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Environmental Management Certification and Environmental Performance: Greening or Greenwashing?[1]

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Abstract

This article analyzes the contribution of certifiable environmental management standards—such as ISO 14001 and the Eco-Management and Audit Scheme (EMAS)—to corporate environmental performance. Based on a content analysis of 414 third-party-verified environmental statements from EMAS-registered Spanish organizations, which included information for around 6,700 detailed indicators, a weak improvement in environmental performance was found. Less than half of the analyzed indicators—namely 48.27%—revealed a net improvement. Similarly, analysis of the justifications of the registered companies for the lack of improvement points to a rather symbolical adoption of the certification, intended to do only the bare minimum. These findings call into question the prevailing opinion about the positive impact of voluntary certifiable environmental management standards on environmental greening. Implications for managers, and public policy makers, as well as for other stakeholders, are discussed.

Keywords: voluntary certifiable standards, environmental management systems, certification, EMAS, ISO 14001, environmental performance, greenwashing.

Classification: Research paper.

1. Introduction

In the last two decades, many firms have adopted third-party certifiable Environmental Management Systems (EMSs) based on voluntary international standards (Heras-Saizarbitoria and Boiral, 2013; Chiarini, 2017, 2019a; Baek, 2018; Wagner, 2019; Lozano, 2019). Two main frameworks have been disseminated for this purpose: ISO 14001 and the Eco-Management and Audit Scheme (EMAS). The former was launched in 1996 based on ISO 9001, its successful predecessor for Quality Management Systems (QMSs). The latter was launched in 1993, came into force in 1995, and since then has been adopted by thousands of European organizations, especially in Germany, Spain and Italy (European Commission, 2019). From a practitioner perspective, although it is quite

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similar to ISO 14001 and fully compatible with the latest versions of that standard (Neugebauer, 2012; Morrow and Rondinelli, 2002; European Commission, 2011), the EMAS system is generally considered more demanding in terms of managerial requirements (e.g., objectives, performance indicators, regulatory compliance). For example, EMAS establishes the obligation to inform all stakeholders of the most important environmental aspects as well as the operations carried out by the firm, for which purpose a third-party validated or verified environmental statement is required (European Commission, 2011). This statement had been referred to as one of the most difficult aspects of EMAS for firms to implement (Hillary, 2004; Heras-Saizarbitoria et al., 2020a), as they are not used to informing the public of internal facts about the environment.

In both the practitioner and scholarly literatures, the adoption of certified EMSs has been associated with better environmental performance (e.g., Testa et al., 2014; Boiral et al., 2018; Wagner, 2019; Para-González and Mascaraque-Ramírez, 2019; Martínez et al., 2019)[2], following the general trend in the scholarly literature that establishes a connection between the adoption of green practices and the improvement organization's performance (e.g., Graafland and Smid, 2016; Franceschelli et al., 2019). Nevertheless, the findings reported in the literature are not conclusive as this type of certification has also been associated with the improvement of corporate image and legitimacy among stakeholders, and greenwashing (e.g., Christmann and Taylor, 2006; Boiral, 2007; Heras-Saizarbitoria et al., 2013; Vílchez, 2017; Testa et al., 2017; boiral et al., 2017; Iatridis and Kesidou, 2018), and it remains controversial. The process-focused rather than performance-focused perspective of certifiable EMSs has been criticized, as these standards only require firms to implement the systems or structures for monitoring environmental aspects. The implementation of the standard is supposed to reduce environmental impact (Bansal and Bogner, 2002; Boiral, 2007, 2011; Heras-Saizarbitoria et al., 2013), but the certifiable EMSs do not set environmental performance levels, as underlined in the scholarly literature (e.g., Boiral, 2011; Chiarini, 2017; Delmas, 2002; Iatridis and Kesidou, 2018; Heras-Saizarbitoria et al., 2020b). Bansal and Bogner (2002) note that, 'a firm's environmental performance could even deteriorate while the firm is certified' (Bansal and Bogner, 2002; p. 282).

The adoption of ISO 14001 and EMAS has been the object of many empirical studies, but the findings have been scattered and often contradictory, and do not necessarily lead to a better understanding of the subject (Boiral et al., 2018). These inconsistent findings lead to uncertainty as to whether or not the adoption of certifiable EMSs improves the environmental performance (Fryxell et al., 2004: Iraldo et al., 2009; Zobel, 2016). This has been also the case for ISO 9001 and QMSs (Heras-Saizarbitoria and Boiral, 2013; Chiarini, 2019b). One of the possible explanations for this inconsistency has been related to the methods used (Schylander and Zobel, 2003; Heras-Saizarbitoria and Boiral, 2013; Nguyen and Hens, 2015; Boiral et al., 2018). There is a tendency to analyze the link between EMSs and environmental performance based mainly on perceptions—in particular the opinions of environmental managers—which may be influenced by social desirability or self-reporting bias (Heras-Saizarbitoria and Boiral, 2013). For example, in their literature review on the outcomes of ISO 14001, Boiral et al. (2018) found that 80.9% of the works studied used perceptual measures, while only 13.8% used data on environmental impact. Therefore, doubts about the *real*, substantive or relevant impact of certifiable EMSs to improve the environmental greening or performance of the certified organizations, and the need to gather more different types of evidence, can be understood,

[2] The adoption of certified EMSs has also been associated with better financial performance (e.g., Lee et al., 2017; Endo, 2019; Riaz and Saeed, 2019; Yusof et al., 2020), despite the limitations of this type of association (Heras-Saizarbitoria et al., 2011).

especially in the case of the EMAS scheme (Testa et al., 2014, 2018a; Heras-Saizarbitoria et al., 2020a and 2020b).

