in production system availability</li> <li>• Reduction of rejects</li> <li>• Reduction of waste treatment costs</li> <li>• Rejects exploitation</li> <li>• Reduction of idle times</li> <li>• Public incentives</li> <li>• Health care</li> <li>• Insurance cost reduction</li> <li>• Increase in capacity</li> <li>• Decrease in some logistic costs</li> <li>• Increase in recourses usage efficiency</li> </ul>	<ul style="list-style-type: none"> <li>• Company image</li> <li>• Liability and risk reduction</li> <li>• Market opportunities</li> <li>• Reduction of contamination risk</li> <li>• Better knowledge of job and production system</li> <li>• Product image towards customers</li> <li>• Relationship with authorities</li> <li>• Reduction of human risk</li> <li>• Flexibility of management system</li> <li>• Pro-active attitude to the environmental question</li> <li>• Compatibility with ISO 9000 and ISO 14000</li> </ul>

**Table 1: Economic and non-economic benefits of EMS**

Source: Alberti [13]

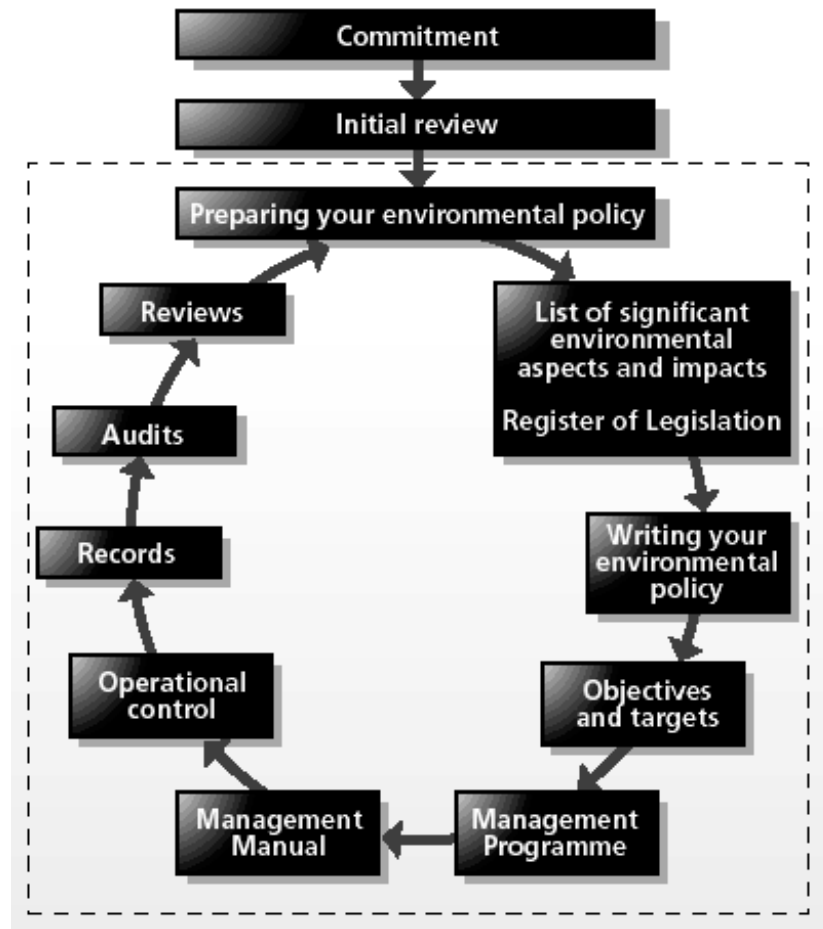
Considering the economic and non-economic benefits of an EMS, it is not difficult to understand the potential value to politicians of propagating the benefits of its implementation for the good of both the local community and industry. Owing to increased international pressure for organisations to implement an EMS, in order to preserve, and grow, employment in the industrial sector, its potential long-term values versus the short-term cost of implementation must be emphasised by political and statutory bodies.

