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## STILL IMPLEMENTING ISO 14000 FOR THE SAME REASONS?

### Article info:

Received 19.09.2018

Accepted 05.01.2019

UDC – 04.057.2

DOI – 10.24874/IJQR13.01-07

**Abstract:** *Purpose – The purpose of this paper is to (1) identify and classify the main motives that underpin the theoretical and empirical studies of ISO 14000, and (2) to analyze the evolution of these motives regarding time, geographic domain and industry.*

*Design/Methodology/Approach – The analysis was conducted through a literature review, analyzing 66 articles between 1998 and 2017 from Scopus and/or Web of Science databases.*

*Findings – A categorization of motives to implement the ISO 14001 standard is proposed. The main important motivations are external: customer pressure and compliance with legal frameworks. These motivations remain unchanged over time.*

*Asia is the region that pays the most attention to the standard, followed by Europe.*

*Finally, the service sector should be analyzed with more detail, as the manufacturing sector has been the focus of most studies.*

*Originality/Value – Policymakers, management bodies and standardization agencies can benefit from these findings.*

**Keywords:** *Environmental Management System, EMS Motivations, ISO 14000, Systematic Review*

## 1. Introduction

Over the last decades there has been an emergence of a novel paradigm of management focused on quality and sustainability. Quality and Environmental Management Systems have become very popular, and an increasing number of organizations are adopting third-party certifiable management systems (Heras-Saizarbitoria, Arana Landín, & Boiral, 2016; Santos, Rebelo, Lopes, Alves, & Silva, 2016).

The International Organization for Standardization (ISO) is an independent and non-governmental international organization that began operating in 1947. Its purpose was to facilitate the international coordination and

unification of industrial standards. Until now, ISO has published over 22,008 standards that cover every industry, from manufacturing to services and technological or managerial aspects (International Organization for Standardization 218a).

ISO 9000 and ISO 14000 are two of the most popular standards around the world, and during the past years their implementation has increased steadily (Marimon, Casadesús, & Heras-Saizarbitoria, 2006; Marimon, Heras, & Casadesús, 2008; Marimon, Heras-Saizarbitoria, & Casadesús, 2009; Marimon, Casadesús, & Heras-Saizarbitoria, 2010; Casadesús, Marimon, & Heras, 2008; Bernardo, Casadesús, & Karapetrovic, 2011; Llach, Marimon, & Bernardo, 2011). ISO

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9000 covers aspects related to quality management, and ISO 14000 covers environmental management issues.

ISO has published a set of norms, rules and values that can be used as a basis for environmental management and as a guide for organizations to improve their performance. The ISO 14000 family standards provide consumers, regulators and organizations with environmental tools having six characteristics: (1) technically credible, (2) fulfill stakeholder needs, (3) facilitate the development of uniform requirements, (4) promote efficiencies, (5) support regulatory compliance and (6) enhance investor confidence (International Organization for Standardization 2018b).

These standards have been studied by many authors over the years with the purpose of identifying the motivations, benefits or costs, and barriers of implementing them (Dick, Heras-Saizarbitoria, & Casadesús, 2008) The motives for implementing each of these standards can be a decisive point for the benefits obtained, as they have a significant impact on the benefits of certification (Boiral & Roy, 2007). Previous literature analyzes specific sectors, or regions, or particular cases. However, different questions have been addressed in literature respecting this topic: Are environmental management systems still being implemented for the same reasons as a few years ago? Have these reasons changed over time? Are there different motivations to adopt ISO 14000 among countries or continents? Are there different reasons according to whether the companies are industrial or provide services? None of the previous papers have done a full literature review on this matter. So, the objective of this paper is twofold: (1) to carry out a thorough review of all aspects concerning motivations of companies to implement the ISO 14000 standard, as well as to identify and classify the different motivations; (2) analyze the evolution of the application of the ISO 14000 standard. This objective was set, taking into account the time

period, geographic area and activity sectors. To achieve the purpose of this article, a literature review of all articles on this subject found in Scopus and ISI Web of Science was undertaken. By analyzing all the articles according to the above three aspects, a secondary objective was set of giving the reader a deeper knowledge of the evolution of the research made on this standard and the motives for implementing it.

