

# Shedding light on the motivations and performance of the eco-management and audit scheme (EMAS)

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## ARTICLE INFO

### Keywords:

Environmental management systems  
Eco-management and audit scheme  
EMAS  
ISO 14001  
Literature review  
Research agenda

## ABSTRACT

This work aims to shed light on the motivations and environmental performance of Eco-Management and Audit Scheme (EMAS) registration, the more demanding voluntary certifiable international standard to adopt environmental management systems in organizations. Based on a systematic review and analysis of the outcomes of 73 scholarly empirical works published in the period from 1998 to 2021 the work makes an original contribution to the scholarly literature with the definition of a research agenda with avenues for further research. The sources of motivations related to EMAS are found to be diverse and contingent to a set of factors. Regarding performance, the results showed a mixed picture with a greater prevalence of studies underlining a positive impact of EMAS adoption. Deep implications for managers, policy makers and other stakeholders are discussed.

## 1. Introduction

An increasing number of companies adopt and certify Environmental Management Systems (EMSs) based on international reference standards (Heras-Saizarbitoria et al., 2015). These standards are also known as meta-standards, voluntary codes or guidelines that can be verified by a third party and define the requirements concerning the types of policy, planning, organizational practice and control mechanism to be adopted by organization (Heras-Saizarbitoria and Boiral, 2013). They are hybrid forms of regulation designed to manage environmental activities in the firm that have a significant environmental impact, but they do not set environmental goals or environmental targets (Heras-Saizarbitoria et al., 2016).

At the international level there are two main meta-standards to adopt and certify EMSs: ISO 14001 and the Eco-Management and Audit Scheme (EMAS). ISO 14001 was launched in 1996 by the International Organization for Standardization (ISO) and is the main global standard for EMSs (Heras-Saizarbitoria and Boiral, 2013). In order to ensure that ISO 14001 remains updated and relevant, ISO 14001 was revised in 2015 with some new and reinforced approaches (Da Fonseca, 2015). The Eco-Management and Audit Scheme (EMAS) was launched in 1993 and came into force in 1995 (this is referred to as EMAS I), and since then has been adopted by more than 3900 European organizations, notably in Germany, Italy and Spain (European Commission, 2021). In 2001 the revised Regulation (EC) No 761/2001 was adopted (EMAS II); and

finally, in 2009 Regulation (EC) No 1221/2009 came into effect on 11 January 2010 (EMAS III). In 2017 Annexes I, II and III of the EMAS Regulation were amended to include the changes associated with the revision of the ISO 14001:2015 standard. Similarly, the two standards include references to new items such as the organization's context, the needs and expectations of interested parties and the life cycle perspective (Martins and Fonseca, 2018).

As underlined in the literature (e.g. Fonseca et al., 2017; Fonseca and Domingues, 2018) EMSs can be audited and certified by independent external certification bodies that assess whether the applicable EMS complies with the international reference and achieves the intended results by performing a third-party audit. As underlined by Fonseca and Domingues (2018) the main distinction between the EMAS Verification and the EMS Certification is the Environmental Declaration of the organization that wishes to register with EMAS and obtain its validation.

From the practitioner perspective, EMAS is generally considered more demanding in terms of managerial requirements (e.g. objectives, performance indicators, regulatory compliance). Whereas EMAS regulations requires *total* compliance with the environmental legislation in force, ISO 14001 requires a *commitment to compliance* with this legislation – a terminological difference that is by no means insignificant (Heras-Saizarbitoria et al., 2008). Similarly, EMAS establishes the obligation to inform all stakeholders of all the most relevant environmental aspects as well as the operations carried out by the firm, for which purpose a validated environmental declaration is required, while the

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ISO 14001 is confined to the obligation to provide the relevant interested parties the information that they ask for (Heras-Saizarbitoria et al., 2016). From the theoretical standpoint, the differences between EMAS and ISO 14001 are even greater – the latter is a meta-standard that arose from a private initiative set in motion by ISO, but EMAS is a voluntary standard promoted by legislation of the European Commission (Heras-Saizarbitoria et al., 2015).

Despite these important differences, most studies on the subject have focused on EMS adoption based on ISO 14001. Among other relevant research avenues related to ISO 14001 (for a recent review see Boiral et al., 2018 and Sartor et al., 2019), a series of works have attempted to analyze the link between the reasons given by organizations for adopting EMSs based on the international standard, and the results or benefits of such adoption or actual internalization of the standard on a day-to-day basis. However, this question has not been studied in the specific case of the EMAS standard. The EMAS is under-researched compared to ISO 14001. As a result, there is a lack of specific studies that analyze the adoption process for the EMAS model. This standard deserves more attention because of its importance, especially in the European Union.

Only three scholarly works have been published that review the academic literature about EMAS. One of them is the work by Tourais and Videira (2016) focused on the period 1993 to 2012. The main differences between the work by Tourais and Videira (2016) and the present work are the time period covered, the languages of publication considered and the integrative review methodology adopted in the present study that includes the general Google Scholar database alongside the usual academic document databases (see the next section). Other work is the systematic literature review carried out by Todaro et al. (2020) which identified the main theoretical frameworks applied to the study of both ISO 14001 and EMAS. And the third is the meta-analysis conducted by Erauskin-Tolosa et al. (2020), which studies the influence of the adoption of ISO 14001 and EMAS on corporate environmental performance. There are other review works that have tangentially reviewed aspects related to EMAS (e.g. Marrucci et al., 2019) or empirical works with relevant literature reviews (for a set of recent works see Marrucci and Daddi, 2022; Marrucci et al., 2021, 2022a, 2022b) but those are not explicit systematic reviews on this topic.

Considering this gap in the literature, the following research questions are set:

- What are the main findings of the scholarly empirical works that have analyzed the sources of motivation that lead companies to adopt EMAS?
- What are the main findings of the scholarly empirical works that have analyzed the impact of EMAS on environmental performance?

The remainder of this paper is arranged as follows. Following this introduction, the methodology for the literature review is presented. In the third section, the results of the literature review and the discussion are presented. The paper ends with the section of conclusions.

## 2. Methods

The academic contributions on EMAS have been produced from a wide range of disparate but related disciplines, such as operations management, environmental management, business economics, engineering, and environmental studies. Therefore, for our review we adopt an interdisciplinary perspective, and we produce an integrative review. In integrative reviews, the search strategy is not usually systematic (Snyder, 2019). However, in order to provide greater rigour and objectivity, we based our review on the three stages of systematic reviews: setting the research question and review protocol; searching for relevant studies using inclusion and exclusion criteria; and data extraction and analysis (Macpherson and Holt, 2007; Oliver et al., 2005; Tranfield et al., 2003).

The review was carried out in January–February 2022. The

computer search was carried out within the bibliographic databases of Web of Science and Scopus, covering most of the peer-reviewed journals in this field. These databases were chosen because they contain the largest number of results relevant to our field research (Johnstone, 2020; Siva et al., 2016; Todaro et al., 2019; Tourais and Videira, 2016). The other researcher carried out the same search within Google Scholar, to capture relevant documents and complement the classical search.

