



Do drivers matter for the benefits of ISO 14001?

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Abstract

Purpose – The ISO 14001 is already a global meta-standard for implementing Environmental Management Systems. The purpose of this paper is to analyze the influence of the sources of motivation that lead companies to adopt this global standard for its perceived benefits.

Design/methodology/approach – An extensive review of the academic literature published on ISO 14001, motivations, and benefits has been carried out in order to establish the working hypotheses that are analyzed based on the information obtained from 214 Spanish companies that participated in a survey.

Findings – The internal drivers to implement and certify the ISO 14001 standard have a degree of influence on the benefits that is significantly higher than external ones, irrespective of the size of the company and the sector of activity.

Practical implications – The findings help to characterize ISO 14001 certified firms and anticipate benefits of the implementation and certification of the standard.

Originality/value – The article sheds light on the relationship among the motivational factors and the benefits of the process of implementing and certifying ISO 14001 in the country in the world that has experienced the greatest intensity of certification. A typology of integration level from Boiral and Roy is empirically analyzed for ISO 14001 for the first time in the literature.

Keywords International standards, Standardization, Environmental management, Spain

Paper type Research paper

1. Introduction

Motivated by different stakeholders and the internal improvement of their general and environmental efficiency, an increasing number of companies are implementing an Environmental Management System (EMS). This is an environmental practice that has become increasingly widespread, especially in the European Union (EU) and in Japan.

An EMS is a systematic process that corporations and other organizations use in order to implement environmental goals, policies and responsibilities, as well as regular auditing of its elements (Cascio, 1996). EMSs tend to be based on international models of reference: the most widely used one is the international ISO 14001 standard.

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In recent years, ISO 14001 certification has been experiencing major growth on the international stage. By the end of 2007, 154,572 certificates had been issued in 148 countries (ISO, 2008). In eight years, the number of certificates issued world wide had increased nearly 11-fold. Attention should be drawn to the fact that around 40 per cent of ISO 14001 certificates issued world wide were issued within the EU. The USA, on the other hand, accounted for only 3.5 per cent, while China and Japan are the undeniable leaders in terms of the absolute number of certificates on a world wide level, accounting for 20 and 18 per cent of the total, respectively. Spain ranks third in the number of certificates issued (ISO, 2008), and is the country in the world with greatest intensity of ISO 14001 certification (Marimón *et al.*, 2006; Casadesús *et al.*, 2008).

The phenomenon of ISO 14001 has been studied from different perspectives. The authors have studied it from the point of view of private, decentralized institutions (King *et al.*, 2005), self-regulatory institutions and market signalling (Terlaak and King, 2006; King and Toffel, 2007), the theory of cartels and clubs applied to voluntary programmes (Potoski and Prakash, 2005) and the self-regulation of companies (Mendel, 2002; King and Toffel, 2007).

The aim of this article is to analyze the influence of the sources of motivation that lead companies to establish these standards on the benefits they perceive that they derive from implementation and certification of the model, based on the information obtained from 214 Spanish companies that participated in a survey. An exhaustive review of the literature available regarding sources of motivation and the benefits of ISO 14001 was carried out. In addition, the distinction between internal and external sources of motivation is used to determine their influence on perceived benefits, determining which of them has greater influence. Previous research in the ISO 14001 field has not analyzed this issue.

The remainder of this paper is arranged as follows. Following this introduction, the motivations for and benefits from the ISO 14001 standard are analyzed from a theoretical perspective, involving a review of the academic literature published thus far on this issue. From this review, the working hypotheses are derived which will be used to structure this article. The results of a survey directed to Spanish companies are then described. Finally, the conclusions are presented, and the original contributions made by this research are identified.

2. Literature review and hypotheses development

2.1 Motivation for ISO 14001

There is a great deal of theoretical literature available regarding the sources of motivation leading companies to implement different self-regulation initiatives in their organizations, such as the ISO 14001 standard or the Eco-Management and Audit Scheme (EMAS) regulations, and this has aroused great academic interest, owing to the increasing use of these self-regulation mechanisms in the private sector.

There are two main theoretical approaches to this issue. From one perspective, it is suggested that self-regulation mechanisms are adopted due to pressures of an external nature. Although, there are many theories that define and classify these external factors that make companies behave in a similar way, the theoretical model established by the institutionalist authors Powell and Dimaggio (1991) is perhaps the most prominent one. These authors maintain that there are three types of external pressure that lead organizations to isomorphism or homogeneity: coercive, mimetic and regulatory

pressure. Coercive pressure consists of external formal and informal pressure established by those external institutions that influence companies such as public administration, customers and suppliers or, on another level, the social or cultural expectations in a given environment. Mimetic pressure refers to a change in course of action on the part of companies to model themselves on other organizations that they take as reference points. Regulatory pressure is related to professionalism and to factors of a psycho-emotional nature, which are the fruits of the influence of networks such as industrial associations or educational training processes. When these networks become formalized, they exert great influence over organizational isomorphism. In short, these authors consider organizations to be passive participants that respond to external pressures and expectations. This perspective is criticized by academics who argue organizations are dynamic and active and are able to respond in different ways according to their resources and capacities.

The alternative theory consequently focuses on explaining the sources of motivation that lead companies to implement self-regulation mechanisms such as the ISO 14001 standard or EMAS, from an internal perspective. This includes factors such as the company's internal strategy and its capacities, which may constitute a source of sustainable competitive advantage. Some scholars highlight the importance of the company's human resources, such as the attitudes of management, as capacities that motivate companies to establish environmental courses of action, whereas others focus on other intangible aspects such as organizational resources. In this respect, Hart (1995) suggests that proactive environmental management is in itself a potential internal strategic resource that may give companies a sustainable competitive advantage, especially in the case of companies that have certain noteworthy intangible resources.