### 2.3 The implementation process and its barriers

ISO 14001 provides basic requirements for firms implementing an environmental management system (EMS). The implementation process involves taking the organisation from the stage of having no EMS in place to the point where it has a fully functional EMS certified by an accredited certification body. (Self-accreditation is possible, but does not have the credibility offered by an accredited body.)

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. However, as Curkovic *et al* [12] warn, an existing quality management system (QMS), such as ISO 9001, cannot be transformed into an EMS by merely replacing the word ‘quality’ with the word ‘environmental’. 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 system to manage these interactions in order to control their environmental impacts. 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 1 illustrates a typical implementation of an EMS.



**Figure 1: Diagram of a typical environmental management system**

Source: Anon [14]

Many organisations are still reluctant to attain an EMS, naming barriers such as lack of funds, availability of skills, and resource constraints as reasons. Biondi *et al*[5] found that these limitations applied to SMEs in particular. In order to overcome these barriers, organisations should break the implementation process down into a series of steps and address each step one at a time [2], as shown in Figure 1.

ISO 14001 requires that the organisation's management demonstrate a commitment to its EMS, as senior management's commitment is essential to ensure successful implementation and operation of the EMS [14]. Graves [15] found that the ISO 14001 certification process required a broad spectrum of support from the organisation and a strong internal commitment from its employees, particularly from management. It has to be emphasized that ISO 14001 is often focused on technical considerations of the organisational components, and is thus seldom efficiently implemented [16]. In this regard Welford [17] advised that a corporate culture

conducive to change be established in order to support the paradigm shift needed for the successful implementation of ISO 14001.

Challenges that organisations have to address when implementing ISO 14001 are to be found in the very nature of contemporary capitalist structure, which stresses competition, the maximisation of profits, and the reduction of costs – fundamental barriers to the adoption of ethical practices such as environmentalism in business [17].

Stephens [18] suggested that environmental performance equates 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 Kershav [19] the solution to this predicament lies in understanding environmental economics and making a paradigm shift. In order to make this paradigm shift, organisations need to demolish certain myths – for example, the myth that anything concerning environmental improvement is a cost and will drain the organisation's profits, or the myth that current practices are so close to perfection that changes are unnecessary [17].

## **2.4 Strategic considerations**

It could be argued that in order to survive, the fundamental purpose of any business is to make a profit – and in order to do this in a competitive environment; the business needs to 'stay ahead of the game'. In order to do that, businesses need to take a holistic view of their organisations to avoid the risk of compartmentalising the organisation and having separate stand-alone management systems. Should this holistic approach be applied to an EMS, the result could be a proactive organisation that will attune the entire organisation to its business environment – inclusive of environmental and strategic objectives – in such a manner that the competitive standing of the organisation is improved [2]. Apart from adopting a holistic approach towards the implementation of an EMS, organisations should take note of global trends among automakers and suppliers with regard to environmental issues. In this regard, trends such as the increase in environment-related regulations in Europe and Japan in particular, challenges with regard to material development, waste reduction, alternative power usage, post-use, and supply chain management systems should be considered [20].

## **3. RESEARCH METHODOLOGY**

The research conducted in this study was in essence descriptive. Dane [21] defined descriptive research as research that endeavours to define or measure a particular phenomenon, usually by attempting to estimate the strength or intensity of behaviour or the relationship between two behaviours, while Parasuraman [22] defined descriptive research as a form of conclusive research intended to generate data describing the composition and characteristics of relevant groups or units. For descriptive research, Dane [21] recommended a survey as the most appropriate data collection method, as it may include a variety of questions, and allows for a variety of concepts to be described.

### 3.1 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” [23]. In this research the population was the DAC. The objective of the research was to survey the entire DAC population, and therefore no specific sampling methodology was needed. A limitation of restricting the survey to the DAC only was that inter-regional and cross-sectoral variables within South Africa could not be addressed. Therefore the outcomes of the research can not be generalised to other populations.

### 3.2 Questionnaire design

The survey instrument was a self-administered questionnaire. The questionnaire design was based on the literature review. Since the population size was small – namely 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 with ISO 14001 implementation. Kohne [24] found that a pre-test was vital as it ensured that the questionnaire performed the various intended functions. The negative side of conducting a pre-test when working with small populations is that the population size could be jeopardised by removing members from the population to be used in 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 was not affected: no members had to be removed for the pre-test sample [2].