First, the set of keywords “eco-management and audit scheme” or EMAS was searched for. This search yielded more than 17,000 results. The search was narrowed down by adding a second set of keywords: “environmental management” or “environmental management system” or EMS or “environmental certification”. Similarly, considering the defined research questions terms such as “motivation(s)”, “driver(s)” and “performance” were added. Asterisks (\*) were used to locate those studies containing variations of the keywords. The results were refined by date (1993–2021), considering the year of launch, by language (English, German, Spanish, French, Italian and Portuguese) and by type of document (article and review). Articles written in the most common European languages were chosen in order to give an integrated perspective. Works in the popular press, and works that had not been peer reviewed were excluded. The search covered the title, abstract and keywords. In Google Scholar, the search was conducted in full text. After unifying the results obtained in the three databases and eliminating duplicates, 441 potentially relevant papers were identified (see Fig. 1). The keywords used in the searches were in line with the two research questions defined.

The next step was to apply inclusion and exclusion criteria. Following Tranfield et al. (2003), to avoid subjectivity, this phase was also carried out independently by the two researchers. At the end of the process, the results were compared and the differences found were discussed, and a common final sample was agreed upon. In this phase, the selection of relevant papers is carried out, so it is an important phase and it is important to perform it properly. We followed the two steps proposed by Petticrew and Roberts (2008) and followed in other systematic reviews (Boiral et al., 2018): practical screening and methodological screening.

In practical screening, inclusion and exclusion criteria are assigned in accordance with the objectives of the search. In this step, the inclusion and exclusion criteria previously established by the researchers were applied (see Table 1). Articles were identified that fit the objective of our research, i.e. empirical articles analyzing the motivations and environmental performance of implementing EMAS. Theoretical articles, conceptual articles, literature reviews, meta-analyses and field notes or short communications were excluded. Papers with unclear or non-rigorous methodology were also excluded. This practical screening was carried out on the 441 documents found in the first stage and 308 articles that did not meet the criteria were excluded, leaving 133 papers.

Methodological screening requires a more exhaustive reading and analysis of the selected articles. For this purpose, an in-depth analysis of the full text was carried out. The in-depth analysis of the full text showed that sometimes the abstract does not report enough information (such as the methodology used or the description of the sample) and, therefore, it is necessary to read the entire document. As a result of this screening, we excluded 62 further papers that either did not meet our objective or did not show a clear methodology.

In addition, reading the full text allowed us to use the snowball technique. The relevant references identified in the articles that satisfied the inclusion criteria were also included (2 references), adding to the integrative character of our review. After these inclusions, the final sample consisted of 73 articles. Fig. 1 describes the process for the selection of articles.

The third stage of the review was the extraction and analysis of the relevant data from the selected articles by means of content analysis (Krippendorff, 2018). To facilitate the extraction and interpretation of information, the articles were grouped by objective (motivations and outcomes), data collection technique (qualitative, quantitative, both),

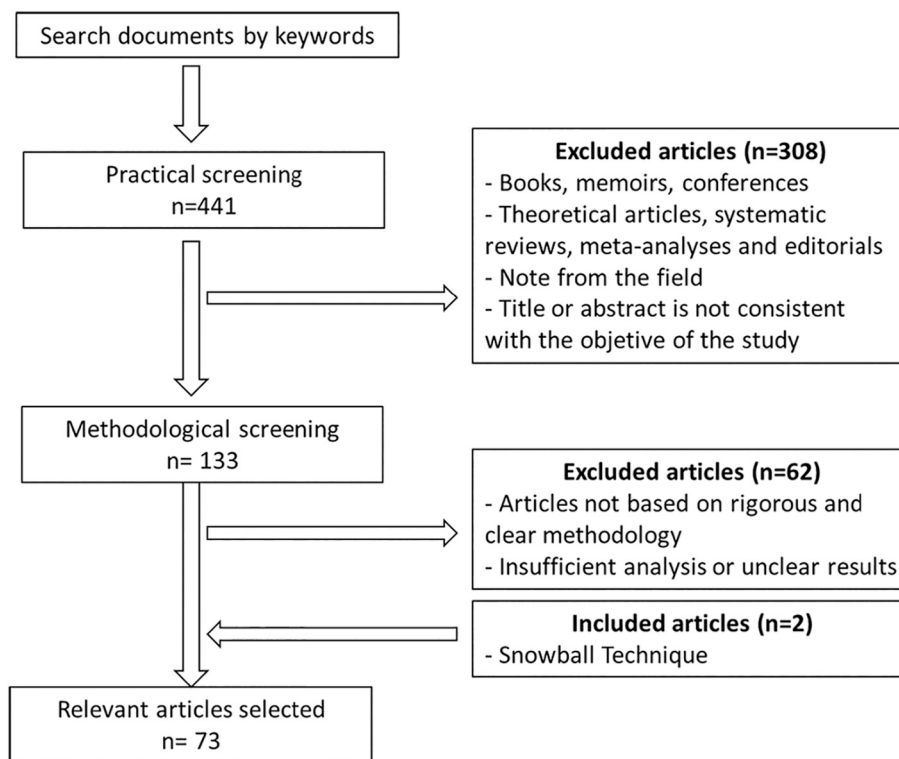


Fig. 1. Selection process. Source: Own elaboration.

Table 1 The criteria for inclusion and exclusion.

Inclusion criteria	Exclusion criteria
<ul style="list-style-type: none"> <li>Articles published between 1993 and 2021</li> <li>Articles published in peer-reviewed journals</li> <li>Empirical articles</li> <li>Articles published in English, German, Spanish, French, Italian or Portuguese</li> <li>Articles addressing the drivers and/or performance of EMAS implementation</li> </ul>	<ul style="list-style-type: none"> <li>Theoretical articles, systematic reviews, meta-analyses and editorials</li> <li>Books, memoirs, conference papers, etc.</li> <li>Note from the field</li> <li>Articles not based on rigorous and clear methodology</li> </ul>

country or region, sample size, journal and language. The extracted information was interpreted, synthesizing the main conclusions of each paper. This synthesis was structured, according to the objectives of the review, in two main topics (drivers and performance) which are developed in the following section.