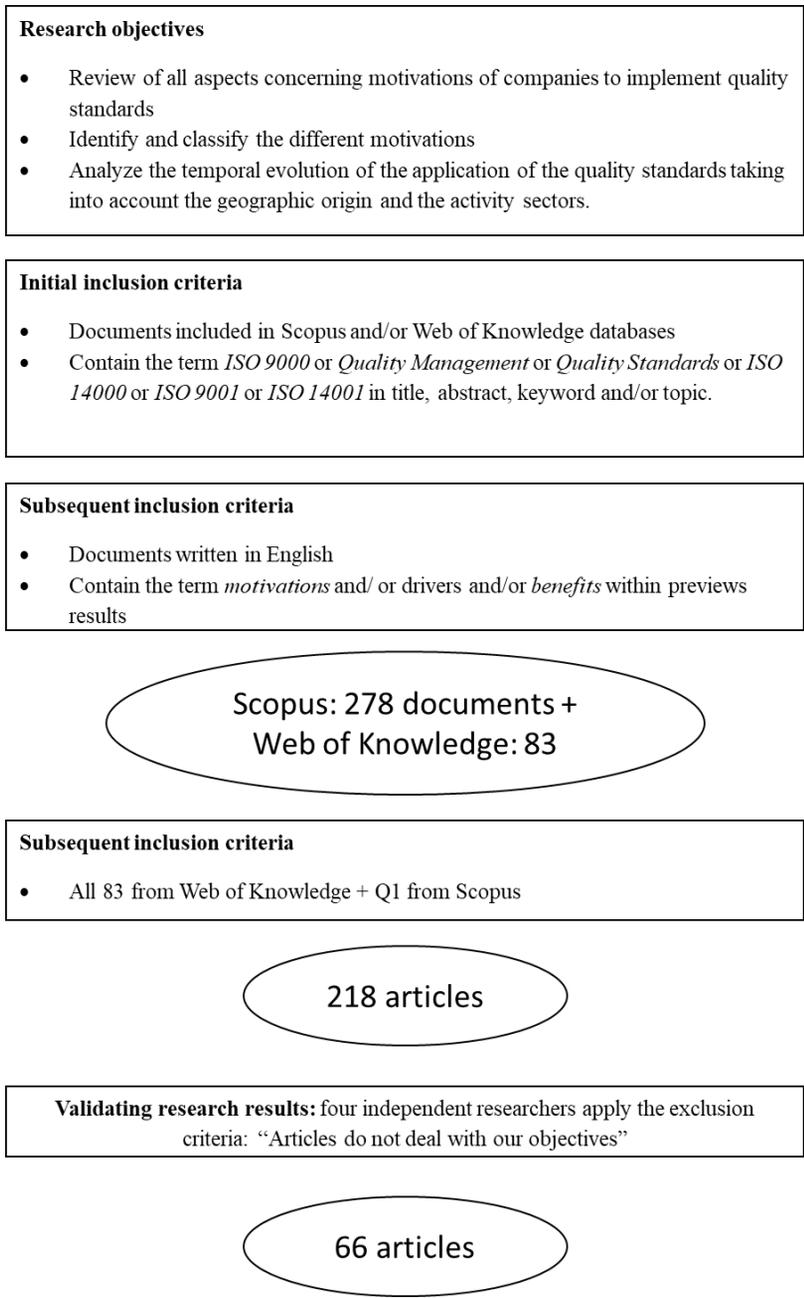
The paper is structured as follows. First, the research method is presented, followed by a summary of the current state of motivations attained by the environmental management system implemented through the ISO 14000 standard. The following section presents the results of the research and, finally, the paper ends by the conclusions and discussing the main findings and the implications for management and practice. Limitations and possible avenues for future research are also outlined.

## 2. Methodology

In order to fulfill the main goals of this research, a comprehensive database with specific inclusion and exclusion criteria was built. Figure 1 shows the steps followed to find the papers analyzed. To that end, all articles containing specific terms in two databases, Scopus and ISI Web of Science, have been researched. These databases are believed to contain all relevant publications in the area of business and management. As depicted in Table 1, four different searches have been done in both databases.

After combining the four searches from Scopus, 278 unrepeated articles were left from this database, and after combining the four searches from ISI Web of Science, 83 unrepeated articles were found. To determine the quality of the journals, the Scimago Journal & Country Rank (SJR) index, as reported on the Scopus website, was used as a guide. To focus on high-quality journals, it was decided to narrow the search by keeping all 83 articles from ISI Web of Science, but to

include only the articles from journals in the first quartile (Q1) for those found in Scopus (specifically, journals that were in the Q1 by the end of 2016).