Considering this gap in the literature, the aim of this study was to shed light on the real contribution of certifiable EMSs to the environmental greening of certified companies. The contribution of EMAS-based EMSs to the environmental greening of certified companies, based on the verified detailed information reported by the EMAS-registered organizations in their environmental statements, was analyzed. This paper contributes to the scholarly literature in at least three ways. First, it contributes to the general research field of certifiable EMSs and environmental performance, whose findings, as stated, have been rather contradictory and inconclusive. Second, it contributes to the specific branch of studies focusing on the adoption of the EMAS scheme, the strictest least researched standard. Third, it proposes the use of the verified environmental statements associated with EMSs and environmental reporting. This type of statement has been overlooked as a way of examining the real contribution to greening of certifiable EMSs.

The remainder of this paper is arranged as follows. First, the literature review and the research question are presented. Second, the methods of the analysis are summarized. Third, the results of the analysis of EMAS-registered companies' statements are described. Fourth, the discussion and the conclusions are presented, and the original contributions made by this research are identified.

2. Literature review and research question

Like the practitioner literature (e.g., Cascio et al., 1996; Dentch, 2016), most of the general scholarly literature on environmental management associates the implementation of ISO 14001 or EMAS certification with an improvement in the environmental performance of the certified organization (e.g., Vachon and Klassen, 2006; Ambec and Lanoie, 2008). Nevertheless, in the specialist literature of the field—which mainly focuses on the adoption of ISO 14001-based EMSs, with only a few studies of EMAS (Iraldo et al., 2009; Testa et al., 2009)—a general positive association between certifiable EMSs and environmental greening or performance of organizations is suggested. (For recent reviews on the impact of ISO 14001, see Boiral et al., 2018, Castka and Corbett, 2015, and Sartor et al., 2019, and for EMAS, see Tourais and Videira, 2016). This issue has been widely debated and the overall results are inconclusive.

Among others issues, the superficial adoption of certifiable EMSs has been highlighted by various studies based on a neo-institutional perspective (e.g., Boiral, 2007, 2011; Aravind and Christmann, 2011; Heras-Saizarbitoria and Boiral, 2013; Vílchez, 2017; Iatridis and Kesidou, 2018). From this theoretical perspective, the adoption of new practices is intended to respond to institutional pressures and to reinforce organizational legitimacy rather than improve the effectiveness of internal practices. As a result, in many certified organizations, these practices can be considered "rational myths" (Boiral, 2007), formal structures and statements which are rational in appearance but in fact somewhat disconnected from internal practices and merely adopted symbolically for the sake of appearances. Similarly, certain organizations adopt certifiable EMSs based on international standards, such as ISO 14001 and EMAS, with the aim of obtaining a commercial certificate or a sort of "organizational degree" mostly intended to influence the perceptions of external stakeholders (Boiral, 2012). Such adoption of certifiable EMSs, driven by the aim of improving external reputation in the eyes of a set of stakeholders, has often been associated with greenwashing practices (Delmas and Burbano, 2011; Potoski and Prakash, 2013; Boiral et al., 2017; Testa et al., 2018b).

Table 1 reviews the main findings of the scholarly literature that studies the impact of the adoption of certifiable EMSs (i.e. ISO 14001, EMAS) on environmental performance. The literature review reported in Table 1 focused on empirical quantitative studies

(qualitative studies were not included) published in English in international journals with a peer-review system between 1996 and 2019. Key terms such as 'ISO 14001', 'EMAS', and 'EMS' were used, together with keywords such as 'environmental performance', 'outcomes' and 'benefits.' Queries were made in the main electronic databases of the management and environmental studies fields and through *Google Scholar*. The articles obtained were analyzed in order to select those that study—either directly or indirectly—the relationship between the adoption of certifiable EMSs and environmental performance.

Table 1 illustrates the inconsistency in the findings mentioned above. To a certain extent, this variety may be associated with the variables selected for the analysis and the methods employed. Boiral et al. (2018) systematically reviewed close to 100 scholarly articles that studied the outcomes of ISO 14001 and found that, among the articles focusing on the impact on environmental performance, a wide range of variables were used in the analysis: 'Rigour and effectiveness of practices' (21% of articles); 'Waste minimization and management' (20%); 'Air pollution' (17%); 'Environmental performance in general' (15%); and 'Regulatory compliance' (15%). The use of diverse sources of information to measure corporate environmental performance could therefore explain the lack of consensus in findings.