### 3. Results and discussion

#### 3.1. Descriptive results

The papers finally selected for review were published between 1998 and 2021, mainly in English (95.9%). Only two papers were written in Spanish and one in German. None were published in the first five years after the launch of EMAS. Fig. 2 shows the number publications in each year. There is a positive trend, with more publications from 2016

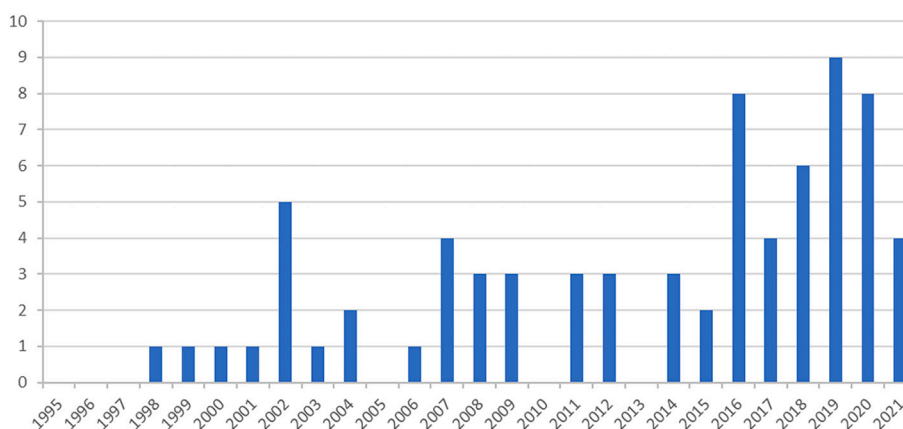


Fig. 2. Number of publications per year (1993–2021). Source: Own elaboration.

onwards. Taking the whole period, the average rate of publications is two and a half per year, while the average for the last six years (from 2016 to 2021) is six and a half per year. In the years in which the EMAS revisions came into force (EMAS II 2001; EMAS III 2010) an increase in the number of publications can be seen, but it cannot be attributed to these revisions as similar fluctuations also occur in other periods.

Of the 73 papers in our sample, 38 study the motivations for implementing an EMS and 37 the performance (in two paper both). Dividing the period for which documents are available (1998–2021) into quartiles, the number of publications increases considerably in the last quartile. It is noteworthy how the trend of the objectives studied has changed, while in the early years of EMAS, the analysis of motivations had more weight, while later, it is performance that acquires greater prominence in the literature (Fig. 3).

Most of the documents analyzed (62%) are single country studies, with Germany, Spain and Italy featuring most frequently. As we have seen, these three countries also have the highest number of EMAS registrant. The other articles analyze more than one European country or take the European Union as a whole. Fig. 4 shows the number of references to each country or region.

The articles analyzed are published in 43 different academic journals. *Business Strategy and the Environment* and *Journal of Cleaner Production* have the most publications, with 9 and 8 papers respectively, followed by *Corporate Social Responsibility and Environmental Management* with 5 papers and *Sustainability* with 4 papers. Fig. 5 shows the journals that contain at least two papers.

The most commonly used data collection techniques are quantitative (68.5%), mainly surveys and databases. Qualitative approaches (26%) are based on case studies and semi-structured interviews. Only 5.5% of the selected papers employed a mixed methodology. As noted by Boiral et al. (2018) for the case of ISO 14001, the proportion of qualitative studies decreases over the years. 47.8% of the documents published before 2010 used a qualitative technique, while in those published after 2010 the percentage barely exceeds 16%. The studies can also be classified in terms of their sources of data, either the perceptions of environmental managers or owners taken from questionnaires or interviews (primary sources), or content analysis of the Environmental Statements, web pages or databases (secondary sources). In our sample, 47.2% used primary sources, 43% secondary sources and 9.8% both.

Table 2 summarizes the ranking of the ten most cited papers for each of the research questions, considering the quotes included in Google Scholar in 2022.

### 3.2. Thematic results

#### 3.2.1. Motivations and drivers to adopt EMAS

According to theoretical approaches, studies on motivations can be grouped into two main currents: neoinstitutionalist, suggesting that the

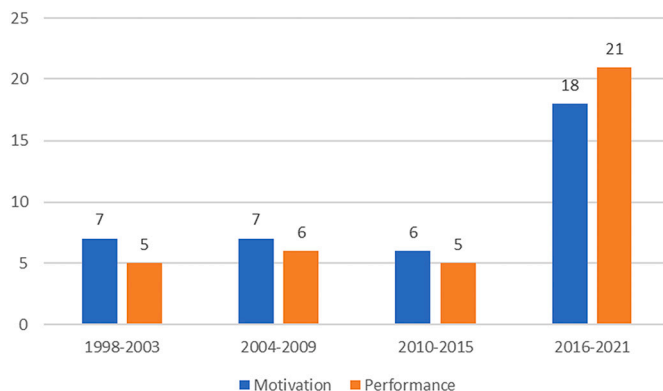


Fig. 3. Number of publications for each objective (1998–2021). Source: Own elaboration.

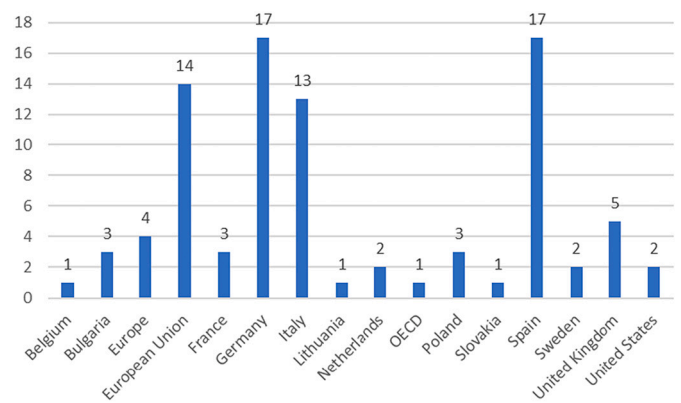


Fig. 4. Number of publications per country/region. Source: Own elaboration

adoption of voluntary regulation initiatives is mainly due to external pressures (market, society, legal requirements), and based on the resource-based perspective, that internal factors are drivers of adopting an EMS. Daddi et al. (2016) argue that there are two main approaches: internal and external. Internal motivations mainly refer to management capabilities, improved environmental performance and regulatory compliance, while external drivers relate to the need to obtain certification to show an image and reputation to external stakeholders (customers, public institutions, local communities).

There are several motivations, and not only one, which impel organizations to start EMS implementation, as Bansal and Roth (2000), Tourais and Videira (2016) and Álvarez-García et al. (2018) point out. From the review, we found that the most common internal factors that lead companies to implement an EMS are those related to environmental friendliness and performance (Emilsson and Hjelm, 2002; Miteva, 2017; Murmura et al., 2018, 2021; Ociepa-Kubicka, 2019; Ociepa-Kubicka et al., 2021; Pedersen, 2007), better financial results by reducing costs (Bracke et al., 2008; Emilsson and Hjelm, 2002; Miteva, 2017), regulatory compliance (Grolleau et al., 2007; Miteva, 2017; Morrow and Rondinelli, 2002; Murmura et al., 2018, 2021; Pedersen, 2007), introduction of new environmental technologies (Miteva, 2017), efficiency (Morrow and Rondinelli, 2002), internal stakeholders pressure (Diez Martín et al., 2008; Neugebauer, 2012), and better corporate management and human resource management (Emilsson and Hjelm, 2002; Grolleau et al., 2007; Miteva, 2017).

The external factors identified in the review are external stakeholder pressure (Diez Martín et al., 2008; Lannelongue and González-Benito, 2012; Miteva, 2017), customer demands (Díaz de Junguitu and Allur, 2019; Grolleau et al., 2007; Pedersen, 2007), improved image and reputation (Miteva, 2017; Murmura et al., 2018; Ociepa-Kubicka, 2019; Ociepa-Kubicka et al., 2021; Pedersen, 2007), market opportunities (Emilsson and Hjelm, 2002; Miteva, 2017; Steger, 2000), favorable institutional contexts (Bracke et al., 2008; Emilsson and Hjelm, 2002) and national culture (Steger et al., 2002). Table 3 summarizes the main internal and external drivers reported in the academic literature.