The covering letter provided the background to and purpose of the research. It also explained how information would be obtained, and assured respondents of confidentiality. The questionnaire consisted of six sections:

- Section A:** This dealt with a profile of the responding organisation and information about the respondent.
- Section B:** This dealt with the organisation and environment-related issues.
- Section C:** This perused the reasons for having sought ISO 14001 certification, as well as the benefits and barriers.
- Section D:** This dealt with the respondents’ opinions and attitudes on specific 14001 issues.
- Section E:** This dealt with opposition to and criticism of ISO 14001.
- Section F:** This was an optional section that allowed for the respondents’ opinions and views on any issues raised in the previous sections.

### 3.3 Data analysis

The responses were segregated along the line of firms with and without ISO 14001, and their stage in the implementation process. The results of this analysis were used in order to facilitate two-way tabulation of the survey results. Due cognisance was given to the warning of Parasuraman [22] that, although two-way tabulation is helpful in uncovering relationships, it has pitfalls that could lead to unwarranted conclusions being drawn, since it does not always tell the whole story about the relationships between the sets of variables. One of the pitfalls would be to focus on

percentages and ignore the size of the raw totals involved. For this reason the sizes of each segment were given.

Having segmented the respondents into the three categories, descriptive analysis techniques were applied to the data in order to provide insight into the opinions of the various segments about particular issues related to ISO 14001 and its implementation. Differences of opinion between the various segments were established by determining the statistical significance of these differences. By conducting the significance testing, the areas of the survey that provided conclusive evidence were 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 hypotheses about the population [22]. The hypothesis that was tested was that organisations with ISO 14001 would respond differently from those that are in the process of implementing the standard, and from those that have not yet started the implementation process. Cooper [25] recommended the Kruskal-Wallis Test as an appropriate test for data collected using an ordinal scale where there are three or more independent samples.

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 the 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 where appropriate, as three related groups were identified [26].

#### 4. RESULTS

Twenty-eight of thirty-seven firms in the DAC responded, giving a total response rate of 76%. The certification status of the responding firms is provided in Table 2 below.

Certification status	No. of firms	Average no. employees
With ISO 14001 Certification	11	599
Without, but started process	11	462
Without, but not started process	6	171
<b>Total</b>	<b>28</b>	<b>453</b>

**Table 2: Certification status of surveyed firms**

As mentioned in the section on questionnaire design, Section A dealt with categorisation of the organisations, and Section B with general environmental issues.



These findings are displayed in Table 3, which shows a relationship between size (based on number of employees) and the certification status of the organisations. The larger organisations, with an average of 599 employees, have all been certified; the

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 system:	64%	82%	73%	17%
ISO TS 16949				
ISO 9001	96%	100%	100%	83%
ISO 14001	39%	100%		
OHSA 18001	4%	9%		
Other (VDA 6, Q1, etc.)	11%	27%		
Level of Environmental Manager:	39%	45%	45%	17%
Senior Management				
Middle Management	46%	55%	45%	17%
No Manager	14%			67%
Additional areas of responsibility	100%	100%	100%	100%
Main areas of responsibility:				
Health and Safety	63%	73%	55%	17%
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 programme in place (Yes)	57%	64%	55%	50%
Part of work place challenge (Yes)	43%	36%	55%	33%

**Table 3: Results of Sections A and B – General organisational information and environmental related matters**

medium-sized ones, with an average of 462 employees, were in the process of certifying; while the small organisations, with an average of 171 employees, have not yet started. This trend could be attributed to two factors: first, the larger pool of resources present in larger organisations; and second, the larger the organisation, the greater its need for systems to help it manage its activities. All the organisations with ISO 14001 had other management systems in place, including ISO 9001 (the quality management system recently replaced by ISO/TS 16949 as mandatory for all first tier original equipment (OEM) suppliers in the automotive industry).