Table 1: Studies on the link between certifiable EMSs and Environmental Performance

Article	*Country*	*Sample*	*Measurement*	*Relationship**
Agan et al., 2013	Turkey	500	Perceptual	Improved
Al-Kahloot et al., 2019	Kuwait	16	Perceptual	Improved
Amran et al., 2014	Asia Pacific	111	Perceptual	Inconclusive
Aravind, 2012	US	192	Perceptual	Improved
Aravind & Christmann, 2011	US	72	Reported data	Inconclusive
Arimura et al., 2008	Japan	792	Perceptual	Inconclusive
Arimura et al., 2011	Japan	945	Perceptual	Inconclusive
Arimura et al., 2016	Japan+US	478	Perceptual	Inconclusive
Babakri et al., 2004	US	177	Perceptual	Improved
Barla, 2007	Canada	37	Reported data	Unimproved
Biscotti et al., 2018	Europe	264	Reported data	Unimproved
Boiral & Henri, 2012	Canada	303	Perceptual	Unimproved
Cheng et al., 2019	China	253	Perceptual	Inconclusive
Comoglio & Botta, 2012	Italy	45	Perceptual	Inconclusive
Daddi et al., 2016	Europe	242	Reported data	Inconclusive
Demirel & Kesidou, 2011	UK	289	Perceptual	Inconclusive
Ferrón-Vílchez, 2016	Global	1,214	Perceptual	Inconclusive
Franchetti, 2011	US	121	Perceptual	Improved
Graafland, 2018	Europe	3,633	Perceptual	Inconclusive
Gomez and Rodriguez, 2011	Spain	126	Reported data	Improved
Heras-Saizarbitoria et al., 2016	Spain	361	Perceptual	Inconclusive
Iraldo et al., 2009	EU	101	Perceptual	Improved
Kawai et al., 2018	US, Europe	123	Perceptual	Improved
King et al., 2005	US	46,052	Perceptual	Unimproved
Link & Naveh, 2006	Israel	40	Perceptual	Improved

Long & Lin, 2018	China	310	Perceptual	Inconclusive
Melnyk et al., 2003	US	911	Perceptual	Improved
Montabon et al., 2000	US	1,510	Perceptual	Improved
Montobbio & Solito, 2018	Europe	30,439	Reported data	Inconclusive
Nemati et al., 2016	US	678	Perceptual	Inconclusive
Nishitani et al., 2012	Japan	2,705	Reported data	Improved
Nguyen & Hens, 2015	Vietnam	56	Perceptual	Improved
Potoski & Prakash, 2005	US	3,709	Reported data	Improved
Qi et al., 2012	China	246	Perceptual	Inconclusive
Russo, 2009	US	530	Perceptual	Improved
Singh et al., 2015	India	63	Perceptual	Improved
Testa et al., 2014	Italy	229	Perceptual	Inconclusive
Testa et al., 2018a	EU	224	Reported data	Inconclusive
Yin & Schmeidler, 2009	US	456	Perceptual	Inconclusive
Zobel, 2016	Sweden	116	Perceptual	Unimproved

Source: Developed by the authors based on the reviewed studies. (*) Note: The term 'Unimproved' refers to articles that found a worsening of EP as well as works that did not find any significant improvement. As the adoption of EMSs based on certifiable voluntary standards aims at the continuous improvement of the organizations' performance, the term 'Unimproved' indicates that the main goal of the reference standard was not achieved.

Similarly, the use of contextual or moderating variables might influence the relationship could be a potential source of variation in the outcomes of the studies. For example, Arimura et al. (2016) found that the effectiveness of ISO 14001 certification differed across institutional settings (e.g., institutional factors related to country differences and differences in the type of environmental impacts). These authors found that the effectiveness of ISO 14001 in reducing pollution varied across countries and also across the type of environmental impact.

Yin and Schmeidler (2009) and Qi et al. (2012) for ISO 14001, and Testa et al. (2018a) for EMAS found that the process of internalizing an EMS played an important role in mediating the relationship between certification and environmental performance. In her study of the impact of ISO 14001 on environmental and business performance in 7 OECD countries, Ferrón-Vílchez (2016) also found that only ISO 14001-adopters who monitor an extensive set of negative environmental impacts are associated with real improvements in performance. In their study focused on US Transportation Equipment Manufacturers, Nemati et al. (2016) found that ISO 14001 was effective in decreasing on-site pollution for certain facilities, but was not effective in decreasing off-site pollution for any facility considered in the study. Likewise, Testa et al. (2014) found that big organizations obtain more benefit from the implementation of an EMS based on either ISO 14001 or EMAS rather than another type of EMS. Finally, Erauskin-Tolosa et al. (2019) performed a meta-analysis on the link between certifiable EMSs and environmental performance drawing on a sample of 53 scholarly studies analyzing a total of 182,926 companies. Their findings showed a positive influence of ISO 14001 and EMAS certification on corporate environmental performance, but a set of underlying moderating effects were also identified; there was a pronounced positive effect of adoptions based on environmental innovation and for firms with a more mature certification.

Lastly, the main controversial aspects of the reviewed studies are associated with the methods used to gather information about the impact of certifiable EMSs on environmental performance. In their review, Boiral et al. (2018) found that the vast

majority of empirical studies used perceptual measures obtained by surveys to analyze the impact of certifiable EMSs on environmental performance. This issue is also reported in Table 1, which shows that most of the reviewed empirical studies were based on perceptual measures. These perceptual measures may be influenced by social desirability bias and self-proclaimed benefits from environmental managers to closed-ended questions included in questionnaires. A common example is the assessment of the impact of EMSs on environmental performance through a 1-5 Likert scale. This type of self-reported perceptual measure is prone to several distortions and biases, as underlined in the specialized literature (e.g., Heras-Saizarbitoria and Boiral, 2013; Boiral et al., 2018).