What is less clear and not easy to determine, is which of the two types of factors has the greatest influence on the adoption of an EMS. In the case of ISO 14001, most empirical studies have shown that external motivation plays a more important role than internal motivation in the adoption the standard (Boiral, 2007; Heras-Saizarbitoria et al., 2011; Jiang and Bansal, 2003; Sartor et al., 2019). However, in the case of EMAS, there is no consensus in the literature on the main drivers. Thus, an interesting debate arises as to the true motivations of organizations when implementing EMAS. Murmura et al. (2018) point out actually the “motivations seem to coincide between the two standards” (p. 698), at least in Italy.

Neugebauer (2012) points out that internal motives, in particular corporate culture and the influence of managers or owners committed to

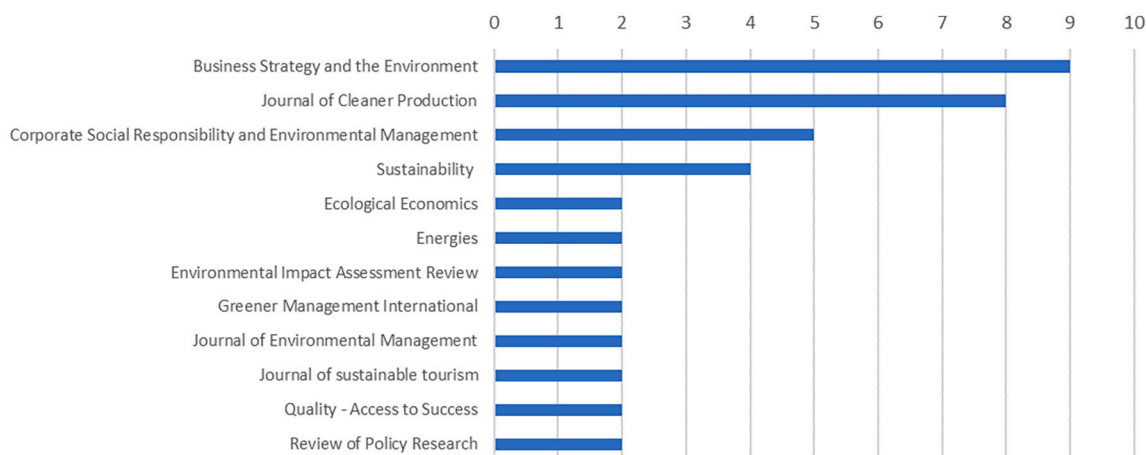


Fig. 5. Journals with at least two selected articles. Source: Own elaboration.

Table 2 Ranking of the ten most cited reviewed articles.

Factors		
Motivation to adopt EMAS	Morrow and Rondinelli (2002)	877
	Bonilla Priego et al. (2011)	200
	Neugebauer (2012)	122
	Heras-Saizarbitoria et al. (2016)	105
	Grolleau et al. (2007)	88
	Pedersen (2007)	86
	Murmura et al. (2018)	79
	Lannelongue and González-Benito (2012)	60
	Bracke et al. (2008)	54
	Steger et al. (2002)	52
Impact of EMAS on performance	Iraldo et al. (2009)	557
	González et al. (2008)	418
	Daddi and Iraldo (2016)	160
	Albelda Pérez et al. (2007)	145
	Emilsson and Hjelm (2002)	102
	Daddi et al. (2011)	108
	Heras-Saizarbitoria et al. (2020a)	39
	Bruzzi et al. (2011)	25
	Heras-Saizarbitoria et al. (2020b)	20
	Botta and Comoglio (2007)	12

Source: Summary compiled by the authors.

Table 3 Main internal and external factor for EMAS registration.

Factors		
Internal factors	<ul style="list-style-type: none"> <li>• Environmental friendliness and performance</li> <li>• Better financial results (reduce costs)</li> <li>• Ensure regulatory compliance</li> <li>• Introduction environmental technologies</li> <li>• Efficiency</li> <li>• Internal stakeholder (managers, board of directors, owner or members of the owning families)</li> </ul>	
	<ul style="list-style-type: none"> <li>• Corporate and human resource management</li> <li>• External stakeholder pressure (customers, suppliers, public authorities, social groups, local communities)</li> </ul>	
	External factors	<ul style="list-style-type: none"> <li>• Improve image and reputation</li> <li>• Market opportunities</li> <li>• Favorable institutional context</li> <li>• National culture</li> </ul>

Source: Summary compiled by the authors.

environmental policy, are more important than external motives when choosing EMAS. In the same vein, for [Álvarez-García and del RíoRama \(2016\)](#) internal sources of motivation are more decisive than external

ones. [Seifert and Guenther \(2020\)](#) show that, in the case of hospitals, internal pressure from the owners or the board of directors is the main factor in the decision to implement EMAS. [Bonilla Priego et al. \(2011\)](#) state, in a study carried out in the Spanish hotel sector, that most hotels have internal drivers, but there has been a shift from internal sources of motivation to external reasons for legitimization, encouraged by stakeholder pressure.

[Lannelongue and González-Benito \(2012\)](#) in their extensive study conclude that implementation responds to stakeholder pressure and once certification is achieved, implementation responds to pressure from internal stakeholders. Regarding stakeholders, they distinguish three groups: regulatory, primary (both internal and external) and secondary (smaller impact on a firms' operations, environmental groups, neighborhood). [Diez Martín et al. \(2008\)](#) differentiate between three stakeholder groups (organizational, regulatory and social) and conclude that, in the case of Andalusian business centers, stakeholders do induce organizations to implement an EMS and that it is the organizational groups (consumers, suppliers, employees and owners) that exert the greatest influence. However, [Álvarez-García et al. \(2018\)](#) argue that stakeholder pressures do not have a significant influence as drivers of EMAS.

Another frequently mentioned internal variable is regulatory compliance. [Morrow and Rondinelli \(2002\)](#) found it to be one of the primary motives. In empirical analyses by [Biondi et al. \(2000\)](#), [Grolleau et al. \(2007\)](#), [Miteva \(2017\)](#), [Murmura et al. \(2018, 2021\)](#) and [Pedersen \(2007\)](#) it also appears as a significant source of motivation to implement an EMS. However, for [Díaz de Junguito and Allur \(2019\)](#) and [Neugebauer \(2012\)](#) complying with regulations is not a significant motivation, "the organization scrupulously complied with environmental regulations prior to the implementation" ([Díaz de Junguito and Allur, 2019, p. 6](#)). [Mazzi et al. \(2020\)](#) found that EMAS-registered Italian waste treatment companies explicitly assumed legislative compliance commitments in relation to environmental improvement planning, but not in relation to environmental performance assessment and monitoring.

