

## **IMPROVING BUSINESS PERFORMANCE THROUGH ENVIRONMENTAL MANAGEMENT SYSTEMS IN SPANISH COMPANIES**

Mejora de los resultados empresariales mediante sistemas de gestión medioambientales en compañías españolas

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## **ABSTRACT**

Environmental management systems (EMS<sub>s</sub>) seek to introduce the concept of sustainable development in the processes of production of goods and services. This paper investigates whether EMS<sub>s</sub> have any impact on six organizational outcomes (i.e. financial soundness; quality of products and services; corporate culture; corporate social responsibility; effectiveness in doing business globally; and innovativeness) through an empirical investigation of 100 large firms in the Spanish MERCO (Monitor Español de Reputación Corporativa), using repeated ANOVA measures. The results indicate that the benefits of EMS implementation fall within five major categories, namely: quality of products and services, business globally, innovativeness, corporate culture, and corporate social responsibility. However, we were surprised to find that EMS had no significant effect on the financial soundness

Keywords: ISO 14000, environmental management system, MERCO and Spain.

## **RESUMEN**

Los sistemas de gestión medioambientales (SGM<sub>s</sub>) buscan introducir el concepto de desarrollo sostenible en el proceso de producción de productos y servicios. El presente trabajo investiga si existe una relación entre los SGM<sub>s</sub> y seis beneficios empresariales (la robustez financiera, la calidad de los productos y servicios, la cultura corporativa, la responsabilidad social corporativa, la efectividad en los negocios internacionales y la innovación) mediante un estudio empírico de 100 empresas grandes españolas incluidas en el MERCO (Monitor Español de Reputación Corporativa). Para ello, usamos la técnica estadística del ANOVA de medias repetidas. Los resultados indican que los beneficios de los SGM<sub>s</sub> se asocian a cinco de los siguientes beneficios empresariales: la calidad de los productos y servicios, la cultura corporativa, la responsabilidad social corporativa, la efectividad en los negocios internacionales y la innovación. Sin embargo, no existe evidencia acerca de que se podrían obtener ganancias financieras.

Palabras claves: ISO 14000, sistemas de gestión medioambientales, MERCO y España.

## INTRODUCTION

The environment has become an important factor in the decision making process of companies around the world, not only to meet legislative requirements but also because of the consumers' increasing requirements. For these reasons, more companies are trying to introduce the environmental variable in their processes through the adoption of a system of environmental management. Environmental management systems (EMS<sub>s</sub>) seek to introduce the concept of sustainable development to the processes involved in the production of goods and services, through different mechanisms that are effective in combining technological process, economic growth and sustainability.

Organizations like the International Organization for Standardization (ISO) have started work on standardising techniques for ecological management. The establishment of these standards motivates organisations to invest in environmental improvements. For example, the international standard ISO 14000 establishes the specifications of an EMS for any type of organization, whether for the intention of certification or not. The international standard ISO 14000 provides a framework for organizations that wish to effectively implement an EMS and manage their environmental affairs. In this regard, Chan & Li (2001) asserted that since the ISO 14000 standards were published in 1996, more and more companies have been certified to the international standard ISO 14000.

The benefits sought by companies considering, or in the process of implementing, an EMS include: cost savings and improved management control; meeting customer expectations; demonstrating commitment to the environmental responsibility; improved environmental performance; staying ahead of

legislation; and increased employee motivation (Holt 1998; Rondinelli & Vastag 2000; Zhang et al. 2000). These benefits clearly imply that companies desire more from an EMS than just a certificate to display on the wall. Companies seek a range of different benefits from their EMS<sub>s</sub>, beyond certification, but companies may be fulfilling ISO standards without considering how this could affect their outcomes (Lawrence et al. 2002). Theyel (2000), for instance, found that firms have not been able to improve their environmental performance as expected, primarily because of the differences between business objectives and environmental management objectives. In this regard, Sena & Dumke (2004) suggested that companies that apply an EMS to their processes could not know for certain whether these processes are designed to help companies achieve their business goals.

To summarize, there is growing evidence of the widespread use of environmental management practices, but there is selective evidence that the adoption of these management practices leads to improved organizational performances (Avila 1993; Rome 1994; Ahmed et al. 1998; Theyel 2000). The major focus of this research is to investigate whether an EMS has any impact on six organizational outcomes (i.e. financial soundness; quality of products and services; corporate culture; corporate social responsibility; effectiveness in doing business globally; and innovativeness) through an empirical investigation of 100 large firms in the Spanish MERCO (Monitor Español de Reputación Corporativa), using repeated ANOVA measures. The companies were categorized into two groups: group 1-companies without an EMS; and group 2-companies with an EMS. Companies designated as having an EMS were selected based on the possession of the environmental accreditation ISO 14000.