**Figure 1.** Summary of the systematic literature review search

**Table 1.** Summary of the systematic literature search

<b>Scopus - Search for the following terms:</b>	
1	ISO 14000 (622 docs.) > English documents (556) > motivations (49) > articles (39)
2	ISO 14000 (622 docs.) > English documents (556) > motives (24) > articles (18)
3	ISO 14001 (1,788 docs.) > English documents (1,605) > motivations (273) > articles (219)
4	ISO 14001 (1,788 docs.) > English documents (1,605) > motives (107) > articles (84)
<b>Web of Science - Search in all databases - Search for the following terms:</b>	
1	ISO 14000 (563 docs.) > English documents (516) > motivations (15) > articles (11)
2	ISO 14000 (563 docs.) > English documents (516) > motives (2) > articles (1)
3	ISO 14001 (2,556 docs.) > English documents (2,373) > motivations (73) > articles (68)
4	ISO 14001 (2,556 docs.) > English documents (2,373) > motives (17) > articles (16)

Following this rule, and after combining the articles in both databases, 218 articles remained. For these 218 articles, an evaluation was done for each article to check whether it really addressed the objectives of the study. Those that did not match the objectives were discarded. A significant number of papers analyze were discarded because the abstract did not any reference to motivations. In that way, 66 research articles remained from high-quality journals, dealing

with motivations for environmental management systems in companies.

The 66 articles were published in 40 different journals. Some journals included up to 16 articles, while others only included one. Table 2 offers a comprehensive list of all journals, the number of articles in each of them and their respective ranking in both the Journal Citation Report (JCR) Thomson Scientific and SCImago Journal Rank (SJR).

**Table 2.** List of journals in the literature review, journal ranking and articles per journal

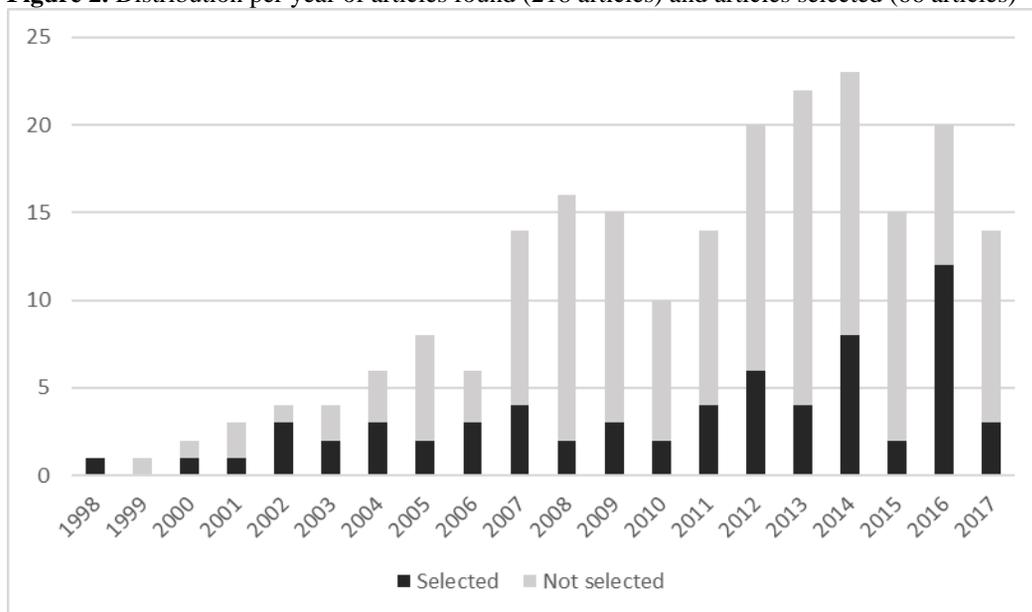
Journal	Article Count	%	2017 SJR Index	2017 SJR Quartile	2017 JCR Index	2017 JCR Quartile
Journal of Cleaner Production	16	24.24%	1.615	Q1	5.715	Q1
Business Strategy and the Environment	4	6.06%	2.228	Q1	3.076	Q1
Journal of Environmental Management	4	6.06%	1.141	Q1	4.010	Q1
Corporate Social Responsibility and Environmental Management	2	3.03%	2.217	Q1	2.852	Q1
Ecological Economics	2	3.03%	1.712	Q1	2.965	Q2
Environmental Management	2	3.03%	0.794	Q2	1.878	Q2
Journal of Environmental Planning and Management	2	3.03%	0.798	Q1	1.560	Q3
Total Quality Management and Business Excellence	2	3.03%	0.652	Q1	1.368	Q3
Others	32	48.48%	-	-	-	-
Total	66	100.00%	-	-	-	-