Bansal and Roth (2000) focus on ISO 14001 and draw a distinction between three types of motive that lead companies to implement the ISO 14001 standard: ethical, competitive, and relational. Ethical motives are a response to feelings related to environmental responsibility, competitive motives arise from the search for competitive advantage and relational motives emerge from the desire on the part of companies to become legitimized and to improve the relationship existing between the different interest groups in the company (stakeholders).

Along similar lines, Neumayer and Perkins (2005) stress the fact that, broadly speaking, there are two sources of motivation that lead companies to implement this type of standard and to become certified in accordance with them: on the one hand, internal motives related to efficiency (efficiency motives) – that is, an improvement in performance, productivity and profitability – and, on the other hand, external or institutional motives related to the social pressure exerted by different agents to persuade company managers to adopt certain practices.

In the empirical literature, there is no clear consensus among specialists as to which are the main drivers for ISO 14001 (Table I). It would seem that most studies stress the fact that sources of motivation of an external nature are the ones that lead companies to implement and certificate ISO 14001. Specifically, attention is drawn to the influence of customer pressure and demands or those of other interest groups (UNC-ELI, 2001; Chin and Pun, 1999; Corbett and Kirsch, 2001; Gerde and Logsdon, 2001), as well as matters relating to the external image of the company (Schylander and Martinuzzi, 2007; Poksinska *et al.*, 2003; Hamschmidt and Dyllick, 2001), the motivation of sending out a message to potential consumers by stressing the company's environmental concern

Study	Sample	Country	Motives
Quazi <i>et al.</i> (2001)	300	Singapore	Genuine concern of top management, potential cost savings, employee welfare, environmental regulations, customer expectations, environmental trade barriers, head office environmental practices, and competitors' intention
Fryxell and Szeto (2002)	29	Hong Kong	Ensuring regulatory compliance, environmental performance improvement, customer expectations, cost reductions, external groups' pressure, and enhance firm reputation
Pokinska <i>et al.</i> (2003)	268	Sweden	Internal performance motives, external marketing and regulatory motives
Pan (2003)	2,968	Taiwan, Hong Kong, Japan, and Korea	<i>Export pressure</i> : customer and competitor pressure, marketing advantages, and avoid potential export barrier. <i>Other motives</i> : cost reductions, environmental improvements, capturing workers knowledge, relations with authorities, relations with communities, and corporate image
Yiridoe <i>et al.</i> (2003)	5	Canada	Internal factors: to increase production efficiency, to increase working environment safety, and to promote company goodwill and integrity. External factors: compliance with existing government regulations, anticipating future regulatory requirements, anticipating future market demands, pressure from customers
Zutshi and Sohal (2004)	286	Australia and New Zealand	High waste disposal costs, international trade barriers, to comply with regulatory requirements, pressure from the customers, suppliers, employees, the community, to identify potential areas for improvement, to monitor set targets, to benchmark with other organizations, to satisfy insurance, finance and other lending criteria, to explore market for green products, corporate image, to avoid liability costs from spills, and to ensure continual identification and implementation of cleaner production
Zeng <i>et al.</i> (2005)	108	China	To enter international market, to improve management, to satisfy customers' requirements
González-Benito and González-Benito (2005)	184	Spain	Operational competitive motivations (costs, productivity), commercial competitive motivations (market, image, customers), ethical motivations, and relational motivations (regulators, local organizations)
Schylander and Martnuzzi (2007)	71	Austria	To ensure legal compliance, systematization of environmental activities, to improve the environmental performance, risk minimization, to improve public image, to identify cost reduction potentials, to improve relation with authorities, technology improvement (cleaner production), and to improve employee motivation, to get new customers
Gavronski <i>et al.</i> (2008)	182	Brazil	Reactive motivations, internal motivations, legal motivations, and proactive motivations
Salomone (2008)	103	Italy	Local community pressures, customer pressures, distributor pressures, public authority pressures, competitiveness improvement, image improvement, product improvement, productivity improvement, reduced management costs, new market opportunities, and continual improvement

Note: Full citations for the studies' authors can be found in the references
Source: Summary compiled by the authors

Table I.
Motivations for ISO
14001: summary of the
main surveys

(King *et al.*, 2005), or the influence of pressure exerted by public administration (Del Brío *et al.*, 2002; Chan and Wong, 2006; Shin, 2005; Uchida and Ferraro, 2007).

Among the sources of external pressure, all studies highlight the influence of coercive pressure from customers in those sectors in which the degree of customer bargaining power is high. Thus, attention should be drawn to the prescriptive role played by major industrial purchasers. Examples might be found in the automotive industry (González *et al.*, 2008), where, by the 1990s, Honda in the Japan and General Motors and Ford in the USA were starting to ask their suppliers to become certified in accordance with ISO 14001, which gave rise to a strong chain reaction in the sector (Christmann and Taylor, 2006).

On the other hand, other studies stress the influence of factors of an internal nature (Ruddell and Stevens, 1998; Summers, 2002; Florida and Davidson, 2001), such as an improvement in the environmental behaviour of companies, an internal improvement in the organization, or employee motivation. Quazi *et al.* (2001) and Fryxell and Szeto (2002) also point out the potential for cost savings of ISO 14001. Similarly, Yiridoe *et al.* (2003) and González-Benito and González-Benito (2005) stress the potential to increase production efficiency and to increase working environment safety. Nevertheless, only the minority of surveys identify the presence of such internal driving factors, as has been stated above.

2.2 Benefits of ISO 14001

The results and benefits associated with the implementation and certification of ISO 14001 have also been analyzed very extensively in the academic literature, though not so much from a theoretical perspective, as the majority of contributions are of an empirical nature.