Among the external factors, in addition to pressure from stakeholders (mainly customers and public institutions), image and reputation improvement are most frequently mentioned. In the review conducted by [Sartor et al. \(2019\)](#) for ISO 14001, the most cited driver was the desire to improve the company's image. Recently, [Ociepa-Kubicka \(2019\)](#) and [Ociepa-Kubicka et al. \(2021\)](#) also concluded that image improvement is the main motive to adopt EMAS in the Polish case. Conversely, [Heras-Saizarbitoria et al. \(2020a\)](#) express doubts about the idea that improving the company's image is one of the main drivers for adopting EMAS since, from the qualitative analysis they perform, they find that EMAS communication is very limited. In their study of EMAS

certified hotels, they conclude that EMAS certification, “is hardly used as a communication tool or as a signal of better environmental performance” (Heras-Saizarbitoria et al., 2020a, p. 429).

The type of motivation can lead to different extents of implementation, from symbolic implementation to substantial implementation (see Christmann and Taylor, 2006; Testa et al., 2018a). Bonilla Priego et al. (2011) argue that organizations that have a highest degree of implementation (called by the authors Strategic group) have internal motivations, mainly environmental aspects, and those that show a symbolic implementation (Greenwashers and Lagggers) have only external drivers, mainly market, competitors and stakeholders. Testa et al. (2018a) analyze the determinants of a proactive internalization and conclude that the influence of institutional pressures reinforces such internalization. For Todaro et al. (2019) it is the perception that managers have of the environment that influences the substantive internalization and not governmental regulatory incentives. Daddi et al. (2021) point out that environmental management of the supply chain has a positive relationship with EMAS internalization.

In line with the New Institutional Theory that suggests that institutional frameworks influence organizational behavior, Whitford and Tucker (2012) argue that governments use strategies to influence the decision to implement voluntary regulatory practices in companies. Specifically, the defense of EMAS by the European Commission has made it possible for European institutions to promote this standard instead of ISO 14001. In Bulgaria, Miteva (2017) highlights that 88% of the companies in the sample were certified against EMAS in 2007, after the integration of Bulgaria into the European Union, which makes companies see EMAS “as an important step in adapting to EU legislation and market” (p. 917). Whitford and Provost (2019) conclude in their analysis that government support has a significant and positive effect on EMAS adherence. Steger et al. (2002) analyzed whether favorable and unfavorable conditions exist between northern and southern European countries when adopting EMAS. They conclude that Porter's national competitiveness has more explanatory power than cultural dimensions when evaluating why EMAS has been accepted in different countries. Other studies in the same line that try to explain the heterogeneity in geographical diffusion are Kollman and Prakash (2001, 2002) for UK, Germany and USA; Glachant et al. (2002) for Germany, France, Netherlands and UK; Emilsson and Hjelm (2004) for UK and Sweden; Wätzold (2009) for Germany, Netherlands and UK; and Braun (2004) for regions within Germany. Heras-Saizarbitoria et al. (2015) and Tessitore et al. (2019) also corroborate the hypothesis that the intensity of EMAS adoption is different between EU member countries, indicating that the national context influences the degree of EMAS adoption. Testa et al. (2016) show that public incentives are closely related to EMAS adoption and confirm the role of institutional pressures in driving the adoption of environmental practices. However, others empirical works, such as Daddi et al. (2014), who analyzed whether the measures carried out in Italy to simplify costs and administrative burdens enabled the diffusion of ISO 14001 and EMAS, conclude that despite an increase in the number of registrations this is not significant and the effectiveness of the simplifications is not proven, especially in the waste sector. Wagner (2020) also notes in his analysis that the difference between national business systems does not influence the adoption of an EMS.

Other ways of grouping motivations to implement EMAS are found in the literature. Álvarez-García et al. (2018) in their study identified three groups of motivational factors: competitive orientation, environmental orientation and compliance with stakeholders. The most important factor was competitive orientation in a strategic decision and improvement of the image were the most prominent items. Merli et al. (2016) differentiate three types of drivers: strategic drivers (improve image, improve legislative compliance and improve the relationship with customers and citizens); environmental drivers (reduction of waste generation, reduction in the use of resources, raw materials and energy and reduction of emissions); and economic drivers (energy savings, savings in the use of raw materials and increased competitiveness).

**Table 4**  
Motivations for EMAS Registration: Summary of the main outcomes.

Study	Sample	Country	Approach	Motive
Álvarez-García et al. (2018)	114 EMAS industrial and services companies	Spain	QuaN	Competitive: strategic decision, improve image and marketing Environmental: socially acceptable behavior, integrate environment into the corporate strategy Compliance with stakeholder: competition, customer and supplier's requirement
Biondi et al. (2000)	358 sme companies	EU	QuaN	Comply with legal requirements, competitive advantage and satisfy customer requirements
Bonilla Priego et al. (2011)	27 EMAS hotels	Spain	Both	Shift from internal reasons, resource based, to external legitimization reasons, stakeholder pressures
Bracke et al. (2008)	436 large publicly quoted companies	Europe	QuaN	Sound financial structure, high average labour costs and relative size of a company compared to its sector average
Dfáz de Junguito and Allur (2019)	4 organizations CS	Spain	QuaL	Customer pressure, recognition and legitimacy and bet for a future
Diez Martín et al. (2008)	142 ISO 14001/ EMAS business center	Spain	QuaN	Stakeholders, mainly organizational group (consumers, suppliers, employees and owners)
Emilsson and Hjelm (2002)	107 local authorities	Sweden	QuaN	Organizational reasons, direct environmental reasons, set a good example and marketing reasons
Emilsson and Hjelm (2004)	2 city councils CS	United Kingdom and Sweden	QuaL	UK: main drivers are external (integration of EMAS into Best Value scheme), but internal drivers (financial saving) are also important Sweden: main drivers are internal (strengthen the environmental efforts)
Grolleau et al. (2007)	215 agrifood firms	French	QuaN	Firm size, previous ISO 9000, customer demands, human resource management, regulatory compliance
Heras-Saizarbitoria et al. (2016)	361 EMAS companies	Spain	QuaN	Internal: improve environmental efficiency, environmental proactivity and minimize environmental problems External: improve company image, competitive

(continued on next page)

Table 4 (continued)

Study	Sample	Country	Approach	Motive
Lannelongue and González-Benito (2012)	3748 manufacturing plant	OECD	QuaN	advantage, public body demands and customer demands Pressure from stakeholders. But once it certified, pressure from internal primary stakeholders
Merli et al. (2016)	562 EMAS organizations	Italy	QuaN	Strategic: improve image, legislative compliance and relationship with customers and citizens Environmental: reduction of waste generation, use of resources, raw material, energy and emissions Economic: energy and use of raw materials savings and increase in competitiveness
Miteva (2017)	461 companies	Bulgaria	QuaN	Internal: better corporate control and management, reduction pollution, better financial results External: legal requirements, pressure from regulators, market opportunities, image and reputation
Morrow and Rondinelli (2002)	5 energy and gas companies CS	Germany	QuaL	Improved documentation, increased efficiency and regulatory and legal compliance are primary motives.
Murmura et al. (2018)	190 EMAS/ ISO 14001 organizations	Italy	QuaN	Improve image, guarantee of respecting the environment, alignment to legal requirements.
Murmura et al. (2021)	231 EMAS III companies	Italy	QuaN	Compliance with legislation, transparency in environmental policy and environmental protection improvement.
Neugebauer (2012)	21 automotive and engineering industry	Germany	QuaL	Internal: corporate culture and influence of particular individuals
Ociepa-Kubicka (2019)	17 EMAS organizations	Poland	QuaN	External: reputation Improve image and competitiveness, and condition of natural environment
Ociepa-Kubicka et al. (2021)	50 EMAS/ ISO 14001 organizations	Poland	QuaN	Improve image and competition on the market; environmental improvement (reduction of energy, raw material and emissions)
Pedersen (2007)	162 EMAS organizations	Europe	Both	Promote environmental friendliness as part of corporate values, improve image, reduce environmental