As shown in the table 2, the Journal of Cleaner Production (JCP) is, by far, the journal that includes the most articles (16), with 24% of the 66 articles analyzed belonging to this journal. The JCP is followed by Business Strategy and the Environment, which includes only 4 articles (6% out of the 66 articles). When analyzing ISO 14000, the importance of the JCP should be taken into consideration. Based on the number of articles related to this standard that can be found in the JCP, the journal's impact factors

(SJR and JCR), and the quartile (Q1), the JCP can be used as a good reference for future research.

No restrictions were placed on the search in terms of time period. This was done intentionally to identify all articles since the topic originated. Figure 2 shows the distribution per year for all the articles found (218 articles) and the distribution per year for the final articles selected (66 articles).

**Figure 2.** Distribution per year of articles found (218 articles) and articles selected (66 articles)



Although the ISO 14000 standard was first published in 1996, the first article found was in 1998, two years later. Since then, there has been an increasing tendency in the number of articles published over the years. Figure 2 shows that the largest increases in articles published took place between 2005 and 2007, and between 2009 and 2012. From 2005 to 2007, the number of articles published increased by 75%, while from 2009 to 2012, the increase was 33%.

### 3. Motivations for the ISO 14000 standard

This section is devoted to investigating the motivations that organizations have in order to implement a management standard based on the ISO 14000 norms.

The reasons for implementing ISO 14000 certification can vary according to different authors, but after analyzing the available literature it can be concluded that there are two kinds of motivations: internal and external (Heras-Saizarbitoria, Arana Landín,

& Molina-Azorín, 2011; Prajogo, Tang, & Lai, 2012; Qi, Zeng, Li, & Tam, 2012; Niu & Fan, 2015; Tuppura, Toppinen, & Puumalainen, 2016). However, although a high number of authors classify according to these two categories, not all the authors use these categories. For example, Gavronski, Ferrer, & Paiva (2008) grouped motivations into reactive, internal, proactive and legal motivations, while Iatridis, Kuznetsov, & Whyman (2016) identified four main categories: coercive, normative, mimetic and internal efficiency motives. Similarly, Singh, Jain, & Sharma (2015) described relational, innovational, operational and business motivations.

The theoretical foundations for external and internal motives are based on two different orientations (Gavronski, Iuri, Ely L. Paiva, Rafael Teixeira, & Marta Cleia Ferreira De Andrade, 2013; Prajogo, 2011): the institutional theory, which involves external motives, and the resource-based view (RBV) theory, which involves internal motivations. The institutional theory suggests that companies are influenced by external factors such as society and environment, which affect the decisions and development related to the firm's organization and management practices (i.e., implementing a standard to comply with social norms and to adjust to environmental practices adopted by other companies) (Gavronski et al., 2013). On the other hand, the RBV theory suggests that when implementing ISO standards, firms are influenced by internal factors (resources and capability) such as procedures, costs and quality improvements rather than external pressures (Prajogo, 2011).

According to literature, for ISO 14000, the main external force that drives companies to seek certification is customer pressure, which includes satisfying clients' requirements, finding solutions for customers' problems and satisfying customers' expectations (Chan & Wong, 2006; Heras-Saizarbitoria & Arana Landín, 2010; Massoud, May, Fayad, El-Fadel, & Kamleh, 2010; Niu & Fan, 2015; Pan, 2003; Prajogo et al., 2012; Qi et al.,