From the theoretical perspective, some authors base their approach on theory of natural company resources, and point out that implementation and certification in accordance with ISO 14001 may contribute towards the generation of valuable resources and capacities and, in turn, help create and maintain competitive advantage. As Cañón and Garcés (2006) say, the main resources and capacities that have been associated with the implementation process of these standards are learning and the acquisition of skills on the part of human resources, an improvement in the company's reputation, improvement of information systems and incentives to innovate. It has been shown that the underlying environmental policies in these standards are intensive in terms of human resources and, according to the literature available on the subject, depend on tacit skills that can only be acquired through the involvement of workers and teamwork.

For instance, attention is drawn to the fact that the involvement of employees depends to a great extent on the attitude of management towards the environment – specifically, on the corporate culture they have been able to promote (Darnall, 2006).

Generally speaking, empirical studies have corroborated the positive qualities inherent in applying these standards for business competitiveness and efficiency, although critical studies also exist that stress negative aspects and weaknesses deriving from the implementation of these international standards (Heras *et al.*, 2008).

There are many studies that highlight the improvement in the company's competitive advantage that results from an improvement in the internal efficiency of the company (Kollman and Prakash, 2002; Corbett and Russo, 2001; Montabon *et al.*, 2000; Florida and Davidson, 2001), a reduction in consumption of resources (Bansal and Bogner, 2002; Melnyk *et al.*, 2002), or an improvement in the performance of

certified companies (Rondinelli and Vastag, 2000; Chin and Pun, 1999; Russo and Harrison, 2001; King and Lenox, 2001; Tan, 2005; Link and Naveh, 2006). These studies include companies that implement and become certified in accordance with ISO 14001, and have been conducted by academics in countries as diverse as Hong Kong, Malaysia, Israel, and the USA. These studies also draw attention to the improvement in awareness on the part of management and employees of companies, which results in an improvement in internal efficiency (Rondinelli and Vastag, 2000).

All these results and other similar ones must be analyzed with great care. As the Evaluation of EMAS and Ecolabel for their Revision Survey, carried out by the European Commission, which examined the impact of EMAS regulation on company results (European Commission, 2005, 2008), the environmental performance of companies is characterized by its great inherent variability due, among other factors, to changes in usefulness in installed capacity, the prices of raw materials and product features. Consequently, it is difficult to assess whether a change in performance is due to the influence of implementation of an EMS or due to other factors.

To summarize the main benefits identified in the empirical literature are presented in Table II.

2.3 The relationship between motivations and benefits of ISO 14001

As has been noted, the theoretical and empirical literature in the field shows that the sources of motivation leading to ISO 14001 are diverse, due internal and external, and there is no clear predominance of certain sources of motivation over others. The sources of motivation leading to ISO 14001 are analyzed in this article, together with its benefits. To achieve this, it is necessary to analyze the relationship between aspects that are complex and inter-related, such as perceived motivational factors and the perceived results or benefits of the process.

The theoretical literature on this relationship in the context of ISO 14001, most of it from a practitioner perspective (Tibor and Feldman, 1996; Cascio *et al.*, 1996; Woodside *et al.*, 2004), underlines that more motivated companies experience greater benefits from the adoption of ISO 14001. In qualitative empirical studies this relationship has also been analyzed, and it has been found that the greater degree of motivation – whether of an internal nature (e.g. an improvement in the internal efficiency of the company) or external (e.g. customer demand) – the greater the benefits perceived by companies that implement and become certified in accordance with ISO 14001 (Hillary, 2000; Darnall *et al.*, 2000; Heras *et al.*, 2008; Kitazawa and Sarkis, 2000).

Unfortunately, the majority of the quantitative studies referred to in the previous sections, that analyzed both motivations and benefits, analyze them separately (Poksinska *et al.*, 2003; Pan, 2003; Zutshi and Sohal, 2004; Yiridoe *et al.*, 2003; Zeng *et al.*, 2005). In the literature, only in the survey by Gavronski *et al.* (2008) has this relationship been analyzed all together. In a survey of 63 Brazilian companies from the chemical, mechanical, and electronic industries, these authors concluded that the perceived internal motivations had a strong relationship with the perceived internal benefits, and external motivation correlated with external outcomes.

This previous theoretical and empirical evidence leads us to put advance the following two working hypotheses:

- H1.* Internal sources of motivation are positively related to the benefits of ISO 14001 implementation.

Table II.
Benefits of ISO 14001:
summary of the main
surveys

Study	Sample	Country	Benefits
Chin and Pun (1999)	6	Hong Kong	Lowered legal liability, improved profitability, and improved image and staff morale
Montabon <i>et al.</i> (2000)	1,510	USA	
Melnyk <i>et al.</i> (2002)	1,510	USA	ISO 14001 positively impacts both the performance of environmental management systems as well as corporate performance Position of the company in the marketplace, product's acceptability from the customer's perspective, reputation, to investigate alternative technologies and procedures, reduced waste, reduced costs, improved product quality, and reduced lead times
Melnyk <i>et al.</i> (2003)	1,222	USA	Positive and significant impact of EMS state on ten corporate performance measures
Pokinska <i>et al.</i> (2003)	268	Sweden	Internal performance benefits, external marketing benefits, and relations benefits
Pan (2003)	2,968	Taiwan, Hong Kong, Japan, and Korea	Cost reductions; increased productivity; quality improvements; environmental improvements; increased on-time delivery, customer satisfaction, market share; maintained/increased profit margin; improved internal procedures, employee morale, relations with authorities and communities; and improved corporate image
Yiridoe <i>et al.</i> (2003)	5	Canada	Goodwill and company integrity, working environment safety, community relationships, compliance with existing government regulations, overall benefits, competitiveness, advertising and marketing, and production efficiency
Johnstone <i>et al.</i> (2004)	2,000	Europe	Certified companies promote actions in order to improve their environmental performance
Szymanski and Tiwari (2004)	264	USA	Environmental performance: toxic emissions. A total of 75 per cent of the companies experienced a reduction in their emissions
Zutshi and Sohal (2004)	286	Australia and New Zealand	Waste reduction, cost savings from waste reduction/disposal, protection from prosecutions, fines and legal fees; among others
Potoski and Prakash (2005)	3,709	USA	Environmental performance: pollution emissions
King <i>et al.</i> (2005)	7,889	USA	Environmental performance: pollution generation
Zeng <i>et al.</i> (2005)	108	China	Internal operations; corporate management; marketing effects; supplier relations; and cleaner production
Cañon and Garcés (2006)	34	Spain	Financial performance. Negative impact of certification on pioneer, middle-polluting and lower size firms
Link and Navah (2006)	77	Israel	Environmental and business performance
Barla (2007)	37	Quebec	Variable impact on environmental performance (emissions)
Walba (2008)	156	Egypt	Positive and significant impact on the firm market value measured by Tobin's q ratio
Gavronski <i>et al.</i> (2008)	182	Brazil	Productivity benefits; financial benefits; market benefits; societal benefits
Russo (2009)	242	USA	Environmental performance: emissions