In order for environmental management programmes to become effective, sufficient representation at senior management level is needed. This was reflected in organisations with ISO 14001 and organisations who are currently implementing EMS, as both had 45% of environmental managers in senior management and 55% in middle management positions. The results showed that environmental management was the domain of other functional areas within the organisations, such as Health and Safety, Quality, and even Maintenance. None of the surveyed organisations had environmental managers solely dedicated to environmental management. Forty-eight percent of the respondents felt that ISO 14001 would have an impact on their management structures.

The perceived and real impact on management structures could have been the reason why environmental managers were appointed from relatively senior management positions. Seventy-three percent of organisations with ISO 14001 had staff dedicated to EMS implementation and maintenance. This was much higher than the organisations in the process of implementation. The fact that most organisations with ISO 14001 were larger could have played a role. All organisations with ISO 14001 had set environmental performance measures, which is to be expected, as it is a requirement for the EMS. In addition, 55% of all respondents had a cultural change programme in place, which was indicative of their willingness to accept change.

### **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 of certification were; and what the barriers to gaining certification were. Section C1 dealt with the statement that best described the organisation's reason to seek ISO14001 certification (an option was also given to add other reasons). The findings are given in Table 4 below.

It is apparent from Table 4 that the main reason for seeking ISO 14001 certification is pressure of customer requirements. This applied to all three groups, and is in accordance with the finding of Keogh [4] in the literature survey.

Section C2 dealt with the benefits that would be derived from ISO 14001 certification. The five most important benefits for all firms, in chronological order, were:

1. Certification results in the adoption of sound environmental practices that will lead to cost savings.

2. Certification is a mandatory customer requirement of existing customers, and is thus required in order to protect current business.
3. Certification would enhance the company’s corporate image, which may allow some special considerations when dealing with customers.
4. Certification results in better management controls and more clearly defined targets and responsibilities; and
5. Certification provides a systematic structure for complying with environmental regulations.

Reason for ISO 14001 implementation	ISO 14001 certification status			
	All firms (28)	With cert. (11)	Without but started (11)	Without, not started (6)
Your customers required you to certify to ISO 14001 in order to get new or keep current business	74%	82 %	70%	66%
ISO 14001 offered the company a management system that would facilitate management compliance with all laws and regulations	19%	18%	20%	17%
ISO 14001 offered the company a management system that would improve its environmental performance	7%	0%	10%	17%
Other	-	-	-	-

**Table 4: Results for Section C1: Reasons for ISO 14001 implementation**

The most important benefits mentioned were directly profit-related (1-3) and management-related (4-5). It therefore appears that profit and management considerations carried more weight than environmental concerns. Once again this finding is in accordance with Welford’s finding [17] in the literature survey, which stated that the maximisation of profits and the reduction of costs could become a major barrier to the adoption of ethical practices such as environmentalism. Section C3 offered options for additional benefits, but nothing substantial was reported.

<b>Section C4: Difficulty of stages of implementation</b>		Mean of response for all firms (27)	Kruskal-Wallis Value
< 2.8	Easy		
3	No opinion		
> 3.2	Difficult		
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 interview	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

**Table 5: Results of Section C4: Difficulty of stages of implementation vs. Kruskal-Wallis Test**

Section C4 dealt with the difficulty of the stages of implementing ISO 14001. The Kruskal-Wallis Test was applied to the results of Section C4, as shown in Table 5. 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 – that is, there is a difference in the responses obtained from the organisations in the three different segments, and that was to do with stage 9, writing the management manual. Looking at stage 9 in more detail, as shown in Table 6, and interpreting the results as per Table 5, it appeared that ISO 14001 certified organisations believed that writing the manual was difficult; organisations that had not started the implementation process had no opinion; while organisations that had started the implementation believed that it would be easy to write the management manual. Expanding on Table 5, but excluding stage 9, it appears as though organisations had no problems with getting commitment from top management (stage 1), conducting the initial environmental review (stage 3), preparing the organisation's environmental policy (stage 4), listing environmental aspects and impacts (stage 5), and the internal audit of the organisation against ISO 14001 (stage 12). Organisations had problems, or foresaw problems, with establishing a register of all pertinent legislation (stage 6) and establishing the management programme and structure (stage 8). No opinion could be gained on the issues of obtaining commitment from middle and lower

management (stage 2), establishing operational controls and procedures (stage 10), or training of company personnel (stage 11).