The relationship between an EMS and organizational outcomes is discussed and presented in the next section. This section also provides a discussion of the hypotheses that we sought to test in the study reported in this paper. Details of the survey which was used to collect appropriate data are presented in section 3. This, in turn was used as a basis for testing the hypotheses. The results are presented in section 4 and the discussion in section 5.

### *The conceptual framework*

The ISO 14000 series consists of 21 standards intended to assist organizations in managing their environmental requirements and to ensure that their environmental policies and practices support their goals. ISO 14000 includes policies, organizational systems, management, planning, operational procedures, effect and

regulatory identification procedures, objectives, targets, vendor controls, auditing, record keeping, etc. (Kuhre 1995; Corbett & Kirsch, 2001; Viadiu et al. 2006). These environmental standards are divided into six categories: environmental management system, environmental auditing; environmental performance evaluation; environmental labelling; life-cycle assessment; and environmental aspects in product standards. Sena & Dumke (2004:382) identified 10 dimensions of ISO 14000 groupings as shown in Table 1.

Table 1 shows that the emphasis of ISO 14000 standards is not on the development and implementation of objectives or results, but of procedures. As Corbett & Kirsch (1999) state, ISO 14000 standards focus on many aspects other than those which are environmental, and, therefore, they should not be thought of as designed solely for a certain type of company with a high environmental

TABLE 1. COMPOSITION OF ISO 14000. Source: adapted from Sena & Dumke (2004).

Composición de la ISO 14000.

- ISO 14001:1996 – Environmental management systems – specification with guidance for use.
- ISO 14004:1996 – Environmental management systems – general guidelines on principles, systems and supporting techniques.
- ISO 14010:1996 – Guidelines for environmental auditing – general principles.
- ISO 14011:1996 – Guidelines for environmental auditing – audit procedures – auditing of environmental management systems.
- ISO 14012:1996 – Guidelines for environmental auditing – qualification criteria for environmental auditors.
- ISO 14020:1998 – Environmental labels and declarations – general principles.
- ISO 14040:1997 – Environmental management – life cycle assessment – principles and framework.
- ISO 14041:1998 – Environmental management – life cycle assessment – goal and scope definition and inventory analysis.
- ISO 14050:1998 – Environmental management – vocabulary.
- ISO Guide 64:1997 – Guide for the inclusion of environmental aspects in product standards.

impact. Instead, they should be considered as standards that can be applied to most organizations. According to Sena & Dumke, “companies with ISO 14000-certification establish monitoring procedures and measurement of an EMS” (2004:386). Therefore, the strategies to be adopted for the organisations to achieve EMS implementation must be based on ISO 14000, which means how the companies lead and manage their relationship with the environment, integrating all managerial functions (Kuhre 1995; Corbett & Kirsch 2001). Walker (2000: 21) maintains that a successful EMS assures the management and stakeholders of the organisation that:

- Environmental policies, objectives and stakeholder expectations are addressed;
- Regulatory compliance is a more integral part of the business operation;
- Emphasis is placed on prevention rather than cure;
- There is a systematic approach to support and ensure continual improvement in environmental and profit performances; and
- There is a “green passport” to a greater market.

As noted above, an efficient EMS can become a tool for enhancing the company’s performance by reducing costs, improving operational efficiency and enabling the company to become more knowledgeable about its relationship with the environment. However, if the EMS’s achievements are not satisfactory for the agents involved (e.g. employees, customers, and managers), then, dissatisfaction among members of the organization is created by not achieving the goals desired. This could be expressed through bad expressions or conducts, disloyalty, negligence, aggression or withdrawal, which in turn can be expressed by sabotage, slander,

or direct aggression hindering the fulfilment of the ISO 14000 standards. The implication of such thinking means that an EMS does not have an immediate impact on the environment. The amount or intensity of an EMS at a moment (T) has an impact on other organizational variables (e.g. quality of products and services, effectiveness in doing business globally, etc), and only after a while affects the environment.