Note: Full citations for the studies' authors can be found in the references

Source: Summary compiled by the authors

H2. External sources of motivation are positively related to the benefits of ISO 14001 implementation.

On the other hand, it would also be interesting to analyze which sources of motivation – internal or external – are most related to obtaining the greatest benefits perceived by companies that implement and become certified in accordance with ISO 14001.

This is an issue that has yet to be analyzed quantitatively, although it has been subject to scrutiny in studies carried out on cases (Boiral and Sala, 1998; Rondinelli and Vastag, 2000; Kitazawa and Sarkis, 2000; Hillary, 2000; Heras *et al.*, 2008), from which it may be concluded that companies that implement and certify an EMS due to motives of an internal nature obtain better results than those that implement it only for external reasons.

Evidence of this type has also been obtained in quantitative studies related to the implementation and certification of the ISO 9001 standard, since prior research studies suggest that firms that pursue ISO 9000 certification for internal reasons obtain greater benefits than those pursuing it for external reasons (Lee, 1995; Jones *et al.*, 1997; Singels *et al.*, 2001; Boiral and Roy, 2007). ISO 9000 has many similarities with ISO 14001, in terms of its structure and dissemination process (Corbett, 2006; Marimón *et al.*, 2006), as the quality management philosophy and methods were imported into ISO 14001 from ISO 9000 (Fryxell and Szeto, 2002).

Furthermore, recent studies establish a pattern in terms of integration or internalization level or depth with which ISO 14001 and ISO 9001 are adopted (Christmann and Taylor, 2006; Boiral and Roy, 2007; Jang and Lin, 2008; Nair and Prajogo, 2009), in the sense that internal sources of motivation give rise to certain types of implementation of more substantial quality management systems or EMSs, with benefits that are also greater than those for types of implementation associated with external sources of motivation.

We advance the following hypothesis, taking the above evidence into account:

H3. Internal sources of motivation are more positively related to the benefits of ISO 14001 implementation than external ones.

3. Research methodology

3.1 Survey questionnaire development

In order to evaluate the research hypotheses, a questionnaire was developed to carry out a survey. The questionnaire consisted of two main parts. The first part contained both general company information (sector, number of employees, date of certification, previous available certifications, etc.) and respondent information (age, gender, number of years with the company). In the second part of the questionnaire, the research issues that are analyzed in Section 3.3 were included.

The design process for the questionnaire was in accordance with the objectives set out in the study, and it consisted of two different phases. In the first phase, a draft questionnaire was designed based on the international literature described above, and in particular on the work of Delmas (2002) and the Spanish research by Del Brío *et al.* (2002) and Giménez *et al.* (2003)[1], and previous research work undertaken by the authors themselves in the field of ISO 9001 (Heras *et al.*, 2003; Casadesús *et al.*, 2001).

In the second phase, a more developed version of the questionnaire was validated by carrying out exploratory case studies (Heras *et al.*, 2008) and personal interviews with different stakeholders (managers, consultants, auditors, representatives of

public administrations). Pre-tests were conducted and the definitive version of the questionnaire was then finalised.

This developmental approach to the design of the questionnaire ensured the content validity and accuracy of the questionnaire (Forza, 2002; Hensley, 1999; Malhotra and Grove, 1998), and the method is widely used in the field (González *et al.*, 2008).

3.2 Sample and data collection procedure

The survey was carried out in the Basque Autonomous Region of Spain, first because this is the region of Spain where ISO 14001 and ISO 9001 registrations are most concentrated (Heras *et al.*, 2008), and second, because the regional government has a public database of ISO 14001-certified companies, something that unfortunately does not exist for the rest of Spain. The absence of a register elsewhere makes it impossible to access only certified companies, since some of the most important auditing organizations in Spain do not collaborate with researchers by giving them data on certified companies.

The survey was sent with an accompanying introductory letter to the 658 companies with 815 currently valid certificates. After following up by telephone, the survey was concluded at the end of 2007, after the receipt of 214 valid responses in total from companies with valid ISO 14001 certificates. This is a response rate of 32.5 per cent, which is a very high rate for Spanish companies, since there is not a strong tradition of collaboration of firms with researchers (Del Brío *et al.*, 2002).

This survey was complemented with some field work of a qualitative nature in seven case studies, in which different stakeholders involved in the implementation and certification of ISO 14001 from the companies were interviewed in depth. This field work was completed in September 2008.

3.3 Measurements and analysis

Items were measured using the managers' perception of several aspects of the process of adoption of ISO 14001. Perceptual measures are often used in the empirical operations management literature and are considered to satisfy reliability and validity requirements (Ketokivi and Schroeder, 2004).