Therefore, there is a need to develop new ways to gather reliable information about the impact of EMSs on environmental performance. One possibility is to focus on the validated information provided by EMAS-registered companies in their public environmental statements. To our knowledge, this perspective has not been applied yet to the study of the relationship between EMSs and environmental performance. The analysis of validated EMAS environmental statements has been used very little in previous work on environmental reporting that aims to analyze the characteristics (e.g., reliability, comparability) of the reported environmental indicators (Marsanich, 1998; Erkko et al., 2005; Bonilla-Priego and Avilés-Palacios, 2008; Petrosillo et al., 2012; Mazzi et al., 2012). As a result, to our knowledge, the measurement of the success of an EMS certification scheme, such as EMAS, in terms of tangible environmental improvements—as proposed many years ago by Hillary (1999)—has not been addressed yet in the literature. Based on the theoretical and empirical considerations found in the scholarly literature, the following main research question is proposed: *In the light of their performance reported in the verified environmental statements, do EMAS-registered companies improve their environmental performance?*

3. Methods

To address the research question, an exploratory empirical study was planned. Spain was the geographical focus of the study, as it is one of the member states of the European Union with most EMAS certification (Heras-Saizarbitoria et al., 2015).

The data from 414 statements issued by EMAS-registered companies was obtained from the EU EMAS Helpdesk service of the European Commission and from the websites of those registered companies. The EMAS scheme establishes that the environmental statements are public and therefore anyone should have access to them easily and free of charge. Most of the statements were then obtained from the companies' websites, but around 10% were more difficult to obtain, as the companies did not publish them on their websites. In these cases, we requested them by e-mail or telephone. Of the initially identified companies, five were reluctant to provide us with their environmental statements.

Companies operating in six sectors of activity were selected: Building; Chemical; Food & Beverage; Printing; Retail Trade; and Tourism. These sectors of activity were chosen due to their high environmental impact and their high number of EMAS registrations (Heras-Saizarbitoria et al., 2015). To give a broad and rich picture of the impact of the adoption of EMSs on environmental performance of EMAS-registered companies, the analysis was carried out in two stages. The first stage was performed in 2013 and the second in 2019. The statements analyzed in the first stage ranged from 2007 to 2009, while the statements analyzed in the second stage ranged from 2015 to 2019[3]. In the first

[3] EMAS- registered companies aredid not published the environmental statements once eachimmediately at the end of the reference year, is finished but only withafter a delay lag, which was higherlonger before

stage, 160 statements/companies were analyzed. In the second stage, 254 statements/companies were analyzed. In common with most studies of the adoption of voluntary certifiable standards, such as EMAS and ISO 14001, the present study includes companies have been using their EMSs for different periods of time - a variable measured as the time elapsed from the first EMAS registration. This was used as a control variable in order to try to detect potential biases, together with other variables such as the size of the firm and the location of the firms in Spain (as many public policies that may affect companies are regional)[4].

These data were included in the analysisere because, as underlined in the previous section, they might shed light on the potential of the EMAS-registered companies to improve their environmental performance with externally verified data. The analysis was to shed light on the specific environmental aspects and the main environmental objectives and targets established by EMAS- registered companies following the requirements of the scheme used verify the EMS. For example, registered companies informdisclosed information about the main key performance indicators (KPIs)[5] etoused to monitor their environmental performance and their continuous environmental improvement. T the EMAS scheme setsstates that registered organizations should be able 'to demonstrate an improvement of their environmental performance' (EC, 2009). Unfortunately, it was not possible to setestablish a control group for the set of companies that was analyzed (i.e. a group of non-EMAS- registered companies), as the the type of environmental information disclosed by the data needed for such an exercise is only publicly available for EMAS-registered companiesis.

The analyzed EMAS environmental statements were quite similar with respect to their appearance and structure, although they varied in terms of length (about 40 pages on average). Their typical structure included sections similar to the following ones: Introduction (presentation of the company and the statement); Description of the EMS; Environmental Policy; Environmental aspects and impacts; Objectives, targets and actions; Environmental performance indicators—with the defined targets and a description of the objectives' level of achievement for each KPI—; Legal requirements; and Communication. Although the analysis was carried out for two different time periods, there were no significant differences either in terms of content (e.g., structure, KPIs, targets) or the average length of the statements.

Table 2 summarizes the number of companies and indicators analyzed as well as their sectoral breakdown. Overall, the verified environmental statements of 414 EMAS-registered companies from six sectors of activity and 6,770 indicators of environmental performance disclosed by these companies were analyzed. When reference is made to a specific environmental performance indicator, it generally means the result of a given indicator for a given period of time (usually one year).

Table 2: Sectoral breakdown of analyzed organizations and indicators by fieldwork stage

	2013		2019		Total	
Sector	No. of firms	No. of indicators	No. of firms	No. of indicators	No. of firms	No. of indicators

the EMAS III regulation came into force. The analyzed statements were published in the so-called EMAS Library ofby the European Commission. This information is provided in the revised version of the article.

[4] This information was also provided by the EU EMAS Helpdesk.

[5] The EMAS scheme establishes that the KPIs shall focus on the performance of the following key areas: Efficiency use of materials; Energy efficiency; Water management; Waste management; Biodiversity; Emissions into the air; and Other relevant indicators (EC, 2009).