Table 4 (continued)

Study	Sample	Country	Approach	Motive
Petrová et al. (2021)	64,846 companies	Slovakia	QuaN	impact on the local community, meet customer requirements and ensure legal compliance
Seifert and Guenther (2020)	14 hospitals	Germany	QuaL	Firm size, external stakeholders, debt ration of the company Stakeholders pressure
Steger et al. (2002)	10 chemical companies +11 institutes and organizations	Spain, French and Germany	QuaL	Cultural differences (power distance, individualism, masculinity, uncertainty avoidance) and national competition situation (per capita income, density of population, demand conditions) influence the adoption of the EMAS

Source: Summary compiled by the authors. Full citations for the studies can be found in the references.  
CS: case study.

Table 4 summarizes the main empirical studies focused on the motivations for implementing EMAS. The results of the literature were controlled considering the mentioned EMAS revisions (EMAS II 2001; EMAS III 2010) and no significant differences were found.

### 3.2.2. Impact on organizational performance

The main objective of EMSs is to implement proactive environmental strategies and contribute to the improvement of environmental performance (Daddi et al., 2021; Iraldo et al., 2009; Lannelongue and González-Benito, 2012), so the implementation of these voluntary schemes can be expected to generate positive impacts on environmental performance. However, as several authors point out (Boiral, 2007; Daddi et al., 2011; Heras-Saizarbitoria et al., 2020b; Kube et al., 2019; Testa et al., 2014; Todaro et al., 2019), there is evidence that environmental improvement is not straightforward, and the benefits of EMSs are doubtful. The results are often inconclusive as to the relationship between the implementation of an EMS and improved environmental performance. Lannelongue and González-Benito (2012) point out that this may be because both ISO 14001 and EMAS are not outcome-based standards; certification confirms that the company has implemented a series of processes to manage its environmental impacts, but does not guarantee that it has achieved a certain environmental performance or an improvement in its environmental performance.

Even so, there is considerable evidence on the positive effects that these meta-standards have on the environment. Among the papers suggesting environmental improvements are those of Iraldo et al. (2009), who conclude that a well-designed environmental management system has a positive impact on environmental performance and, as a consequence, on technical and organizational innovations. Daddi et al. (2011) also state that, in the case of Italian companies, EMAS has a positive influence on some environmental aspects, especially water and waste consumption. Díaz de Junguito and Allur (2019) conclude that the main positive result of implementing an EMS is the improvement of environmental aspects and that the involvement of employees, especially managers, is fundamental. Daddi et al. (2019) observe a positive relationship between the satisfaction of the environmental manager and the environmental performance of EMAS companies. Albelda Pérez et al. (2007) argue that the EMAS requirements themselves lead organizations

to create and develop intangible assets (such as environmental awareness) that lead to improved environmental performance.

At the municipality level, the results of the study by Bruzzi et al. (2011) confirm “the potential of the EMS scheme for improving the environmental quality through a systematic review of the organization activities and an in-depth analysis of the environmental situation” (p. 111). A similar argument is found in Ivanova et al. (2016), who claim that, due to the need to apply indicators and monitor emissions and resource consumption, EMSs improve environmental performance. Paradoxically, however, Daddi et al. (2011) point out that “achieving a higher level of monitoring, control and management of an environmental aspect have the unexpected consequence of worsening the corresponding indicator (e.g., previously unconsidered waste categories or nonmonitored water sources)” (p. 860).

The impact of EMAS on the consumption of resources, such as water, electricity, and materials, has also been demonstrated in other studies (Anne et al., 2020; Botta and Comoglio, 2007; Daddi et al., 2011; Daddi and Iraldo, 2016; Díaz de Juguítu and Allur, 2019; González et al., 2008; Ivanova et al., 2016). Numerous papers mention reduced CO<sub>2</sub> emissions as a positive outcome of implementing EMAS (Botta and Comoglio, 2007; Ivanova et al., 2016; Testa et al., 2014). However, Kube et al. (2019) found a 9% reduction in CO<sub>2</sub> emissions in German manufacturing companies, only in those certified in the first years of the EMAS program (prior to 2002). In companies certified in subsequent years, they found no statistically significant evidence of emission reductions. Nor did they find significant evidence that implementing EMAS increased the use of renewable energies or investment in environmental protection. Wagner (2020) also notes that the effects of certification on pollution prevention is limited.

Laskurain et al. (2015, 2017) analyze the contribution of ISO 14001 and EMAS standards to energy management and renewable energy use in the hospitality sector. They point out that companies that implement an EMS carry out energy management practices, even if they do not have a formal Energy Management System (EnMS), and that only the EMAS standard has made an effort to include the use of renewable energy.

The empirical evidence also shows contradictory results. For Morrow and Rondinelli (2002) “it is difficult to attribute environmental improvements directly to the adoption and certification of EMS” (p. 170). Testa et al. (2018b) point out that the level of internalization is a determining factor for a real improvement in environmental performance and “superficial adoption of EMAS does not generate significant environmental performance improvements, thus making this instrument a form of symbolic environmentalism” (p. 64). Iraldo et al. (2009) also point out that it is the degree of penetration of an EMS in the organizational structure that can strongly influence the competitive outcome. Heras-Saizarbitoria et al. (2020c) indicate that, in the context of EMAS III and the Sectoral Reference Documents, there is little use of best practices and performance benchmarks, and they question whether EMAS stimulates pro-environmental behaviors. Matuszak-Flejszman et al. (2019) found a weak correlation between set environmental objectives and changes in performance indicators in Polish companies. Heras-Saizarbitoria et al. (2020b), analyzing 414 Environmental Statements, observed that less than half of the indicators analyzed showed an improvement, suggesting a weak improvement in environmental performance. They question “the prevailing opinion about the positive impact of voluntary certifiable environmental management standards on environmental greening” (Heras-Saizarbitoria et al., 2020b, p. 2829).

Table 5 summarizes the main empirical papers on environmental performance. Again, the results of the literature were controlled considering the EMAS revisions and no significant differences were found.