In our survey, the issue of the main reasons for companies to decide to implement the ISO 14001 standard and the benefits obtained from such implementation and certification were initially addressed with open questions, and later via closed questions. Responses were given on a five-point Likert scale (with values 1-5 being from least to greatest importance). The main responses to the open motivational question were relatively heterogeneous, although nearly 80 per cent of them could be reduced to seven sources of generic motivation that were similar to those identified in the closed questions. This is an indicator of the internal consistency of the questionnaire (Taylor *et al.*, 2007).

In contrast with this, the responses given regarding the benefits of implementing ISO 14001 and becoming certified were less heterogeneous, and over 95 per cent of responses matched the five factors regarding the main benefits of ISO 14001 that had been referred to in the academic literature. Subsequently, interviewees gave their ratings in closed questions on a five-point Likert scale. The specific factors assessed were, improvement in the external image of the company, improved compliance with laws and regulations, improvement in environmental efficiency (e.g. reduction in

consumption and waste), minimization of internal environmental problems in the company (e.g. leaks and dumping) and improvement in the competitive capacity of the company, plus an additional evaluation item about company satisfaction with the ISO 14001 implementation and certification process.

The motivational factors in favour of implementing and certifying ISO 14001 were grouped together into sources of motivation of an internal and external nature, drawing on both the theoretical and the practitioner literature (Tibor and Feldman, 1996; Woodside *et al.*, 2004), the academic literature (Delmas, 2002), and the empirical literature analyzed (especially Giménez *et al.*, 2003). In the case of sources of motivation of an internal nature, the following types were grouped together: motivation related to environmental improvement and sustainable development, motivation related to corporate decision making, previous experience in the field of quality control and other motives of an internal nature. As for external motives, the following were grouped together: motivations related to customer demands, external image, compliance with the current legislation, demands made by the public administration, and other factors of an external nature. There was also an open response option which invited respondents to identify “other motivations”.

In addition to the independent and dependent variables included in the analysis shown below, the following control variables were also included, based on the previous evidence from the literature: the size of the certified companies (measured by the number of employees), the sector in which the certified companies operate, based on a coarse division of sectors as industrial, service or construction companies, certification date, the value of the services provided by the consultancy firms, and previous ISO 9001 certification.

In order to test for internal consistency, a reliability test was carried out using the Cronbach's α as a statistic. To pass this test, it is usual to require a value of more than 0.6, while a value of over 0.7 is considered advisable (Robinson, 1991). In the present study, the construct of internal sources of motivation had an indicator value of 0.915, while in the case of external sources the value was 0.708, meaning that the questionnaire has suitable internal consistency.

To complement the above and to test construct validity, a factor analysis was carried out in which it was shown that, in the case of both the internal and external motivation construct, the percentage variance associated with the first component was 86.9 and 52.6 per cent, respectively, with the variance values of the rest of the components being low, meaning that both constructs can be considered to be unifactorial (Fornell and Lacker, 1981).

4. Results

The mean scores assigned by respondents provide an indication of the most common sources of motivation for seeking ISO 14001 certification. By grouping together, the motivational variables into two categories of external and internal factors, the mean for internal motivation can be seen to be marginally higher (3.77 as opposed to 3.35). On a disaggregated level, the strongest source of motivation for seeking certification was related to the external image of the company (4.04), environmental proactivity (3.93) and an improvement in the internal efficiency of the company (3.61). Other factors that are frequently referred to in the relevant literature such as demands made by customers (3.31) and the public administration (2.76) were not rated so highly.

As for the benefits perceived by companies, it is very interesting to note that the most highly rated benefit is compliance with environmental laws and regulations (4.32).

This is a point that had also been found in the qualitative studies carried out (Heras *et al.*, 2008) and which has also been demonstrated in other empirical studies conducted in countries with very disparate economic and administrative structures (e.g. Hamschmidt and Dyllick, 2001 in the Switzerland; Fryxell and Szeto, 2002 in the Hong Kong; Welch *et al.*, 2002 in the USA).

Although some practitioner perspectives identify ISO 14001 with compliance with an environmental standard (Whitelaw, 1998; Woodside *et al.*, 2004), the standard does not establish absolute requirements for environmental performance other than a commitment to compliance with applicable regulations (Delmas, 2002). This point has been given greater importance with the review of the standard in 2004, as the requirement for establishing a “Systematic process for evaluating compliance with applicable regulations and other requirements” (ISO, 2004) has been included in point 4.5.2 of the standard “Evaluation of Compliance”.

It is because of this that ISO 14001 is defined as a procedure standard rather than a performance standard, although this may need to be examined and analyzed in greater depth, as various studies, including the present one, have indicated that the standard is often understood by participants in terms of compliance with environmental legislation and regulations (Heras *et al.*, 2008). For some authors (Clapp, 2001), the requirement to comply with environmental regulations may not lead to much improvement, as firms should in theory already be complying with such regulations. However, the fact is that in some western countries, and in our opinion Spain is a good example, there are too many environmental regulations that are not systematically enforced, especially in SMEs, due to a lack of adequate public resources for monitoring and prosecuting non-compliance (Heras *et al.*, 2008).

In order to examine the relationship between internal and external motivational factors, respondents were grouped according to the four types of integration rationale that Boiral (2001, 2003) proposed for both ISO 14001 and ISO 9001. This typology was applied in a quantitative empirical survey for ISO 9001-certified firms (Boiral and Roy, 2007), and we now use it for ISO 14001-certified firms. Following the method of Boiral and Roy (2007), we used the median as the cut-off point between the groups.

As shown in Figure 1, the biggest group consists of mobilizing integrators (40 per cent of the firms), companies that adopt the standard due to both internal and external motivations. In these companies, the integration of ISO 14001 into management practices is strongly supported, and the ISO 14001 system takes on a strategic dimension (Boiral, 2001). In the survey by Boiral and Roy (2007) for the ISO 9001 certified companies, this was also the bigger group (34 per cent of the firms). In our survey, the second biggest group consists of proactive integrators (26 per cent of the firms), followed by ritual integrators (19.48 of the firms) and reactive integrators (14 per cent of the firms).