Building	37	507	45	720	82	1,227
Chemical	24	484	26	546	50	1,030
Food & Beverage	14	294	36	792	50	1,086
Printing	11	159	14	224	25	383
Retail Trade	10	236	11	242	21	478
Tourism	64	858	122	1,708	186	2,566
Total	160	2,538	254	4,232	414	6,770

Source: prepared by the authors

All the environmental statements retrieved for the purpose of the content analysis were published as PDF documents. The documents scanned as images were converted to text using OCR software and the final sample of text analyzed represents approximately 5,500 single-spaced pages. This information was extracted, categorized, and analyzed by two researchers using an analysis grid. The qualitative and quantitative information for each EMAS statement was compiled into a set of Excel spreadsheets. As suggested in the specialist scholarly literature (Schreier, 2012), the information was then reviewed separately by a third researcher with an assessment protocol in order to improve the validity and reliability of the analysis.

The main information contained in the analysis grid consisted of: (1) the environmental performance indicators of each EMAS-registered organization (see Table 3 in the next section for a sample of the most frequently used environmental performance indicators) and (2) the descriptive, qualitative explanation for the compliance or non-compliance with the proposed environmental objectives for each indicator. At each stage of the fieldwork (i.e. the analysis of data collected in 2013 and in 2019), the environmental statements were used to determine whether or not the environmental performance indicators had improved over the previous year. Similarly, the explanations given by the EMAS-registered company were also analyzed. The descriptive, qualitative information was analyzed using a process of systematically classifying the data (Schreier, 2012) based on a qualitative content analysis, which was used to interpret textual information through a systematic process of categorization that groups information around recurring concepts or themes. The data analysis process followed these steps: extraction and collection of information from the environmental statements; development of the framework of categories; categorization; analysis and interpretation of information and the selection of illustrative quotations.

In the following section, the main findings of this analysis are summarized, combining descriptive statistical techniques with the outcomes of the content analysis of verified environmental statements (Mayring, 2004).

4. Results

Table 2 summarizes the number of companies and indicators analyzed, as well as their sectoral breakdown. Overall, 6,770 environmental performance indicators from the EMAS-registered companies' verified environmental statements were analyzed. When reference is made to a specific environmental performance indicator, it generally means the result of a given indicator for a given period of time (usually one year). Table 3 shows, as an illustrative example, some of the most frequently used performance indicators included in the environmental statements*FOOTNOTE. This should make clear the nature of the environmental performance indicators analyzed. The performance indicators changed very little between the first and the second stages of the study.

Heras-Saizarbitoria, I., García, M., Boiral, O., & de Junguitu, A. D. (2020c). The use of eco-efficiency indicators by environmental frontrunner companies. *Ecological Indicators*, *115*, 106451.

Heras-Saizarbitoria, I., Boiral, O., García, M., & Allur, E. (2020b). Environmental best practice and performance benchmarks among EMAS-certified organizations: An empirical study. *Environmental Impact Assessment Review*, *80*, 106315.

*The analysis was focused on relative indicators set with minimum eco-efficiency criteria —i.e. combining economic value and environmental impact (Heras-Saizarbitoria et al., 2020b).

Table 2: Sectoral breakdown of organizations and indicators analyzed by fieldwork stage

	2013		2019		Total	
Sector	No. of firms	No. of indicators	No. of firms	No. of indicators	No. of firms	No. of indicators
Building	37	507	45	720	82	1,227
Chemical	24	484	26	546	50	1,030
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Retail Trade	10	236	11	242	21	478
Tourism	64	858	122	1,708	186	2,566
Total	160	2,538	254	4,232	414	6,770

Source: prepared by the authors

Table 3: Variation of the environmental performance indicators by sector and fieldwork stage

	2013		2019	
Sector	% of improved indicators	% of unimproved indicators	% improved of indicators	% of unimproved indicators
Building	53.06%	46.94%	47.41%	52.58%
Chemical	49.60%	50.40%	49.03%	50.97%
Food & Beverage	50.68%	49.32%	38.26%	61.74%
Printing	56.60%	43.40%	47.77%	52.23%
Retail Trade	48.73%	51.27%	47.11%	52.89%
Tourism	48.37%	51.63%	42.56%	57.43%
Total	51.17%	48.83%	45.36%	54.64%

Source: prepared by the authors

Table 4: Sample of the most frequently used indicators of environmental performance by key area

Key area or KPI	*Indicator (units)*
Efficiency of material consumption	Total direct use of raw materials/Total annual production (kg/weight, volume, value or number of products) Total direct use of /Total annual production (MWh/production units)
Energetic efficiency	Total direct energy use/Total annual production (MWh/production units) Total energy use per product unit (kWh/weight, volume, value or number of products) Total use of renewable energy/Total annual production (MWh/production units)
Water management	Total annual water consumption/Total annual production (m^3/production units)
Waste management	Total annual generation of waste/Total annual production (kg/weight, volume, value or number of products)
Biodiversity	Total use of land (m^2 of built-up area)
Emissions into the air	Total annual emissions of GHG/Total annual production (kg CO_2eq/weight, volume, value or number of products)

Source: prepared by the authors

The analysis of environmental performance indicators shows that these indicators were mostly unimproved in EMAS-registered organizations for both stages of the study. This failure to achieve environmental objectives may be interpreted as non-compliance with the requirements of the EMAS scheme, as registered organizations should be able 'to demonstrate an improvement of their environmental performance' (EC, 2009).