Many studies mention the impact on the environmental innovation capacity of companies. Biscotti et al. (2018), Ivanova et al. (2019) and Rennings et al. (2006) found that implementing EMSs influenced environmental technical innovation in organizations. Similarly, Hoffmann et al. (2003) show a positive impact between EMAS and product-related

innovative activities. Montobbio and Solito (2018) also found a positive correlation between EMAS and Eco-innovation. However, Ziegler and Seijas Nogareda (2009) question the causal relationship between the implementation of an EMS and environmental innovation and hypothesize the relation in the reverse causal direction, concluding that it is environmental innovation processes that have a positive impact on EMSs. For Daddi et al. (2016) the different institutional pressures to which managers choose to respond (coercive, mimetic and normative) have an influence on EMS performance, and in the case of innovative capacity, it is the normative pressure that positively affects eco-innovation by promoting the internalization of environmental strategies.

In addition to the effects that EMSs have on environmental performance and innovation capacity, other impacts are mentioned: improved legitimacy and reputation of companies (Tack, 1999); improved economic performance (Cucchiella et al., 2017; Emilsson and Hjelm, 2002; Martín-de Castro et al., 2016); improved competitive performance (Daddi et al., 2011; Iraldo et al., 2009); organizational performance (Emilsson and Hjelm, 2002; González et al., 2008); customer loyalty (Liedtke et al., 1998); sustainable tourism and improved quality of life for citizens (Botta and Comoglio, 2007). Caveró-Rubio and Amorós-Martínez (2017, 2020) conclude that certified companies have better financial performance ratios in times of crisis and that adverse effects are less severe.

The literature reviewed also shows factors that contribute to an improvement in organizational performance. Thus, Martín-de Castro et al. (2016) conclude that the maturity of an EMS has a positive and significant effect on the company's financial results. Testa et al. (2014), for the case of Italian energy intensive industries, found ISO 14001 to have better environmental performance in the short term and EMAS to have better performance in the long term. For Murmura et al. (2021) the length of the period to get the certification also appears to be a relevant factor. However, Daddi et al. (2011) point out that “the concept of ‘continuous improvement’ starts to be applied not only in the medium to long term but also to the years immediately following EMAS registration” (p. 860). For Iraldo et al. (2009), although maturity has a positive effect, it is not a determinant of competitive outcomes. Testa et al. (2014) also suggest that more complex organizations, with more employees, derive greater benefits from implementing an EMS than smaller organizations, which have less potential for improvement. However, the study by González et al. (2008) shows that company size only plays a significant role in reducing material use. Heras-Saizarbitoria et al. (2016) found that EMAS registered firms that are more strongly motivated achieve better results from EMS adoption, especially when the sources of motivation are internal, which underlines the importance of internal motivation in the effectiveness of the adoption of an EMS. Daddi and Iraldo (2016) analyzed the results of implementing EMAS using a cluster approach. The EMAS-cluster approach has been effective in improving the environmental performance of the companies operating in it. Merli et al. (2014) also analyzed the effectiveness of EMAS certification at the cluster level and found improvements such as involvement of local stakeholders, improved environmental performance and operational tools to reduce costs.

#### 4. Discussion

The literature reviewed shows that the motivations that lead organizations to implement and certify a meta-standard such as EMAS are diverse and are moderated and mediated according to companies, industries and sector of activity. Motivation seems to be key to understanding the implementation processes, the extent of internalization and environmental performance results of EMAS (Álvarez-García and del RíoRama, 2016; Johnstone, 2020). These results are very similar to those obtained in the literature reviews on ISO 14001 (Boiral et al., 2018; Heras-Saizarbitoria and Boiral, 2013; Heras-Saizarbitoria et al., 2011; Sartor et al., 2019).



**Table 5**  
Environmental performance of the EMAS Registration: Summary of the main outcomes.

Study	Sample	Country	Approach	Performance
Albelda Pérez et al. (2007)	10 EMAS sites	Spain	Both	Intangible assets lead to improve environmental performance
Anne et al. (2020)	3 EMAS manufacturing companies	Lithuania	QuaN	Improve consumption of water and electricity and diesel and liquid gas
Botta and Comoglio (2007)	1 ski resort municipality CS	Italy	Qual	Short term: sustainable tourism, reduction in energy consumption and CO2 emissions Long term: improvement in the citizens' quality of life
Bruzzi et al. (2011)	1 coastal municipality CS	Italy	Qual	Improve land planning, resources consumption (water, natural gas), sustainable mobility and protected areas
Daddi and Iraldo (2016)	1 cluster Paper industry CS	Italy	Both	EMAS cluster leads to positive effects on performance (water consumption, energy consumption)
Daddi et al. (2011)	64 EMAS organizations	Italy	QuaN	Improve water consumption and waste production, even in the short period
Díaz de Junguito and Allur (2019)	4 organizations CS	Spain	Qual	Improve the environmental aspects, reduce energy, better separation of waste, reduce costs
Emilsson and Hjelm (2002)	107 local authorities	Sweden	QuaN	Organizational outcomes, improving environmental performance, trustworthiness and financial savings
González et al. (2008)	157 automotive supplier organizations	Spain	QuaN	Environmental product design, reduction of material usage, managerial aspects and additional environmental demands on their suppliers
Heras-Saizarbitoria et al. (2020b)	414 EMAS organizations EM	Spain	QuaN	Weak improvement of environmental performance
Heras-Saizarbitoria et al. (2020c)	178 EMAS hotels EM	Spain, Italy, Portugal	QuaN	Poor environmental performance and low use of the best practices in consumption of water and energy, and waste generation
Iraldo et al. (2009)	101 EMAS adopters and no-adopters organizations	EU	QuaN	A positive impact of well-designed EMS on environmental performance and on technical and organizational innovations
Ivanova et al. (2016)	137 small, medium and large companies	Bulgaria	QuaN	The indicators have positive influence on the environmental performance, reducing emission, waste, use of natural resources...)
Kube et al. (2019)	208 EMAS large-energy consuming firms	Germany	QuaN	Reduction of CO2 in the early years of the EMAS certification. No evidence of increase use of renewable energy sources
Laskurain et al. (2015)	314 EM+ 6 ISO 50001 companies	Spain	Qual	Very little commitment to renewable energy, specifically in the hotel industry
Laskurain et al. (2017)	4 ISO 14001+ 4 EMAS III hotels CS	Spain	Qual	Better energy management despite not having EnMS
Matuszak-Flejszman et al. (2019)	187 EMAS organizations	Poland	QuaN	Weak correlation between environmental objectives and changes in performance indicators. No linear relation between the time the EMAS is implemented and its effectiveness
Merli et al. (2014)	9 EMAS Cluster	Italy	QuaN	Involve local stakeholders, improve environmental performance and reduce costs
Testa et al. (2014)	229 energy intensive plants	Italy	QuaN	Reduce CO2 emissions
Testa et al. (2018b)	224 EMAS private companies	EU	QuaN	Internalization level influences environmental performance improvements and the ability to make environmental investments

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

CS: case study. ES: environmental statement.

The review shows that organizations do not have a single motive for implementing EMAS. Rather, a number of motives are mentioned, both internal (corporate culture, commitment to the environment, and ensuring regulatory compliance) and external (pressure from stakeholders, improved image and reputation).