Section C4: Difficulty of stages of implementation	ISO 14001 Status		
	With	Without, Started	Without, not started
< 2.8 Easy			
3 No opinion	(11)	(10)	(6)
> 3.2 Difficult			
Writing Management Manual	3.2	2.3	2.9

**Table 6: Implementation process accepted by alternate hypothesis**

**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 pertinent to ISO 14001, its implementation, or the organisation’s strategic points of view on environmental management. The Kruskal-Wallis Test was applied to the results of Section C4. Using a significance level of 80% (namely, a critical value of 5.99), only five points were accepted by the alternative hypothesis – that is, there was a difference in the responses obtained for organisations in the three different segments, and they were at points D8, D9, D15, D16, and D23 (see Table 7). On the issue of technical knowledge of environmental matters (D8), 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 that they did not have a very good knowledge. These findings are closely tied to those of D15 and D23, as both ultimately came down to the issue of technical capability. Issue D15 asked the question about reliance on external expertise to cover any shortfalls in internal expertise. Organisations with ISO 14001 felt that they would not have to rely on external experts, while those organisations that had not yet been certified felt that they would. Issue D23 focused on the issue of internal auditor skills or expertise, and again the same trend was observed: organisations with ISO 14001 felt they had the expertise, while organisations not yet certified felt they did not have expertise among their internal auditors.

In terms of financial resources available for the implementation of ISO 14001, organisations with ISO 14001 felt that they had sufficient funds to cover all the costs involved, while organisations in the process of implementation also believed they had sufficient funds, but were not sure. Organisations that had not started felt they did not have enough funds. The opinion of organisations that had not started the implementation process were in accordance with the literature survey (Biondi *et al* [5]). The expectations of what an environmental management system could deliver

(D16) was another area of major difference. Organisations with ISO 14001, and those in the process of implementation, felt that the expectations were not unrealistic or exceptionally high, while those who had not started were negative about an EMS and felt that the expectations were unrealistic and exceptionally high. These two issues were both raised in the literature review as being reasons why organisations had chosen not to certify, as the system is allegedly expensive to implement and does not deliver what it claims to.

Section D: Opinions on ISO 14001 issues	ISO 14001 status		
	With ISO (11)	Without ISO, started (10)	Without ISO, not started (6)
< 2.8 Easy 3 No opinion > 3.2 Difficult			
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

**Table 7: Results of Section D – Issues accepted by alternate hypothesis**

**Section E: Criticism of ISO 14001**

Section E was used to gather information about opposition to and criticism of ISO 14001. Respondents were asked to rate how strongly they agreed or disagreed with a number of given statements about ISO 14001. The Kruskal-Wallis Test was applied to the results, as shown in Table 8. Two points of criticism were accepted by the alternative hypothesis – namely, that there was a difference in the responses obtained for organisations in the three segments. They were the accusations that if organisations improved their environmental performance substantially, regulators would just impose more stringent regulations (E10); and the notion that the ends do not justify the means (E3). Organisations with ISO 14001 and organisations in the process of implementing it felt that the ends did justify the means (E3) and that improvements to their environmental performance would not result in more stringent regulations being imposed (E10). However, organisations that had not yet started

implementation felt that the ends did not justify the means (E3), and that improvements to their environmental performance would result in more stringent regulations being imposed (E10). Both these findings are closely correlated to D9 and D8.