Indeed, as shown in Table 5, a deterioration in the environmental performance indicators analyzed can be observed between the two periods in which the analysis was performed, from an average 51.17% of indicators improving in 2013 to an average of 45.36% in 2019. On a sectoral basis, the worsening was generalized but with a set of remarkable cases, such as the case of certified companies in the Food & Beverage sector, which experienced a worsening of more than 10 percentage points for some indicators. Regarding the control variables, no decrease of EMAS benefits over time was detected in EMAS-registered companies, as the years of experience with EMAS registration did not significantly impact the improvement or lack of improvement of the targeted

environmental performance indicators. The effect of company size and regional distribution was also statistically insignificant[6].

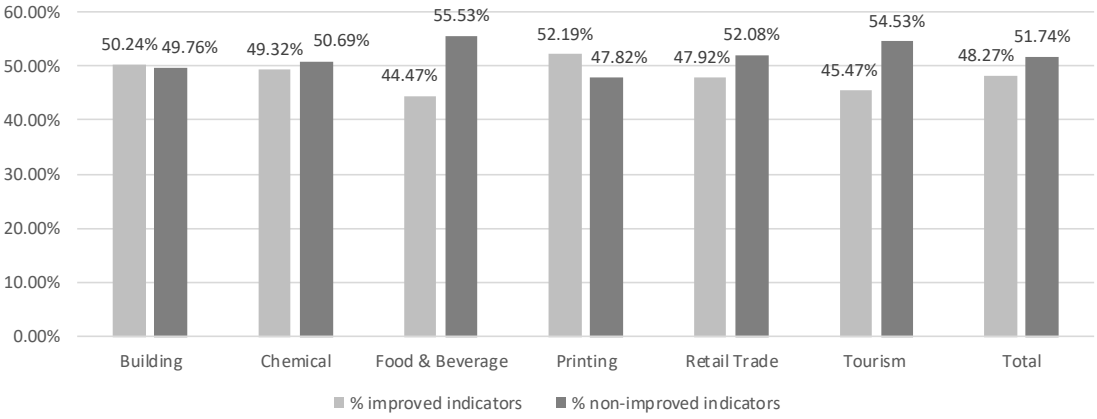
Table 5: Variation of the environmental performance indicators by sector and fieldwork stage

	2013		2019	
Sector	% of improved indicators	% of unimproved indicators	% improved of indicators	% of unimproved indicators
Building	53.06%	46.94%	47.41%	52.58%
Chemical	49.60%	50.40%	49.03%	50.97%
Food & Beverage	50.68%	49.32%	38.26%	61.74%
Printing	56.60%	43.40%	47.77%	52.23%
Retail Trade	48.73%	51.27%	47.11%	52.89%
Tourism	48.37%	51.63%	42.56%	57.43%
Total	51.17%	48.83%	45.36%	54.64%

Source: prepared by the authors

Figure 1: Total of improved and unimproved environmental performance indicators by sector

[6] Descriptive and deductive statistical methods were used (e.g. variance and correlation analyses, regression analysis) in order to test the statistical significance of the variables.



Source: prepared by the authors

In short, the figures for the analyzed certified companies may be considered weak, in both 2013 and 2019. As shown in Figure 1, with the exception of the Building and Printing sectors, the average percentage of unimproved environmental performance indicators was higher than the percentage of improved indicators. These figures may be considered as weak or bad considering that the analyzed companies are supposed to be leading companies in terms of environmental awareness and introduction of environmental practices (Heras-Saizarbitoria et al., 2020). It should also be noted that the environmental practices mentioned in the public environmental statements have not only been evaluated by the staff of the EMAS-registered organization, but also by an experienced external third-party.

Table 6: Variation of justified and unjustified indicators by sector and fieldwork stage

	2013		2019	
Sector	% of justified indicators	% of unjustified indicators	% of justified indicators	% of unjustified indicators
Building	36.55%	63.45%	44.92%	55.08%
Chemical	52.87%	47.13%	44.43%	55.57%
Food & Beverage	43.45%	56.55%	49.73%	50.27%
Printing	4.35%	95.65%	16.31%	83.69%
Retail Trade	71.90%	28.10%	20.62%	79.38%
Tourism	42.21%	57.79%	31.06%	68.94%
Total	44.13%	55.87%	34.51%	65.49%

Source: prepared by the authors.

As stated, beyond this descriptive study, a descriptive and qualitative content analysis was carried out with regard to the justifications given by the EMAS-registered companies when environmental performance indicators were not improved. Table 5 summarizes the figures for the justified and unjustified indicators and Table 6 shows a set of illustrative justifications made by certified companies.

By sector, Table 6 shows that for the two stages considered—except for Retail Trade and Chemical in 2013—there were more unjustified than justified indicators for the EMAS-registered companies. Overall, the negative performance on indicators remained mainly

unjustified. As the unjustified negative results have increased from 55.87% in 2013 to 65.49% in 2019, the accountability of these statements has not improved over time.