There is no consensus in the literature on whether the main motivating factors for EMAS are internal or external. The literature also underlines the importance of contextual factors that mediate or moderate EMAS implementation, such as the institutional environment and national competitiveness. Again, these results are very similar to those obtained in the literature reviews on ISO 14001 (Heras-Saizarbitoria and Boiral, 2013; Boiral et al., 2018; Sartor et al., 2019). Nevertheless, in the case of ISO 14001 overall the internal sources of motivations appears to play a more important role for the adoption of ISO 14001 (Boiral et al., 2018). This may be due to the fact that ISO 14001 is more widely used than EMAS (Heras-Saizarbitoria et al., 2015). Another differential factor that may affect could also be related to the linkage of EMAS to the legislation of the European Commission (Díaz de Junguito and Allur, 2019).

Regarding performance, the results showed a mixed picture although there is a greater prevalence of studies underlining the positive impact of EMAS adoption on environmental performance. Overall, eleven studies were found to connect EMAS with an improvement of the environmental performance, while six others were found no significantly related to an improvement of the environmental performance. These results are also

consistent with the findings of the literature reviews about ISO 14001 published in the scholarly literature (Heras-Saizarbitoria and Boiral, 2013; Boiral et al., 2018; Sartor et al., 2019). In the review by Boiral et al. (2018), nine studies were found to connect ISO 14001 with a positive environmental performance in general, while five others were found no significantly related to positive environmental performance.

## 5. Conclusions

The aim of this review is to synthesize the existing empirical research in the literature on the motivations that lead organizations to adopt EMSs based on EMAS and performance they obtain from its implementation. The review shows that there is no consensus in the literature on what are the main motivations that lead companies to adopt EMAS, as is the case for the academic literature on ISO 14001. As for the influence on environmental performance, the majority academic papers seem to find a positive relationship, although the literature is not conclusive; in particular, because of the biases that some papers emphasize (e.g. Heras-Saizarbitoria et al., 2020b) and that others do not even mention.

The analysis of previous works, as in this review, provides opportunities for future research that should be structured as a research agenda. Although many interesting results have been found in the scholarly literature, clear answers are still waiting to be found.

First, the lack of consensus on whether the main motivations for

adopting EMAS are internal or external is evidence of the need for further research on this topic. The hypothesis that the adoption of ISO 14001 is motivated mainly by external factors, while EMAS is motivated by internal factors requires further research. Future research could also analyze the influence of the source of motivation that lead companies to adopt EMAS on diverse aspects such as in the level of commitment to environmental objectives included in their public statements, or the importance of environmental performance described in them. Key operational aspects, such as the application of regulatory relief measures associated with EMAS (Testa et al., 2016) should also be the subject of study. This is an issue with extraordinary practical implications, especially for managers and policy makers.

Second, more research is also needed on the internal practices and improvements resulting from the adoption of EMAS. In addition, there is a need to investigate these improvements from a multidimensional perspective, including the analysis of other key aspects related to social and cultural variables, as highlighted in recent works carried out in this field of research of meta-standards (e.g. Tayo Tene et al., 2021). The impact of other key variables such as the gender variable should be studied. There is a clear lack in this regard in the literature that has been also overlooked in the literature about ISO 14001, with very few research work on the issue that has analyzed this factor limited to the case of the managers (Mungai et al., 2020; To and Tang, 2014). This is a question that should be analyzed in the future, especially if one takes into account the findings of the limited literature focused on ISO 14001 adoption.

Third, the vast majority of the literature published in the EMAS literature is based on the opinions of managers. It is clear that those are key stakeholders in ensuring with their leadership a fruitful adoption of the standard aimed to improve performance. However, collecting the opinion of other stakeholders such as employees, auditors and consultants is key to the research, as has been shown for ISO 14001 (Heras-Saizarbitoria and Boiral, 2013; Heras-Saizarbitoria et al., 2013).

Four, regarding the methodology of the studies, most of the works reviewed used quantitative methodology and this does not allow for deeper examination of the adoption of EMAS and attitudes inside the organization. Similarly, in the vast majority of quantitative studies, the information used is based on the perceptions of managers who have taken part in the adoption of EMAS. As a result, the outcomes may be influenced by self-reporting bias related to the personal interests of the respondents in the success of the EMAS system (Heras-Saizarbitoria and Boiral, 2013; Heras-Saizarbitoria et al., 2016, 2020a). In addition, as stated, these surveys are sent to environmental managers or to other managers or owners of the organizations, ignoring the perceptions of other relevant stakeholders such as employees, customers or auditors. As underlined by Heras-Saizarbitoria and Boiral (2013) and Heras-Saizarbitoria et al. (2016, 2020a), future research could be based on qualitative studies in order to delve deeper into the motivations and benefits of the adoption of EMAS. Case studies would make it possible to understand better, from the viewpoint of various respondents inside the same organization, the main motivations, obstacles, and outcomes of EMAS implementation (Heras-Saizarbitoria et al., 2016).

Five, as in the case of ISO 14001, the adoption of EMAS is analyzed by researchers from different countries with diverse academic study traditions. It would be advisable to establish a closer relationship between these researchers in order to launch studies with more ambitious objectives and means. As underlined by Heras-Saizarbitoria and Boiral (2013), considering that global standards such as EMAS regulate environmental management practices in a broad range of companies around the world the analysis of the “complex role of the adoption of these meta-standards by researchers of very different backgrounds and different cultural and political environments could provide valuable contributions to a better understanding of their real role, for both academic and practitioner purposes” (p. 60). Similarly, as recently suggested by Fonseca et al. (2022) in their study on B Corp certified organizations, the analysis of the adoption of EMAS may also benefit

from the experience of scholarly research on ISO 14001 and even on the more prolific research on ISO 9001.

This work has strong implications for stakeholders beyond academia. The improvement of environmental performance should be the main focus of EMAS. Thus, a focus on critical environmental issues should be a priority for the adoption of EMAS based EMSs. As it has been mentioned for the case of ISO 14001 (e.g. Heras-Saizarbitoria et al., 2013), external stakeholders should not take the efficiency of EMAS to improve environmental performance for granted. For policy makers, it has to be considered that as the adoption of EMAS continues to be fostered by governments in many regions directly or indirectly, for example with the use of the mentioned regulatory relief measures associated with EMAS. Policy makers should be very interested in following up or even collaborating with academics in order to adapt and improve the incentives being fostered. There is an urgent need to establish collaborative links between academia and policy makers in this field of analysis.

### Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

### Data availability

No data was used for the research described in the article.

### Acknowledgments

This article is a result of a Research Group funded by the Basque Autonomous Government (Grupos de investigación del sistema universitario vasco IT763-13/GIC12- 158 and IT1073-16/GIC 15-176) and the project METASTANDARDS, funded by the Spanish Ministry of Science, Innovation and Universities, the Spanish State Research Agency (AEI) and co-financed with the European Regional Development Fund (ERDF) of the European Union (project reference PGC2018-098723-B-I00). Authors would like to thank to Professor Heras-Saizarbitoria for his contributions and for the initial draft of this work (Heras-Saizarbitoria et al., 2014), a result of the mentioned Research Group.

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