<b>Results of Section E: Criticism of ISO 14001</b>		
< 2.8 Easy 3 No opinion > 3.2 Difficult	Mean 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 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 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 EMS 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 8: Results of Section E: Criticism of ISO 14001**

The results of the survey in terms of criticism of ISO 14001, as shown in Table 8, showed that organisations felt ISO 14001 was criticised because organisations were reluctant to comply with environmental best practices and seek certification (E1); ISO 14001 placed high demands on organisational resources (E2); ISO 14001 did not

materially alter the quality of the organisation's products (E5); and the current system of environmental regulations did nothing to encourage companies to do more than merely comply with minimum regulatory requirements (E7). However, organisations disagreed with the statements that management was too busy doing business to worry about environmental considerations (E4); that ISO 14001 did not necessarily guarantee improvements in environmental performance and regulatory compliance (E6); that information uncovered by the EMS could be used as roadmap to prosecution (E9); and that environmental regulations eroded competitiveness (E11). No opinion could be obtained on the topic of maintaining continuous compliance with environmental legislation being problematic and requiring serious managerial effort, (E8).

## 5. CONCLUSIONS

The research problem was to determine the strategic implications of implementing an Environmental Management System (EMS). The initial literature survey in general, and the empirical survey in particular, addressed this problem. In this regard the empirical finding that customer requirements and profit incentives were the most important reasons for implementing ISO 14001 was not only in agreement with the literature review, but emphasized that management regarded ISO 14001 certification as a strategic pre-condition for sustainable profit and long-term survival. The fact that the majority of respondents in the Durban Automotive Cluster (DAC) had either implemented ISO 14001 or were in the process of implementing it supported the notion that ISO 14001 certification was regarded as a high priority in the DAC. As ISO 14001 certification has become a pre-condition for doing business in many countries, as mentioned in the literature survey, it may be reasonably predicted that it will only be a matter of time before all members of the DAC will have gained ISO 14001 certification, much as they gained certification to the ISO 9000 Quality Management System.

The research objectives were individually addressed with regard to:

- **Reasons for seeking ISO 14001 certification.** (The findings agreed with the major reasons provided in the literature survey, namely customer requirements and profit motives. Strangely enough, fear of not meeting regulatory requirements was not given as an important reason.)
- **Perceived barriers to implementation prior to starting implementation process.** (The findings did not strongly support most of the barriers mentioned in the literature survey, as most of these barriers were regarded as relatively easy to overcome.)
- **Perceived barriers to implementation during the implementation process.** (The findings indicated that the only significant difference between the three groups was the perceived difficulty of writing the management manual.)
- **Strategic implications of an EMS** – this objective was addressed by all sections, inclusive of Section D (Opinions on ISO 14001 issues) and Section E (Criticism



of ISO 14001). (The findings in this regard can be summarised as follows: (1) An EMS is necessary in order to retain current customers, attract new customers, and survive in global markets. (2) Perceived barriers to implementing an EMS can be overcome, and are not as serious as they appear to be. Proof of this can be found in the 'incorrect' assumption of firms that had not started the process, that lack of funds was a major barrier, while certified or certifying firms held an opposing view. (3) The negative perceptions with regard to the potential benefits of EMS held by firms that had not started the implementation process, pointed to the possibility that lack of knowledge or unwillingness to change could be the reasons. Considering this opposition by a small group, however, it could still take some time before all firms in the DAC are ISO 14001 certified).

## 6. RECOMMENDATIONS

Owing to the geographical and branch-of-industry limitations of the study, recommendations can only be made for the Durban Automotive Cluster specifically. In this regard, it appears as though the reality of market forces will require all firms in the DAC to acquire ISO 14001 certification as soon as possible. The implications are that firms that already have ISO 14001 certification should ensure that they retain it; firms in the process of implementing ISO 14001 should speed up the process; and firms that have not started the implementation process should start immediately or consider getting out of the business. A recommendation that applies to all groups is that a paradigm shift is needed on the part of management to include environmental management as a strategic option in their strategic planning process.

## 7. CAVEATS

The major limitations of the study are that it was limited to the geographical area of Durban, which made inter-regional comparisons impossible; and that it was confined to the automotive industry only.

## 8. SUGGESTIONS FOR FURTHER RESEARCH

Expand the study to include automotive clusters throughout South Africa.  
Expand the study to other countries as well, to allow for international comparisons.  
Expand the study to include other branches of industry at both national and international level.

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