Therefore, a company’s EMS should be aligned with its strategic and operational goals; otherwise, the EMS will not get the commitment and cooperation from all levels and functions within the organization (Chin et al. 1999). Considering this, we argue that an efficient EMS cannot be successful without the corresponding analysis of the organizational outcomes achieved by the environmental actions (Thompson 1998). A company’s success can be characterized in many ways. The performance outcomes that are typically of importance to a firm fall into several categories. These goal areas relate to markets, products, economic outcomes, and employees. Thompson (1998) suggests that sound profits and a strong balance sheet are very important, but they alone will not necessarily lead to a company being ‘admired’. Admiration encourages customers to buy more and to stay loyal, employees to work harder, suppliers to be more supportive, and shareholders to also remain loyal.

In the 1980s, and based on research in the USA by Fortune, The Economist and The Financial Times began to investigate which companies were most admired by other businessmen, particularly those with whom they compete directly (e.g., The Global Most Admired Companies, the World’s Most Respected Companies). More recently, the Complutense University of Madrid has taken over a similar project in Spain, in association with ‘Villafañe & Asociados’ and the

newspaper 'Cinco Días', has published a ranking with the most admired companies in Spain (The MERCO's annual list). The criteria used in the MERCO's annual list are as follows:

- Financial soundness (FS);
- Quality of products and services (QPS);
- Corporate culture (CC);
- Corporative social responsibility (CSR);
- Effectiveness in doing business globally (BG); and
- Innovativeness (IN).

This categorization represents an attempt to capture a broad range of outcomes that are important to firms. The complexity in designing and implementing an EMS may influence many organizational outcomes including the factors above. They are all fundamentally influenced by the quality of the environmental management system and the way in which it is implemented in an organization. In the following paragraphs, we shall explain the way that organizations develop the above outcomes using an EMS.

The Financial soundness (e.g., annual earnings and return on investment) of an organization can be achieved through enhanced productivity, such as improved use of energy, and reduced costs due to the use of fewer chemicals and the correct handling and cleansing of wastes (e.g., Pearson et al. 1993; Kuhre 1995). Therefore, in order to maintain continual improvement in environmental performance, the suitability and effectiveness of the EMS, and thereby its outcomes, the top management should review and evaluate the relationship between its EMS and its financial soundness (FS) at regular intervals (Pearson et al. 1993, Clements 1996).

It is crucial for today's organizations to be able to manufacture and deliver QPS cost-effectively and minimize any adverse impact

on the environment. As noted above, the whole ISO 14000 family addresses not only the environmental aspects of an organization's processes, but also those of its products and services. The ISO 14000 standards provide guidance for the continuous improvement of existing quality systems beyond the minimal requirements (Beaumont et al. 1993). A lot of successful cases also indicate that well-formulated environmental strategies could lead to a number of business advantages such as better quality (see Pearson et al. 1993, Kuhre 1995, Pun et al. 2001).

From the point of view of corporate culture (CC), the implementation of ISO 14000 fosters important changes in an organization (Chapman 1994, Lin 1995). The changes include structure and responsibility, training and awareness, communication, documentation and control, and emergency preparedness (Chin et al. 1999). Corporate culture or 'CC' includes elements such as core values and beliefs, corporate ethics, and rules of behavior. It is important to recognize that the mechanisms that are used to define and communicate 'any change' are never context free, they are always created, shared, and leveraged within a context shaped by the organization's history, culture, mind-set, preoccupations, and external competitive milieu. Therefore, the integration of environmental issues is helping companies reassess their corporate cultures as a contribution to share responsibilities (Abounaga 1998, Pun et al. 2001).

Corporative social responsibility (CSR) is about how companies manage the business processes to produce an overall positive impact on society (Wood 1991: 693). The effective development and implementation of an EMS is inevitably associated with external and social aspects (Lin 1995, Sayre 1996). For example, the implementation of an EMS supports procedures to identify potential for

and respond to accidents and emergency situations. It should also develop, establish and maintain procedures for preventing and mitigating the environmental impacts that may be associated with accidents and emergency situations. For example, companies may implement new processes that use less hazardous materials, resulting in less hazardous waste needing land disposals, which in turn may result in less soil and ground water pollution (Kuhre 1995).

With the movement towards environmental management standards such as ISO 14000, there is currently a window of opportunity to implement more consistent and uniform regulations that would significantly reduce the costs of tax compliance by global businesses sponsoring sporting and cultural events globally. Under these circumstances, registration with the ISO 14000 management system may become the primary requirement for doing business globally 'BG'. In this regard, Chapman (1994) and Sayre (1996) asserted that multinational companies, particularly the high-profile ones, are expected to be pioneers in adopting a comprehensive EMS<sub>s</sub> to enhance their public image. The operations effectiveness of an organization also improves its credibility with customers, and enhances its business performance (Chapman 1994).