Table 7: Illustrative justifications by sector and fieldwork stage

	Justifications included in the environmental statements (stage)
Building	'Growth in consumption of raw materials, possibly due to increased workload.' (2013)
	'The reason for the increase [in fuel consumption] is due to a greater number of rented vehicles.' (2019)
	'Cardboard production has increased due to the greater number of jobs linked to business line *[name omitted]*.' (2019)
Chemical	'The increase in consumption is due to leaks in the system's pipes.' (2013)
	'There is a slight upward trend, due to the introduction of new equipment and facilities, necessary for the increase in production capacity.' *[Note: there was a strong increase of 5%, twice the increase in production of the section concerned].* (2019)
	'Removals from many departments that generated a large amount of paper waste.' (2019)
Food & Beverage	'There is evidence of increased electricity consumption as production at the facility increases.' (2013)
	'The worsening of data is due to the installation and adjustment period of a new washer with a higher flow.' (2013)
	'The introduction of a new and less efficient machine for the manufacture produced a worse performance.' (2019)
Printing	'Growth in electricity consumption due to the expansion of offices [...] although total production is not increasing much.' (2013)
	'Because water is used in the community areas by the various tenants of the building, it is impossible to know the *[growing]* consumption derived from the activities and personnel of the company.' (2019)
	'Electricity consumption per end product is worsened by production inefficiencies.' (2019)
Retail Trade	'*[The increase in electricity consumption was due to]* a leak in the air conditioning circuit.' (2013)
	'The slight increase observed in the summer months compared to the winter months is due to the implementation of air conditioning and the increased demands on the cooling circuit due to heat.' (2019)
	'Exchange of glass containers for plastic ones.' (2019)
	'Loss of water due to possible breakdowns in the circuits.' (2019)
Tourism	'Breakdown in the recirculation pump of the purification system.' (2013)
	'Breakages and leaks in the pools.' (2013)
	'More optimal days for recreational boating.' (2019)
	'Lack of common sense in the use of pool towels.' (2019)
	'Replacement of shower curtains with screens that require daily cleaning.' (2019)
	'Incorporation of 3 osmosis machines and 23 new Jacuzzis.' (2019)

Source: prepared by the authors

Table 7 shows some of the illustrative justifications obtained in the qualitative analysis. In general, it was found that the justifications given were neither very detailed nor very rigorous. These justifications can be classified into four types: (1) increase in activity; (2) environmentally inefficient changes; (3) tautology; (4) hypocrisy.

(1) For around 50% of the justifications provided in the statements, the poor performance on indicators is justified by an increase in activity, for example in the final or intermediate production, which in turn seems to require—at least in

the perception of the analyzed companies—an increased use of resources. It is interesting to note in this respect that a very small number of indicators for the companies studied were of the eco-efficiency type (Erkko et al., 2005). Among the most common justifications were leaks and breakdowns. Very few companies emphasised that they either had preventive maintenance plans or that they plan to implement them to avoid this type of problem.

(2) Many justifications (around 30%) also refer to changes introduced in organizations that were questionable from the perspective of environmental policy and more advanced practices in this field. This is the case, for example, in the tourism sector where on one occasion the growth in electricity consumption was justified by the *'need to introduce tumble dryers in all rooms.'* Or the case of an EMAS-registered company from the Retail trade sector that justified the growth in the generation of plastic waste due to the *'exchange of glass containers for plastic ones.'*

(3) For a number of justifications (around 10%), the explanations released in the statements could be qualified as tautological, with statements such as: *'waste management performance has worsened due to an increase in hazardous waste generated.'* In some cases, surprising and paradoxical justifications were found. For example, a company in the chemical sector justified its increase in paper generation *'because of the elaboration and distribution of the procedures of the Quality and Environmental System.'*

(4) Finally, in a percentage of cases (around 10%), the justifications provided did not correspond to reality, even though they were extracted from externally verified reports. For example, the existence of particularly hot summers is argued to justify the increase in electricity consumption (due to an allegedly higher use of air conditioning), when, according to official data from the Spanish meteorology agency (AEMET, 2020), this was not the case. Justifications were also given based on assertions that cannot be confirmed in light of the company's own data detailed in their environmental statement**.**

5. Discussion and conclusions

This article analyzes the contribution of a strict certifiable EMS, namely EMAS, to corporate environmental performance. Based on a content analysis of 414 third-party verified environmental statements from EMAS-registered Spanish organizations, which included information for 6,770 detailed indicators, a weak improvement of environmental performance was found, as less than half of the analyzed indicators revealed a net improvement of the environmental performance. Similarly, the analysis of the justifications for the lack of improvement on indicators by the registered companies may point to a rather symbolical adoption of the certification by a relevant percentage of registered companies since, when such justifications exist—which only happens in 39.32% of the cases—they are not rigorous and well-founded.

These findings are consistent and complementary with other contributions of the scholarly literature (e.g., Boiral, 2007; Heras-Saizarbitoria et al., 2013; Testa et al., 2018; Heras-Saizarbitoria et al., 2020). According to a recent systematic literature review in the field of voluntary certifiable standards for EMSs (Boiral et al., 2018), although the dominant scholarly literature is optimistic with regard to the impacts of these certifiable standards, an increasing body of research questions their effectiveness. As it has been pointed out by the neo-institutional literature on certifiable EMSs such as ISO 14001 and EMAS (e.g., Yin and Schmeidler, 2009; Heras-Saizarbitoria et al., 2013; Iatridis and Kesidou, 2018; Testa et al., 2018; Heras-Saizarbitoria et al., 2020b), many companies use these standards just to obtain the certification, which is used as an organizational degree (Boiral, 2012), i.e. a tool to strengthen the firm's social legitimacy—a concept associated

with greenwashing—rather than to improve internal practices and environmental performance.