2012; Quazi, Hesan, Khoo, Tan, & Wong, 2001; Tuppura et al., 2016). The second most common motivation is the desire to improve company image and reputation, including marketing and promotion strategies in order to obtain brand and company enhancement (Studer, Welford, & Hills, 2006; Santos et al., 2016; Qi et al., 2012; Pan, 2003; Massoud et al., 2010; Mariotti, Kadasah, & Abdulghaffar, 2014; Kudlak, 2017; Kehbila, Ertel, & Brent, 2009; Heras-Saizarbitoria & Arana Landín, 2010; Gavronski et al., 2008; Fryxell & Szeto, 2002). Although companies seeking ISO 14000 certification mainly identify the reasons mentioned above, the literature shows that some companies also seek certification in order to comply with policies, laws and regulations (Prajogo et al., 2012; Niu & Fan, 2015; Mariotti et al., 2014; Kudlak, 2017; Heras-Saizarbitoria & Arana Landín, 2010; Heras-Saizarbitoria et al., 2011; Fryxell & Szeto, 2002; Chen, Li, Shen, & Xu, 2004; Chan & Wong, 2006) and due to incentives or persuasion by public organizations, industry organizations, the government and NGOs (Chen et al., 2004; Gavronski et al., 2013; Studer et al., 2006). Another underlying motive for seeking ISO 14000 certification is to increase export capacity or enter international markets, adapt to the behavior of the market and its expectations, or increase market share (Chan & Wong, 2006; Gavronski et al., 2013; Heras-Saizarbitoria et al., 2011; Kudlak 2017; Mariotti et al., 2014; Massoud et al., 2010; Pan, 2003; Qi et al., 2012; Quazi et al., 2001; Santos et al., 2016; Tuppura et al., 2016; Zeng, Tam, Deng, & W.Y. Tam, 2003; Zeng, Tam, Deng, & W.Y. Tam, 2005). Most companies are also motivated by the desire to differentiate themselves from competitors, or in response to the pressure from competitors in the industry (Tuppura et al., 2016; Studer et al., 2006; Quazi et al., 2001; Prajogo et al., 2012; Pan 2003; Heras-Saizarbitoria et al., 2011; Gavronski et al., 2008; Chan & Wong, 2006; Chen et al., 2004). Although it is not very common, companies seeking ISO 14000 are also motivated by the pressure and

requirements from suppliers or to improve their supply chain and supplier relationships (Chen et al., 2004; Gavronski et al., 2008; Heras-Saizarbitoria et al., 2011; Kudlak, 2017; Mariotti et al., 2014; Studer et al., 2006). Finally, the desire to make better use of resources – such as reducing waste, energy, electric power, water, gas and oil (Qi et al., 2012; Mariotti et al., 2014) – are drivers frequently mentioned as well. Moreover, ISO 14000 certification is a standard that provides tools for companies to improve their environmental performance, so as expected, some authors mention environmental improvements as a main motivation (Fryxell, Lo, & Chung, 2004; Kehbila et al., 2009; Massoud et al., 2010; Pan, 2003; Prajogo, Castka, Yiu, Yeung, & Lai, 2016).

Although most of the external motives have already been mentioned, it is interesting to note that a survey of 1,268 industrial enterprises in China (Qi, Zeng, Yin, & Lin, 2013) pointed out that foreign investors, being publicly listed, and the neighboring community are significant drivers for ISO 14000 certification. In addition, based on the results that (Boiral, 2007) conducted among nine ISO 14001 certified Canadian organizations, in eight of nine cases, concern for institutional legitimacy was the main driving force behind the initial decision to adopt the ISO 14001 standard.

On the other hand, the internal forces affecting ISO 14000 are primarily influenced by factors affecting processes and procedures. These factors include the desire to improve the production process, internal operations and performance, the productivity and efficiency of the company (Gavronski et al., 2013; Mariotti et al., 2014; Prajogo et al., 2012; Qi et al., 2012; Tuppara et al., 2016), as well as to reduce costs (Chan & Wong, 2006; Fryxell & Szeto, 2002; Kehbila et al., 2009; Mariotti et al., 2014; Massoud et al., 2010; Pan, 2003; Qi et al., 2012; Quazi et al., 2001; Studer et al., 2006). Human Resources (HHRR) aspects such as teamwork, employee training, increasing knowledge and motivation, and the welfare and environment

of employee are also drivers for seeking ISO 14000 certification (Santos et al., 2016; Quazi et al., 2001; Qi et al., 2012; Pan, 2003; Niu & Fan, 2015; Mariotti et al., 2014; Kehbila et al., 2009; Heras-Saizarbitoria et al., 2011; Chen et al., 2004; Gavronski et al., 2008). In addition to all the motives mentioned above, those related to technology, defect rates, and products and service quality could also be mentioned as drivers for certification (Chen et al., 2004; Gavronski et al., 2008; Heras-Saizarbitoria et al., 2011; Tuppara et al., 2016). Other companies also seek certification in order to improve management or due to corporate management initiatives (Zeng et al., 2003; Zeng et al., 2005; Studer et al., 2006; Quazi et al., 2001; Kudlak, 2017; Chan & Wong, 2006). Finally, De Oliveira, Serra, & Salgado (2010) conducted a survey with industries in the state of Sao Paulo and discovered that for a high percentage of companies, the possibility of integrating ISO 9000 standard with ISO 14000 certification motivated the implementation of the latter.