The design of "green" products represents, in some industries, the only way to develop differentiation-based business strategies (Azzone & Noci 1998). Many companies are trying to eliminate toxic substances from their products, since executives believe that this is the only solution to differentiate themselves from competitors. Indeed, starting from the consideration that "green" issues may represent a significant driver of product differentiation, the introduction and/or greater attention towards the implementation of design for recycling, design for dismantling and

design for disassembling techniques, allow the product manager to identify the best trade-off between a product's eco-compatibility and its contribution to profitability. Consequently, executives encourage innovation by considering environmentally friendly design techniques as strategic tools in the development of new products and services (e.g., Kuhre 1995, Clements 1996, Azzone & Noci 1998).

Under this framework the hypotheses that we propose are:

- H<sub>1</sub>: (Environmental management systems \_ Financial soundness)
- H<sub>2</sub>: (Environmental management systems \_ Quality of products and services)
- H<sub>3</sub>: (Environmental management systems \_ Corporate culture)
- H<sub>4</sub>: (Environmental management systems \_ Corporative social responsibility)
- H<sub>5</sub>: (Environmental management systems \_ Effectiveness in doing business globally)
- H<sub>6</sub>: (Environmental management systems \_ Innovativeness)

The next section examines the methodology for the delineation of this research.

## METHODOLOGY

In order to contrast the above hypotheses, we used a list of 100 companies indexed in MERCO's list as an initial sampling frame. The MERCO list establishes a ranking of the most admired companies in Spain. All companies are required to have at least 45 million euros in revenue to be eligible for the list. For those companies on the most admired list, a maximum of 10 top executives and seven directors (outside board members) per company were selected. Then, they were asked to allocate marks according to certain criteria

for their own companies and their main rivals. Before elaborating the final MERCO list, pilots involving a series of interviews with consumer associations, trade union associations as well as a pool of industry analysts were conducted. During these interviews, the individual responding has to indicate which companies he or she perceives to offer good value for money, understand their market, be trustworthy, and care about the environment.

The measures relating to the existence of an ‘FS; QPS; CC; CSR; BG; and IN’ scale consisted of 6 indexes designed by Villafañe & Asociados (2005) to create a ranking of the most admired companies in Spain. This information was collected using data from the

MERCO annual report for 2004 (Villafañe & Asociados 2005). Each of these indexes contains three variables that explain certain social and economic characteristics. As noted above, these measures reflect multiple perspectives and stakeholder interests, and they are transformed into an index with a range of 0 to 3 to facilitate comparison (Roos & Roos 1997). The scale points are: (0) no achievement, (1) low levels of achievement, (2) medium levels of achievement, and (3) high levels of achievement. Table 2 provides an overview of the questions used in the MERCOCO list.

In order to develop an appropriate measure for the construct ‘EMS’, every web page of each company on the most admired list was

TABLE 2. SUMMARY OF THE QUESTIONS USED IN THE MERCOCO LIST. Source: adapted from Villafañe & Asociados (2005).

Resumen de las preguntas utilizadas en la lista MERCOCO.

1. Financial soundness (FS)	4. Corporate social responsibility (CSR)
<ul style="list-style-type: none"> <li>a. Yearly turnover</li> <li>b. Profitability</li> <li>c. Quality of the economic information</li> </ul>	<ul style="list-style-type: none"> <li>a. Entrepreneurial ethics</li> <li>b. Commitment with the community</li> <li>c. Social responsibility</li> </ul>
2. Quality of products and services (QPS)	5. Effectiveness in doing business globally (BG)
<ul style="list-style-type: none"> <li>a. Value of the product</li> <li>b. Value of the brand</li> <li>a. Customer service</li> </ul>	<ul style="list-style-type: none"> <li>a. International expansion</li> <li>b. Strategic alliances</li> <li>c. Strategic positioning on the Internet</li> </ul>
3. Corporate culture (CC)	6. Innovativeness (IN)
<ul style="list-style-type: none"> <li>a. Appropriateness of the culture to the entrepreneurial project</li> <li>b. Quality of the occupational life</li> <li>c. Evaluation and remuneration</li> </ul>	<ul style="list-style-type: none"> <li>a. Investment in R+D</li> <li>b. Renovation of the products and service portfolios</li> <li>c. New channels</li> </ul>



examined to identify the presence of an ISO 14000 certificate (1) or otherwise (0). In three cases where this information was unavailable, the information was collected by means of telephone interviews with the technical manager of the business using a simple structured questionnaire. Respondents were asked to indicate whether the company has the ISO 14000 certificate (0 - no, 1 - yes) and if yes, respondents were asked to indicate when they got the certificate. As a result of the above answers, we got a variable (EMS) with a minimum value of zero and a maximum value of one.