A cross tabulation was performed to examine the relationships between integration rationale, sector, certification date and firm size (Table III). Results suggest significant differences in the proportion of respondents according to each of those control variables. Larger firms had a greater proportion of both “Mobilizing integration” and “Reactive integration”; the proportion of “Ritual integrators” was smaller. Results were quite different for smaller firms, where the proportion of “Ritual integrators” was greater. These results are quite similar to those obtained by Boiral and Roy (2007) for ISO 9001. Regarding the sectorial breakdown, the proportion of “Ritual integrators”

<i>External motivations</i>	<i>High</i>	Ritual integration (19.48% ^a) <ul style="list-style-type: none"> • High level of Image improvement and Competitiveness improvement • Low level of Satisfaction of implementation and certification • Lowest level of Fulfil the laws and regulations, Environmental effectiveness improvement and Minimize environmental problems 	Mobilizing integration (40.02% ^a) <ul style="list-style-type: none"> • Highest level of Satisfaction, Image improvement, Fulfil the laws and regulations, Environmental effectiveness improvement, Minimize environmental problems and competitiveness improvement
	<i>Low</i>	Reactive integration (14.35% ^a) <ul style="list-style-type: none"> • Low level of Image improvement, Fulfill the laws and regulations, Environmental effectiveness improvement, Minimize environmental problems and Competitiveness improvements • Lowest level of Satisfaction of implementation and certification 	Proactive integration (26.15% ^a) <ul style="list-style-type: none"> • High level of Satisfaction of implement. & certification, Fulfil the laws and regulations, Environmental effectiveness improvement and Minimize environmental problems • Lowest level of Image improvement and Competitiveness improvements
		<i>Low</i>	<i>High</i>
<i>Internal motivations</i>			

Note: Significant differences; Chi-square, $\chi^2 = 30.327$

Source: ^aPrepared by the authors based on the typology proposed by Boiral (2001) and Boiral and Roy (2007)

Figure 1.
The integration level of the ISO 14001 standard

	Mobilizing integration (%)	Proactive integration (%)	Ritual integration (%)	Reactive integration (%)	Significance level <i>p</i>
<i>Size</i>					
Small	33.3	26.98	30.16	9.52	0.253
Medium	41.18	27.94	17.65	13.24	0.627
Large	46.88	28.13	3.13	21.88	0.425
<i>Sector</i>					
Manufacturing	41.40	33.60	10.90	14.10	0.143
Construction	47.62	14.27	33.27	4.84	0.375
Services	35.74	11.92	38.06	14.28	0.134
<i>Certification date</i>					
Before 31 December 2000	53.85	23.08	12.82	10.26	0.050
Between 1 January 2001 + 31 December 2004	37.40	26.72	21.37	14.50	0.287
After 1 January 2005	28.57	28.57	19.05	23.81	0.239

Source: Prepared by the authors

Table III.
Integration rationale, firm size, sector and certification date

was greatest for services companies (even though these companies are taking into account that these firms are on average smaller – Table V).

In Table IV, the relationship between the integration level and the perceived benefits of ISO 14001 implementation and certification is analyzed, based on an analysis of

Table IV.
Integration rationale and
results of implementation
and certification

	Mobilizing integration	Proactive integration	Ritual integration	Reactive integration	Significance level <i>p</i>
Image improvement	3.98	3.53	3.97	3.74	0.011
Fulfil the laws and regulations	4.64	4.46	3.78	4.03	0.004
Environmental effectiveness improvement	4.23	3.96	3.55	3.57	0.001
Minimize environmental problems	4.23	3.74	2.65	2.67	0.000
Competitiveness improvement	3.58	3.44	2.38	2.48	0.000
Satisfaction	4.22	4.07	3.68	3.70	0.001

Source: Prepared by the authors

variance on the average scores for each benefit. On the issue of image improvement associated with the standard, the results demonstrate that both “mobilizing integrators” and “ritual integrators” seem to have noted more improvement. Similarly, “ritual integrators” and “reactive integrators” are also the groups that score lower on the impact on the fulfilment of laws and regulations and the reduction of environmental problems. In contrast with this, those groups are the ones that note less competitiveness improvement and lower satisfaction with the process of implementation and certification of ISO 14001.

Once the sources of motivation and the main benefits had been identified, which led companies to implement and certify the ISO 14001 standard, we then used statistical regressions to test the hypotheses that have been put forward. Table V contains a summary of the correlations between the variables subjected to analysis.

The purpose of our regression analysis is to evaluate the effects of two independent variables (internal and external motivations) on each dependent variable, namely, the results and the satisfaction of ISO 14001 adoption. With that aim, we have carried out six regressions in two steps. In the first step, we have introduced each dependent variable and the control variables, and in the second step, the internal and external motivations. To analyze the significance of the regression model, we have used the *F*-value for the regression and for the step, and as shown in Table VI. In the second step, the regression is significant for all cases for the step, and, with the exception of the case of the item “Image improvement”, for the regression, too. The significance of these values and the betas of the independent variables are evidence for the influence of the motivations over the results and satisfaction (Cohen and Cohen, 1983; Jaccard *et al.*, 1990; Dean and Snell, 1991). The values of R^2 in the second step are increased by the dependent variables and they explain between 11.8 and 45.7 per cent of the variance of the dependent variables.