Generally speaking, this work contributes to the branch of the literature questioning the prevailing opinion about the positive impact of voluntary certifiable EMSs on environmental greening. Similarly, this article contributes to the scholarly literature on both voluntary certifiable EMSs and environmental reporting and corporate disclosure as it proposes an overlooked methodological approach (related to data collection), which avoids common distortions and biases such as the social desirability bias associated with the use of perceptual data. This study also contributes to the literature on the neo-institutional approach to EMSs and the greenwashing tendencies associated with certification practices (e.g., Testa et al., 2018; Martín-de Castro et al., 2016; Iatridis and Kesidou, 2018). Most research in this area has criticized the use of certifiable EMSs as a marketing tool with uncertain or little impact on internal practices and environmental performance. Nevertheless, the information on these impacts are difficult to obtain and tend to be shaped by the greenwashing tendencies of organizations (Boiral, 2007).

It seems unlikely that the explanations given in the EMAS statements analyzed in the present study are significantly biased by the same greenwashing tendencies for at least three interrelated reasons. First, it is reasonable to assume that such tendencies would have resulted in the disclosure of substantial improvements in environmental performance, which is clearly not the case for the majority of the statements analyzed. Second, although most EMAS statements are publicly available, they are not publicized by companies (Heras-Saizarbitoria et al., 2020) and stakeholders tend to ignore their existence. As a result, the information contained is not really used by stakeholders to exert pressure on certified companies, or to require better environmental performance and more detailed explanations in this area. This lack of external pressure related to the content of EMAS statements does not encourage greater accountability from certified companies with regard to environmental issues, which could explain why the reported performance has not significantly improved over time. Third, the EMAS statements seem to be used by certified companies to comply with the requirements of the standards and for auditing purposes. Despite the need to exercise caution in interpreting the results, the findings point to a lack of significant improvement in environmental performance, and the lack of substance in most of the explanations provided by companies suggests that the indicators published in the statements could have not been used as an effective internal tool to improve practices and correct deviations from environmental objectives.

The findings of this study have many implications for managers, policy makers, and other stakeholders. Considering the results of this study, managers should be aware of the actual or day-to-day limitations of third-party certification schemes in motivating the adoption of advanced environmental practices. They should also be aware of the heterogeneous behaviours of the parties involved in the verification and audit of EMSs, including those that allow a symbolic adoption of these tools without representing a substantial improvement in environmental practices and performance.

For policy makers, these results once again underline the need to rethink policies that promote the indiscriminate adoption of certifiable voluntary schemes for environmental management. They also underline the importance of establishing adequate public monitoring and evaluation programmes to analyze the real impact of those programmes for corporate environmental performance. There is also a need to rethink public policies associated with this type of tool, such as regulatory relief policies for certified companies (Testa et al., 2016).

Regarding other stakeholders, the findings might be of interest to consumer groups, such as the European consumer groups who have been critical of voluntary third-party certification schemes such as EMAS. The criticism of these groups with regard to the

'lack of performance requirements and the absence of a mandatory set of comparable performance indicators which would allow for a differentiation between good and bad performers' (ANEC, 2006; p. 1) seems reasonable in the light of the evidence collected. The inclusion of sectoral benchmarks and best practices does not appear to have benefited registered companies much, at least on the evidence in the literature (Heras-Saizarbitoria et al., 2020). Despite the limits of certifiable EMSs and criticism on their lack of effectiveness, in the case of the EMAS standard, stakeholders could pay more attention to the statements released by companies. The lack of reported benefits could be used by stakeholders who are really concerned by environmental issues as a leverage to exert pressure on companies and to require more corporate accountability on environmental performance.

This study has a number of limitations due to its exploratory nature and its limited geographical scope. The research design of the study could have been substantively improved if a control group of non-EMAS-registered firms could have been included in the analysis. But this type of analysis is very difficult, if not impossible, due to the difficulties in obtaining this type of sensitive data from companies. Similarly, the sample of certified companies was drawn from a set of sectors of activity in a specific country where the dissemination of EMAS has been high (Heras-Saizarbitoria et al., 2015), and this is also a limitation of the study. Therefore, the findings of this study may not be generalizable to other sectors of activity or to other countries, even though some isomorphic behaviour has been reported in the scholarly literature (Heras-Saizarbitoria and Boiral, 2013) among organizations from different geographical areas. The limitations of this work suggest avenues for future research. In addition to extending the geographical scope of the analysis to other countries, it would be interesting to extend the analysis to other voluntary certifications schemes such as ISO 14001. The potential for using control groups, using information from non-certified firms that they disclose on environmental performance indicators to meet legal requirements — e.g., in complaince with the Integrated Pollution Prevention and Control directive in the EU — and voluntary drivers — e.g., the publication of sustainability reports based on reference models such as guidelines of the Global Reporting Initiative — might also be analyzed.

6. References

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