The system repeated ANOVA measures were used to prove the explanatory power of only one factor or independent variable, not metrics, in our case (EMS =1 and no EMS =0), on a set of dependent variable metrics (i.e. FS; QPS; CC; CSR; BG; and IN). As dependent variables of repeated ANOVA measures may be highly correlated with the independent variable when there is no correlation amongst them, they can present problems of

multicollinearity (Peterson 1994). Therefore, using the correlation matrix (see Table 3) as an initial guide, ‘tolerance’ and ‘variance inflation factor’ (VIF = 1/tolerance) were calculated. The ‘tolerance’ value indicates the percentage of variance in the predictor that cannot be accounted for by the other predictors. Therefore, very small values indicate that a predictor is redundant, and values that are less than (0.10) or equivalent when VIF >10 suggest a need for further investigation. Furthermore, all condition number bounds from the seven components were not greater than fifteen, with the lowest eigenvalue for the sixth dimension being 0.043 (see Table 3), thus confirming that multicollinearity does not exist among the variables included in the analysis (Hair et al. 1999). Table 3 also provides an overview of the construct’s means, standard deviations and correlations. The results of testing the hypothesis using SPSS (version 11.5) are shown below.

TABLE 3. CORRELATION MATRIX ANALYSED. <sup>a</sup><0.01; <sup>b</sup>p<0.05; <sup>c</sup>p<0.1. Condition number bounds (CNB); Mean (m); Standard deviation (s) VIF: variance inflation factor Financial soundness (FS); Quality of products and services (QPS); Corporate culture (CC); Corporate social responsibility (CSR); Effectiveness in doing business globally (BG); Innovativeness (IN); and Environmental Management System (EMS).

Matriz de correlaciones analizada.

Eigenvalue	CNB		μ	σ	FS	QPS	CC	CSR	BG	IN	EMS	Collinearity Statistics	
												Tolerance	VIF
4,558	1,000	FS	0,65	109	1,000								
0,912	2,236	QPS	1,42	1,14	0,096	1,000						0,512	1,954
0,630	2,689	CC	2,05	1,00	0,054	-0,081	1,000					0,506	1,976
0,424	3,279	CSR	1,50	1,12	-0,344 <sup>a</sup>	0,079	-0,068	1,000				0,428	2,338
0,335	3,686	BG	1,35	1,34	-0,298 <sup>a</sup>	0,27 <sup>a</sup>	0,464 <sup>a</sup>	0,064	1,000			0,834	1,199
0,097	6,861	IN	0,71	1,03	-0,191 <sup>c</sup>	0,252 <sup>b</sup>	0,300 <sup>a</sup>	-0,004	-0,006	1,000		0,368	2,717
0,043	10,294	EMS	0,55	0,50	-0,107	0,335 <sup>a</sup>	0,167 <sup>c</sup>	0,243 <sup>b</sup>	0,268 <sup>a</sup>	0,313 <sup>a</sup>	1,000	0,548	1,826

## RESULTS

Mauchly's test of sphericity tests the null hypothesis that the error covariance matrix of the orthonormalized-transformed dependent variable is proportional to an identity matrix. As Mauchly's test of sphericity is significant –  $c^2_{(14)} = 105.847$  – with a significant level of ( $p < 0.01$ ), we can assert that the dependent variables are related. As shown in Table 4, the multivariate contrast analysis shows that the Lambda of Wilks is 0.883 with a significant level of ( $p < 0.05$ ). Furthermore, the partial Eta squared is 0.117 and the observed power is 0.755. As a consequence, EMS has an explicative power on dependent variables (FS; QPS; CC; CSR; BG; and IN).