#### 4. Analysis of a systematic review of the literature

After analyzing the categorizations made by different authors in different papers, a new classification of motivations based on the external and internal criteria was established. External motivations are defined as those aspects that do not depend on the company itself, but depend on external factors, while internal motivations refer to factors directly affected by the company's decisions and management (Prajogo et al., 2012). From the 66 articles, 54 articles mentioned at least one external motivation and 47 mentioned at least one internal motivation.

According to our study, the main motivations identified by the literature can be classified into twelve categories: six external factors and six internal. After the analysis of the 66 articles, a list with all the individual motivations mentioned in each of them was set. Each motivation in the list was allocated into the external or internal category. Finally,

the motivations were grouped by topics, obtaining exactly six categories regarding external factors and six categories for internal motivations. The following paragraphs list all the categories and give a short definition for each of them.

The six categories for external factors are: (1) customers, community and image (aspects related to customer or community pressure and the company's reputation); (2) market and internationalization (including market share and exports); (3) suppliers (mainly suppliers' requirements to be certified); (4) competitors (in order to gain competitive advantage); (5) legal issues, organizations

and government (laws and norms asking for certification); and (6) environmental (environmental and natural factors). The six categories for internal factors are: (1) human resources (employees and workforce improvement); (2) financial (costs savings and profit margins); (3) operations (processes and procedures); (4) product, service and innovation (improvement of technology, goods and services); (5) management (improve managerial skills); and (6) general improvement (other general factors that improve the company). Table 3 shows how many different articles mentioned motivations and benefits belonging to each category.

**Table 3.** Number of articles that name each motivation for ISO 14000

	Motivations ISO 14000		Ranking position
	<b>External</b>		
E1	Customers/Community/Image	**47	1°
E2	Market/Internationalization	27	5°
E3	Suppliers	*10	11°
E4	Competitors	19	7°
E5	Legal/Organizations/Government	42	2°
E6	Environmental	33	3°
	<b>Internal</b>		
I1	HHRR	18	8°
I2	Financial	15	9°
I3	Operations	**30	4°
I4	Product/Service/Innovation	12	10
I5	Management	23	6°
I6	General Improvement	*7	12°

In regards to external motivations, the most mentioned category for ISO 14000 was Customers/Community/Image, with 47 articles; while the category mentioned by the fewest number of authors was related to suppliers, with only 10 articles. For internal motivations, operations was the category mentioned by more authors (30 articles), while the category with less mentions was related to general improvements, with 7 articles.

Remembering that the standard analyzed is ISO 14000, specifically an Environmental Management Standard, it is surprising to see that the environmental category is in third place in terms of the number of times authors mentioned this category as a motivation (surpassed by Customers/Community/Image and Legal/Organizations/Government).

As mentioned above, the motives for implementing ISO 14000 can be a decisive factor for the benefits obtained with the

certification (Boiral & Roy, 2007). Taking this into account, we would expect higher benefits for aspects related to Customers/Community/Image and operations, as they are the motivations most often mentioned. Conversely, benefits related to suppliers and general improvements are not expected to be very significant as authors do not mention these as possible motivations for implementing ISO 14000 certification.

In addition, the analysis of the motivations for implementing the environmental management standard focused on three main issues: (1) evolution in time, (2) geographical dissemination, and (3) industries. The tables 4, 5 and 6 in next subsection present the number of studies that have addressed this topic according to these three different criteria.

#### 4.1. Evolution in time

Since the ISO 14000 standard was first published in 1996, it has been reviewed and revised in order to respond to the latest trends and ensure its compatibility with other management system standards. It was last revised in 2015, with the key changes relating to (1) increased prominence of environmental management within the organization's strategic planning processes, (2) greater focus on leadership, (3) addition of proactive initiatives to protect the environment from harm and degradation, (4) improving environmental performance added, (5) life cycle when considering environmental aspects, and (6) addition of a communications strategy (International Organization for Standardization 2018c).