In relation to the control variables, although generally speaking, the correlation coefficients are not very high, and the regression coefficients are not significant, with the exception of one case, it is observed that the sector influences the motivations and the results. There is a significant positive correlation between the manufacturing firms and internal motivations and the outcomes related to the fulfilment of laws and regulations and the minimization of environmental problems. In addition,

	Mean	SD	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1. Manufacturing	0.66	0.47	1														
2. Construction	0.12	0.31	-0.475**	1													
3. Services	0.22	0.41	-0.725**	-0.175*	1												
4. Firm size	2.78	0.81	0.314	-0.026	-0.327**	1											
5. Certification date	1.88	0.58	-0.089	0.089	0.027	-0.350**	1										
6. Consultancy services	3.84	0.93	-0.105	-0.007	0.101	-0.144	0.082	1									
7. ISO 9001 certification	0.84	0.36	0.134	-0.026	-0.034	0.170*	-0.076	-0.076	1								
8. Internal motivation	3.77	1.08	0.230**	0.012	-0.208**	0.067	-0.172*	-0.156	0.068	1							
9. External motivation	3.35	0.82	-0.210**	0.159*	0.172*	-0.018	-0.103	-0.009	-0.043	0.556**	1						
10. Image improvement	3.85	0.96	-0.117	0.090	0.098	0.023	0.045	0.118	-0.128	-0.001	0.307**	1					
11. Fulfil laws/regulations	4.32	0.89	0.309**	-0.046	-0.287**	0.071	-0.119	0.067	-0.011	0.401**	0.180*	0.090	1				
12. Environmental effectiveness	3.93	0.96	0.093	0.025	-0.144*	-0.006	-0.062	0.024	-0.077	0.346**	0.051	0.080	0.281**	1			
13. Minimize environmental problems	3.58	1.20	0.179*	0.061	-0.222**	0.121	-0.114	-0.055	0.034	0.521**	0.120	0.069	0.390**	0.481**	1		
14. Competitiveness improvement	3.08	1.18	-0.228**	0.136	0.178*	-0.137	-0.077	0.081	-0.083	0.041	0.525**	0.340**	0.060	0.133	0.255**	1	
15. Satisfaction	4.01	0.71	0.106	-0.127	0.008	0.092	-0.137	0.127	-0.014	0.332**	0.193**	0.179*	0.323**	0.279**	0.166*	0.170*	1

Notes: * $p < 0.05$ and ** $p < 0.01$ in two-tailed tests; cell entries are standardized coefficients
Source: Prepared by the authors

Table V.
Descriptive statistics and correlations for motivations and benefits of the process of implementation and certification of ISO 14001

Table VI.
Results of regression
analysis for motivations
for seeking ISO 14001
certification and the
benefits of
implementation and
certification

	Image improvement		Fulfil the laws and regulations		Environmental effectiveness improvement		Minimize environmental problems		Competitiveness improvement		Satisfaction	
	Step 1	Step 2	Step 1	Step 2	Step 1	Step 2	Step 1	Step 2	Step 1	Step 2	Step 1	Step 2
<i>Control variables</i>												
Sector (dummy-coded)												
Industry	-0.054	-0.044	0.246	0.255	-0.031	-0.024	0.527	0.535	0.296	0.317	0.030	0.043
Construction	0.110	0.086	-0.011	-0.012	0.044	0.061	0.351	0.375	0.353	0.310	-0.115	-0.127
Services	0.132	0.120	-0.126	-0.064	-0.016	0.071	0.310	0.443	0.392	0.392	-0.042	0.009
Firm size	0.124	0.142	0.016	0.037	0.244*	0.257*	0.125	0.146	-0.052	-0.012	0.034	0.062
Certification date	0.111	0.139	-0.109	-0.048	0.071	0.127	0.012	0.100	-0.052	0.020	-0.083	-0.013
Consultancy	0.105	0.116	0.116	0.160*	0.076	0.124	0.003	0.077	0.052	0.089	0.129	0.076
ISO 9001	-0.040	-0.032	0.021	0.036	0.026	0.040	0.107	0.128	0.060	0.080	-0.053	-0.034
<i>Independent variables</i>												
Internal motivation	-0.028			0.307**		0.406**		0.625**		0.054		0.397**
External motivation	0.234**			0.194**		0.071		0.135		0.494**		0.177
<i>Model information</i>												
R ²	0.064	0.118	0.158	0.279	0.058	0.214	0.081	0.457	0.058	0.295	0.047	0.265
F for the regression	1.174	1.749	3.219**	5.081**	1.050	3.544**	1.505	11.032**	1.061	5.488**	0.842	3.973**
F for the step	1.174	3.582*	3.219**	9.924**	1.050	11.616**	1.505	40.875**	1.061	19.818**	0.842	14.849**

Note: Significance at: * $p < 0.05$ and ** $p < 0.01$ in two-tailed tests

Source: Prepared by the authors

the adoption of ISO 14001 in service and construction firms is significantly more motivated by external aspects, and the perception of better results is related with competitiveness improvement. Moreover, company size is not significantly correlated in all cases, even though it does appear to have a positive influence on the internal sources of motivation and on the internal benefits of ISO 14001, such as the minimization of environmental problems, and improvement of environmental effectiveness. Also, the certification date is negatively correlated with motivations and results, but this relationship is only significant for internal motivations. Early adopters appear to have higher motivation, especially internal, and they get better results. The value of the service provided by the consultancy firms in the process of ISO 14001 adoption is not significantly correlated with the motivations or results, but seems to have a negative influence on the motivations and a positive one on the main results, especially image improvement and satisfaction. The last control variable, previous ISO 9001 certification, does not have an important influence on either motivation or results, contrary to what was expected based on Zhu and Sarkis (2004).

In the analysis of the independent variables, there are positive relationships between the degree of internal motivation (*H1*) and external motivation (*H2*) and the benefits of ISO 14001, although this relationship is not statistically significant for all the items analyzed. For internal motivation, we found significant influence in four of the six results analyzed. In these cases – fulfil the laws and regulations, environmental effectiveness improvement, minimize environmental problems and satisfaction – the influence is quite strong, changing the beta coefficients by between 0.307 and 0.625. On the other hand, external motivation has positive influence in all six cases, and this influence is significant in four cases – image improvement, fulfil the laws and regulations, competitiveness improvement and satisfaction. However, the beta values of the external motivations, except in the case of the competitiveness improvement, do not reach 0.24. Thus, the results of these analyses provide only partial support for both *H1* and *H2*.