Tests of the effects within subjects show an F value of 22.715 at a level of ( $p < 0.01$ ). Therefore, we can assert that there are some differences among the means of FS; QPS; CC; CSR; BG; and IN. The effect size for each independent variable was (0.188), with an estimated power of (1). The interaction MERCOS\*EMS shows an F value of 2.906 at a level of ( $p < 0.05$ ). Therefore, there are also differences among the means of the interaction MERCOS\*EMS. In this case, the effect size for each independent variable was (0.03) with an estimated power of (0.79). Tests of the effects within subjects show an F value of 25.609 at a level of ( $p < 0.01$ ). Therefore, we can assert that there are differences depending on whether or not there is the presence of EMS<sub>s</sub>. The partial Eta squared is 0.207, and the observed power is (0.99).

If we analyse the univariate tests, it can be observed that the meaningful difference is found concretely in the QPS (F value of 12.415 at a level of  $p < 0.01$ ). Table 4 also shows that EMS had a positive influence on BG and IN, both with a level of ( $p < 0.01$ ). Table 4, again, shows that EMS had some significant effects on CC and CSR with levels of ( $p < 0.1$ ) and

( $p < 0.05$ ) respectively. Consequently, we can assert that EMS has a positive influence on QPS, BG, IN, CC and CSR. This analysis supports H2, H3, H4, H5, and H6 respectively.

In order to compare the relationship between EMS and each of the MERCOS list's dimensions, a binary logistic regression through the method «introduce» was also carried out, which allows the probability of the existence of an EMS depending on a pre-determined series of independent variables (i.e., FS, QPS, CC, CSR, BG and IN). As Table 5 shows, the model has statistical significance, which has to fulfill the conditions of the contrast of  $-2 \log$ -likelihood ( $p < 0.01$ ), indicating the improvement of the adjustment, including the independent variables from the model. The Hosmer & Lemeshow test does not give a statistic significance  $c^2_{(14)} = 9.981$  at a level of ( $p = 0.266$ ). These conditions indicate that significant differences do not exist between the observed classifications and those that were predicted at that significant level. Nagelkerke's R<sup>2</sup> statistic shows that the percentage of variance explained by the model is 25.8%. Analysing the (B) coefficients of the model, the variables which explain the existence of EMS most are 'CSR and IN'. CSR and IN reached B coefficients of (0.610) and (0.822) respectively, suggesting positive associations between higher levels of CSR and IN and the existence of EMS at a level of ( $p < 0.05$ ).

The findings of the binary logistic regression show that EMS<sub>s</sub> also depend on the results of strategic goals (e.g. CSR and IN). Therefore, in order to be successful, any company that wishes to develop and implement an EMS based on ISO 14000 must first consider the implementation of an environmental policy that address CSR and IN issues. Consequently, these findings support that companies should not view environmental concerns as detrimental to performance. In

TABLE 4. ANOVA EMS<sub>s</sub> FACTOR . <sup>a</sup>p<0.01; <sup>b</sup>p<0.05; <sup>c</sup>p<0.1. Mean (m); Standard deviation (s). Financial soundness. (FS); Quality of products and services (QPS); Corporate culture (CC); Corporate social responsibility (CSR); Effectiveness in doing business globally (BG); Innovativeness (IN); and Environmental Management System (EMS).

Anova del factor SGM<sub>s</sub>.

Variable	EMS	μ	σ	n	F	Partial Eta Squared	Observed Power
FS	No	0,778	1,146	45	1,134	0,011	0,184
	Yes	0,545	1,033	55			
	Total	0,650	1,086	100			
QPS	No	1,000	1,000	45	12,415 <sup>a</sup>	0,112	0,937
	Yes	1,764	1,138	55			
	Total	1,420	1,139	100			
CC	No	1,867	1,057	45	2,807 <sup>c</sup>	0,028	0,382
	Yes	2,200	0,931	55			
	Total	2,050	0,999	100			
CSR	No	1,200	0,991	45	6,134 <sup>b</sup>	0,059	0,689
	Yes	1,745	1,174	55			
	Total	1,500	1,124	100			
BG	No	0,956	1,261	45	7,606 <sup>a</sup>	0,072	0,780
	Yes	1,673	1,320	55			
	Total	1,350	1,336	100			
IN	No	0,356	0,743	45	10,681 <sup>a</sup>	0,098	0,899
	Yes	1,000	1,139	55			
	Total	0,710	1,028	100			
Wilks' Lambda (0,883)					2,486 <sup>b</sup>	0,117	0,757
Tests of within-subjects effects. MERCO					22,715 <sup>a</sup>	0,188	1,00
Tests of within-subjects effects. MERCO*EMS					2,906 <sup>b</sup>	0,03	0,79
Test of between-subjects effects. EMS					25,609 <sup>a</sup>	0,207	0,99
Mauchly's Test (0,332) $\chi^2_{(14)} = 105,847$ <sup>a</sup>							

general, the advantages of implementing an EMS are a review of the corporative social responsibility and the innovation process, which in turn may have the effect of quality improvements, global businesses and the

avoidance of potential environmental risks. The theoretical and managerial implications of the bi-directional relationships observed across those constructs are discussed in further detail in the following section.