**Table 4.** Number of articles classified by period

External	Motivations ISO 14000		
	1998–2011	2012–2017	Variation
Customers / Community / Image	**23	**24	1
Market / Internationalization	13	14	1
Suppliers	*5	*5	0
Competitors	12	7	-5
Legal / Organizations / Government	19	23	4
Environmental	19	14	-5
Internal	1998–2011	2012–2017	Variation
HHRR	10	8	-2
Financial	5	10	5
Operations	**16	**14	-2
Product / Service / Innovation	8	*4	-4
Management	15	8	-7
General Improvement	*3	*4	1

After analyzing the 66 articles, they were divided into two different periods according to the year published, trying to maintain roughly the same number of articles for each period. The first period comprises articles from 1998 to 2011 and includes 31 articles, and the second period includes the remaining

35 articles from 2012 to 2017.

As shown in Table 4, the evolution of each category has been quite different during the two periods. While four categories have remained the same (Customers/Community/Image, Market/Internationalization, Suppliers and General Improvement), two

categories have increased over time (Legal/Organizations/Government and Financial), and six categories have decreased in the second period (Competitors, Environmental, HHR, Operations, Product/Service/Innovation and Management).

The increase in some categories suggests that over the years more authors have considered, studied and identified motivations in these categories as possible drivers for organizations to implement ISO 14000. On the other hand, the reduction in some categories may suggest that authors do not consider those categories to be main motivations for companies to pursue the standard, or that fewer authors studied the drivers included in these categories.

Despite the differences in each category over the years, it should also be noted that for both periods, external motivations (mainly Customers/Community/Image and Legal/Organizations/Government) have always been mentioned more than internal motivations.

#### 4.2. Geographical dissemination

The articles were divided according to the geographic area they studied. Although most of the authors studied the situation in Asia and Europe, articles were found regarding all continents: North America, South America, Europe, Asia, Africa and Oceania (Australia).

As we can see in Table 5, the most studied continent was Asia. Of the 54 articles that mentioned external motivations, 28 had studied data from Asia, and of the 47 articles that mentioned at least one internal motivation, 24 analyzed data from Asia.

Europe was the next most studied continent. Regarding external motivations, 21 out of 54 articles analyzed Europe, while for internal motivations, 18 articles out of 47 investigated the subject in this continent.

North America, South America and Africa are less mentioned. Regarding external motivations, seven articles studied North America, five did so for South America and

six for Africa. For internal motivations, the results are the same for South America (five articles) and Africa (six articles); North America had a total of six articles (one fewer compared to external motivations).

Finally, Oceania was the continent least analyzed by authors, with only two articles (out of 54) for external motivations and two articles (out of 47) for internal motivations.

**Table 5.** Number of articles classified by continents

Motivations	North America	South America	Europe	Asia	Africa	Oceania / Australia
External	7	5	21	**28	6	*2
Internal	6	5	18	**24	6	*2

\*\* most mentions / \* least mentions

#### 4.3. Industry

The articles were also divided according to the type of companies the authors analyzed in their studies. Four different groups were created: (1) manufacturing, for those articles studying companies in the manufacturing sector; (2) service, for those authors that analyzed companies in the service sector; (3) both, for those authors that analyzed companies in both the manufacturing and service sector; and (4) not mentioned, which includes articles that did not specify the type of sector.

Table 6 shows that for both external and internal motivations, the service industry has been the sector with less research, while the manufacturing sector has been analyzed in greater depth.

Most of the articles studied both manufacturing and services sectors simultaneously. However, when only one was analyzed, the manufacturing sector was studied in a higher number of articles than the service sector.

**Table 6.** Number of articles according to industry sector

Motivations	Manufacturing	Service	Both	Not Mentioned
<b>External</b>	**21	*5	18	8
<b>Internal</b>	**17	*5	15	8

\*\* most mentions / \* least mentions

## 5. Conclusions

The widespread of the global adoption of ISO 14000 is an evidence. Literature suggest clear benefits and motives from the implementations of ISO 14000 standards (increased sales, cost reduction, access to international markets, better communications with suppliers, enhanced employees attitude, among others). But at the same time, quality management standards have been received some critics referring to be a management fashion and an audit-biased activity. At that point, it is relevance to study the evolution in time, geographical area, and type of activity of the motives of adopting ISO 14000.

As explained in section 3, after analyzing all available literature for this matter, a new way of classifying motivations has been proposed. Each individual factor was first classified into the external or internal category, and then into another subcategory. The goal was to simplify motivations by grouping them together, taking into account which company aspect was affected. The following six subcategories were established for external factors: (1) customers, community and image; (2) market and internationalization; (3) suppliers; (4) competitors; (5) legal issues, organizations and government; (6) environmental. And the following six categories were determined for internal factors: (1) human resources; (2) financial; (3) operations; (4) product, service and innovation; (5) management; and (6) general improvement.