H3 would seem to be confirmed with greater clarity, given that the correlation and regression coefficients in the case of internal sources of motivation are statistically significant and greater than those for external sources of motivation in four of the six benefits analyzed. These four areas are the factors that, according to Christmann and Taylor (2006), might be deemed important as far as ISO 14001 adoption is concerned, and are the factors involving minimization of problems (correlation coefficient 0.521 as opposed to 0.120 and regression coefficient 0.625 as opposed to 0.135), improvement in environmental efficiency (correlation 0.346 as opposed to 0.051 and regression 0.406 as opposed to 0.071) and compliance with laws and regulations (correlation 0.401 as opposed to 0.180 and regression 0.307 as opposed to 0.194).

Firms that adopted ISO 14001 motivated by internal drivers were generally more satisfied with the process than those responding to external factors (correlation coefficients of 0.332 and 0.193 and regression coefficients of 0.397 and 0.177, respectively). It is also interesting that this relationship would appear to be independent of the control variables in the model, i.e. by sector of activity, size of company, certification date, consultancy or previous adoption of ISO 9001.

5. Discussion and conclusions

In the survey summarized in this paper, it transpired that there is a positive relationship between the level of internal and external motivation of Spanish

companies when implementing and certifying the ISO 14001 standard and the benefits that, in the managers' opinion, they obtain from that process.

On the other hand, it also appears that is a stronger relationship between the sources of motivation of an internal nature in the implementation and certification of the standard and the benefits obtained from that process. Those internal motivations include customer satisfaction with the process, which corroborates some previous theoretical suggestions in both the academic and practitioner literature regarding the implementation of ISO 14001. This finding also coincides with prior research into ISO 9001 which concluded that firms that pursue this certification for internal reasons obtain greater benefits than those pursuing it for external reasons (Lee, 1995; Jones *et al.*, 1997; Singels *et al.*, 2001; Boiral and Roy, 2007).

Furthermore, based on the works by Boiral (2001) for ISO 14001 and by Boiral and Roy (2007) for ISO 9001, in this article, we have concluded that the four types of integration of ISO 14001 play a key role in the perceived levels of business benefits and satisfaction with the adoption process. Focusing on the performance of the "ritual integrators" (firms with high level of external motivation and low level of internal motivation), as anticipated by institutional and neo-institutional theory, it has to be noted that members of this group attach less importance to outcomes such as the impact on the fulfilment of laws and regulations and the minimization of environmental problems. These have been identified as two important internal outcomes of ISO 9001 adoption in the literature (Christmann and Taylor, 2006). In contrast with this, "mobilizing integrators" (firms with high level of external motivation and high level of internal motivation) have higher perceived benefits.

The implications of the findings will be of great interest to the main stakeholders involved in the implementation and certification of ISO 14001, especially managers, consultants, certified bodies and the public administration. We have found that internal and external motives give rise to different benefits for companies certified in accordance with ISO 14001, irrespective of the size of the company or the sector of activity. Furthermore, companies motivated by internal factors perceive superior benefits, including greater satisfaction with the process itself.

Finally, there are two possible limitations to our survey and possible lines for future work should be mentioned. The methodology used to obtain the quantitative information, even though it is fairly conventional and is similar to approaches that have been generally accepted, does have limitations. As with the vast majority of quantitative studies, the information used in this paper is based on the perceptions of specialized managers who have taken part in the EMS introduction process, and any analyses of the effect of EMSs conducted in this way are subject to at least two possible weaknesses and methodological distortions. On the one hand, even though perceptual measures are considered to satisfy reliability and validity requirements, in cases where motivations and outcomes are analyzed together, as in this case, there could be some interpretation problems for the respondents, since some perceived benefits could also be the motivation factors for ISO 14000 adoption (Podsakoff and Organ, 1986; Ketokivi and Schroeder, 2004). Similarly, Boiral and Roy (2007) stressed that reverse causality bias could be a problem, since the outcomes of ISO 14001 adoption may influence the perception of its drivers. On the other hand, there is also a conventional self-reporting bias, due to the personal interests of the respondents, a problem that Wayhan *et al.* (2002), Wayhan and Balderson (2007), Heras *et al.* (2002)

and Boiral and Roy (2007) have identified in the case of the ISO 9001 standard, and that Nawrocka and Parker (2009) have recently pointed in the case of EMSs. In order to avoid these problems, it would be interesting, as suggested by Ketokivi and Schroeder (2004), to use quasi-perceptual data, as this data may be affected less, because it defines the content of measurement exactly, and to avoid gathering information for single informants. Consequently, future surveys might collect, analyze and triangulate information from various stakeholders, including middle managers, employees, suppliers, customers and auditors.

There is also a limitation in terms of the geographic area in which the survey has been carried out. Although many surveys have been conducted in Spain, in different regions, that have obtained similar results using similar or identical study methodologies (Casadesús *et al.*, 2001; Giménez *et al.*, 2003; Bernardo *et al.*, 2009), the extrapolation of results to other international environments is not so simple. In this respect, and given the degree of maturity of dissemination of ISO 14001, we consider that it would be desirable to conduct a global survey of the organizational incidence of this standard along the lines used by Corbett (2006) in the case of ISO 9001 (a global survey of over 5,000 firms in nine countries), for which purpose it would be important to establish an active network among researchers in the field.

Note

1. It should be stressed that the previous empirical work carried out in Spain regarding the implementation of ISO 14001 was undertaken over a very different period from that of this study, as it was carried out during the first phase of introduction of ISO 14001, at a time when Spanish companies did not hold the leading position in terms of certification intensity.

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