TABLE 5. BINARY LOGISTIC REGRESSION MODEL. <sup>a</sup><0.01; <sup>b</sup>p<0.05. Financial soundness (FS); Quality of products and services (QPS); Corporate culture (CC); Corporate social responsibility (CSR); Effectiveness in doing business globally (BG); Innovativeness (IN); and Environmental Management System (EMS).

Modelo de regresión logística binaria.

	B	S.E.	Wald	gl	Exp (B)
FS	0,210	0,291	0,522	1	1,234
QPS	0,369	0,290	1,619	1	1,446
CC	0,005	0,349	0,000	1	1,005
CSR	0,610 <sup>b</sup>	0,243	6,287	1	1,841
BG	0,449	0,288	2,432	1	1,567
IN	0,822 <sup>b</sup>	0,342	5,788	1	2,274
Constant	-2,434	0,811	9,000	1	0,088
<hr/>					
Nº validate observations	100				
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- 2 log initial verisimilitude:	107,771	$\chi^2_{(8)}=29,857^a$			
<hr/>					
R <sup>2</sup> Cox y Snell:	0,258				
<hr/>					
Hosmer and Lemeshow Goodness of Fit:	$\chi^2_{(14)}=9,981$	p=0,266			
<hr/>					
R <sup>2</sup> Nagelkerke:	0,345				

## DISCUSSION

The economics and management of environmental resources is a field of growing global importance, so it is necessary to focus on the potential organizations have for implementing EMS<sub>s</sub>. This study represents an attempt to address the deficiency in research literature concerning the outcomes of firms' environmental efforts. The performance outcomes included in this study are based upon the criteria used in the MERCO annual list. This decision is justifiable, due to the success

and usefulness of these criteria among the Spanish companies (e.g., Cegarra & Rodríguez 2004, Villafañe & Asociados 2005).

The findings corroborate that the presence of an EMS contributes positively to help firms to adequately achieve 'QPS, BG, IN, CC and CSR' performances. However, we were surprised to find that EMS had no significant effect on the financial soundness. Therefore, our results do not support the views of Chapman (1994) that there is a positive association between EMS and FS. Considering this, we argue that the implementation of an

EMS needs to involve changes in the organization (e.g., technologies, structure, responsibility, etc), the consequences of which, in turn may involve initial set-up costs and subsequent maintenance and improvement. These results support the suggestion of Chin et al. (1999) and Babakri et al. (2003), that the cost of certification and audit is too high and the economic and institutional benefits are often long term.

With regard to H2 (EMS\_QPS), the findings demonstrate a bilateral association between EMS and QPS. Therefore, results support the suggestion of Pearson et al. (1993), and Sayre (1996), that an organization committed to the environment is more likely to bolster team spirit, engender loyalty, and increase the organization's ability to attract high quality staff. Kuhre (1995), for instance, found that the number of employees injured by the use of hazardous chemicals and processes, and hence liability, can be reduced if an effective EMS based on ISO 14001 is implemented. Under these circumstances, employees can optimise and control the activities and processes affecting quality in order to achieve their policies and promises (Zeng et al. 2005).

In testing H3 (EMS\_CC), our findings demonstrate a bi-directional association between EMS and the CC. This finding corroborates the notions of Zeng et al. (2005), that the implementation of EMS<sub>s</sub> may be helpful for organizations to establish an effective culture by documenting and communicating roles and responsibilities. This may indicate that one of the important aspects of EMS<sub>s</sub> is the support it provides for developing and maintaining an organization's culture with external and internal relationships. In particular, environmental responsibilities should not be seen as confined to the environmental function, but should also include other areas of an organization

(Aboulnaga 1998, Pun et al. 2001). Thus, potentially, implementing an EMS provides an environment that supports the dynamic modification of corporative culture when this proves necessary.