With regard to ISO 14000 and its external motivations, it can be concluded that customers, community and company image have been the most common motivations over the two periods (1998–2011 and 2012–2017). This motive remains as the most important driver for implementing ISO 14000 over time. To fulfill customer demands and enhance the company’s image, might be considered the major motive to seek an environmental management system standard. After that, the reaction to legal pressures is another significant external motive and also keeps the same importance between both periods. On the other hand, what is significantly important is that number of articles analyzing the environmental factors decreased over time. One possible explanation could be that Asia is the area analyzed by previous authors, where the main motivations there are related to image and customer’s engagement, but no the environmental improvement in itself. For example, Singh, Jain, & Sharma (2015) study the motivations to adopt environmental management systems (EMS) in Indian industries. Results suggest that the implementation of EMS practices is positively related by relational motivations as firm image and prevention of environment incidents. Meanwhile, do not consider innovation or cost saving as relevant motivations.

The rest of the external factors remain similar over the years, particularly those motivations related to open new international markets and to intensify relationship with suppliers. An exception of that is the case of competitors, which seems to be less relevant year by year. In this vein, Gotzamani & Tsiotras (2002) show that market pressure and competitor’s certification came last in the hierarchy with a long distance from all others.

The internal motivations are less cited in the analyzed literature (105 out 283). These findings are partially aligned to current version of ISO 14001:2015, which highlight in first term the internal motivations related to the environmental impact of the activity. In

the same way that the external motivations, the internal also remain invariant along time. These motivations are focused to build an effective quality assurance system in terms of product quality and customer satisfaction. Operations has been the most mentioned category during both periods and remains similar. Operational effectiveness make reference to some valued issues as quality of the products and services, alignment of activities with objectives, allocations of authority, performance control, among others (Vilkas & Vaitkevicius, 2013). The "management" motivations have dropped significantly in the second time period, while "financial" have increased also significantly, suggesting that management drivers are not as important as they were before and that financial motivations are gaining importance over the years. One possible reason could be the recent economic crisis suffered specially in Europe.

The third position of internal motivations is related to HHRR policies. Internal communication among supervisor and employees and colleagues is a powerful tool for managers to implement quality standards. In addition, actually, people are more sensitive towards sustainability and work for a prosocial motivation. In that sense, implementing an EMS will allow managers to align personal and organizational values. This new way to manage employees deals with some society challenges. This internal motive is one of the most important driver and have a uniform evolution. Finally, two of the less important motives are the innovativeness (becoming less relevance over time) and general improvement of the company (with the lower number of studies). We can conclude that the internal driver of innovate product and service or to general improve of the company to implement ISO 14000 is not quite relevant. However, some studies (e.g. Lo & Chang, 2007) indicate that the main motivations in leading Taiwanese companies to pursue certification are the desire to improve their internal operations rather than satisfy customer's demands or external

pressures.

According to the articles and its geographical dissemination, Asia and Europe have been the continents where more studies have been performed. One reason is that ISO 14000 standard was published in Europe. However, the standard became very soon popular in Asia. On the other hand, motivations in America and Africa were studied by a reduced number of authors, while Oceania has barely been studied in any of the articles found. Vilkas & Vaitkevicius (2013) consider that the factor influencing decisions to implement management standards can vary from different countries because they reveal the level of institutionalization of particular fields, trade relation and economic history.

Finally, regarding the activity sector, most of the articles studied either the manufacturing industry or both the manufacturing and service industries at the same time. However, very few articles studied the motives in the service sector alone.

Future research regarding motivations for implementing ISO 14000 could be done in Oceania and the service industry in order to have a deeper and wider knowledge in this areas.

From a theoretical point of view, the findings of this study could benefit (1) policymakers, (2) management bodies, and (3) standardization agencies. Policymakers could take into consideration companies' motives in order to create or modify policies so that they adapt to improve its strategy. Management bodies could benefit from these findings by having wider and better knowledge of the implications of the ISO 14000 standard for a company. This could help managers in deciding whether or not to implement a quality standard, and what would be the best time to do it. Finally, standardization agencies or organizations may take into account this study when developing or amending standards, as it gives an updated assessment of the factors that drive companies to implement this certification, which could help develop an appropriate standard.

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