Regarding H4 (EMS\_CSR), our results support a positive relationship between EMS and CSR. This implies that EMS<sub>s</sub> develop and implement corresponding response actions to improve the organization's environmental performance in a practical manner leading to compliance with environmental legislation. Similarly, competitiveness can also be enhanced by improved company public image and staff morale, as a consequence of ISO 14000 implementation (Zhang et al. 2000). In Spain, this fact has given rise to a growing quantity of companies that are using eco-tourism as a marketing gimmick rather than as a way of conducting business (Jiménez & Céspedes 2001). We think this is a problem as this attitude towards the environment may help to create an extremely poor reputation for eco-tourism globally.

With regard to H5 (EMS\_BG), the findings also highlight how EMS contributes to BG and what authors such as Sena & Dumke (2004) refer to EMS as "not merely a method by which embedded ecological ideas are revamped to increase competitiveness; it is equally regarded as an approach designed to be in compliance with laws and legal requirements". This view is shared by some authors, Beechner & Koch (1997), for instance, assert that ISO 14000 provides a way of ensuring that products conform to specific requirements. Miles & Russell (1997) suggest that ISO 14000 certification may allow firms to reach global markets without limitations originating from environmental issues. Green differentiation may produce economic value, because it enables the enlargement of market access globally for eco-friendly products (Roy & Vezina 2001). Consequently, as customers

are putting high priority on legislative requirements, organizations adopting ISO 14000 may have a larger pool of potential customers to choose from their competitors, giving them a competitive advantage in international markets.

In testing H6 (EMS\_IN), the findings demonstrate a bi-directional association between EMS and IN. This accomplishes what authors, such as Theyel (2000), express when they highlight that the adoption of environmental management practices is significantly related to the innovation variable. For example, implementing an EMS can help managers to adopt new processes such as pollution prevention and product stewardship (Jiménez & Céspedes 2001), which in turn could be associated to higher levels of innovation (Kuhre 1995, Clements 1996).

#### *Managerial implications*

There are many methods for managing the environment, but companies still show some resistance to EMS<sub>s</sub> adoption. The general notion among many businesses is that social responsibility based on environmental concerns may be contrary to company goals and performance (e.g., Ahmed et al. 1998, Sena & Dumke 2004). The results from this study contradict this. It has been observed that environmental companies are better performing in 'QPS, BG, IN, CC and CSR' than the non-environmental companies. In terms of FS, it must be noted that the implementation of EMS<sub>s</sub> strongly depends on short-term investments (e.g., initial start up costs, training costs, documentation costs, changeover or process modification costs, operating costs, compliance costs, waste disposal and pollution prevention costs). Therefore, the amount or intensity of an EMS at a moment (T) has an impact on other organizational variables (for ex-

ample in terms of increased investor confidence, customer satisfaction or loyalty, conservation of materials or energy, prevention of negative environmental impact, adherence to industry codes or legislative requirements, decreased costs, process and product innovation, amongst others), and only after a while impacts on FS.

The implication for management practice is that EMS<sub>s</sub> represent a long-term programme to change, and a proactive way to improve CSR and IN. Therefore, to consolidate EMS<sub>s</sub>, companies need to provide and support organizational outcomes (i.e. QPS, BG, IN, CC and CSR). We further suggest that these qualitative or quantitative performances must be evaluated in detail and must reflect the goals and objectives of the EMS (Clements 1996). In this aim, EMS<sub>s</sub> should be based on performance audit results and must address all possible needs for changes needed in the policy, objectives and other elements of the organizational outcomes, changing circumstances and the commitment to continual improvement.

#### *Limitations and future research*

It has been further observed that relatively larger companies are more inclined to be environmentally conscious (e.g., Ahmed et al. 1998). The reason for this may be that the smaller companies may find it riskier to invest in environmental strategies because of their resources constrains. Considering this, we argue that future studies including large and small enterprises may help improve the rigor of the results.

On the other hand, the existing production facilities and practices in most of the industrial companies, particularly production processes, need to be enhanced so that they become more environmentally friendly (Cegarra & Rodrigo

2002). In this regard, Sena & Dumke (2004) detected that companies belonging to the chemical industry have a strong concern with the impacts that this sector can cause to the environment. Consequently, future research, including companies from different sectors (e.g., telecommunications and chemical) should be addressed to analyse the relationship between the company's activity and its EMS<sub>s</sub>.

Finally, in this study we have only considered whether the companies had or did not have an EMS. Therefore, different forms of EMS<sub>s</sub> have not been included in this study. Future research should investigate the linkage between operations and the environmental strategies. It may also be interesting to observe through case studies the change in the performances of companies after adopting EMS<sub>s</sub>.

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