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Disentangling the influence of internationalization on sustainability development: Evidence from the energy sector

Abstract

This paper aims to deepen our understanding of the relationship between firms' internationalization and their sustainability development. We expected firms with a higher level of internationalization to exhibit better environmental management and performance. A sample of 287 publicly traded firms in the energy and energy-related utilities sector was used to test these relationships. We focused on the energy sector, as energy production and supply have historically accounted for the lion's share of global greenhouse gas (GHG) emissions. We found that firms' level of internationalization had a positive effect on their environmental management, while its effect on environmental performance was not found to be significant. We also tested whether these relationships change when firms' internationalization is oriented towards developing countries. Upon a closer look, this relationship was found to be significant for internationalization towards developing countries and better environmental management, thus contributing to the line of literature that does not support the pollution haven hypothesis.

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Keywords: internationalization; sustainability, developing countries; energy industry

INTRODUCTION

The global issue of climate change is one of the main current challenges facing internationalized firms (Buckley, Doh, & Benischke, 2017). Internationalization increases firm exposure to global norms and global legitimating actors (Marano & Tashman, 2012), such as multilateral or international nongovernmental organizations (NGOs) that monitor the social and environmental impact of firms on a global scale (Marano & Kostova, 2016). Furthermore, firms operating in international markets cope with the institutional pressures from external actors, such as governments, regulators, markets, and society (e.g., constituency groups and industry associations), located across the multiple countries where such firms operate. These pressures can vary across countries and even provide conflicting prescriptions for legitimate practices (Meyer, Mudambi, & Narula, 2011). In this context of complexity, firms need to comply with institutional pressures to attain legitimacy and maintain their competitive positions in their operating environments (Delmas & Montes-Sancho, 2010; Suddaby, Bitektine, & Haack, 2017). Legitimacy can be defined as the “generalized perception or assumption that the actions of an entity are desirable, proper, or appropriate within some socially constructed systems of norms, values, beliefs, and definitions” (Suchman, 1995: p 574). Firms that attain legitimacy may be considered more trustworthy, improve their ability to compete for resources and benefit from stakeholders’ goodwill in times of need (Babiak & Trendafilova, 2011; Cormier & Magnan, 2015; Crane, 2018; Suchman, 1995).

Recent studies have made important contributions to understanding how firms respond to greater pressures for social responsibility and sustainability in their global operations (e.g., Aragón-Correa, Marcus, & Hurtado-Torres, 2016; Christmann & Taylor, 2001; Pinkse & Kolk, 2012). The literature has shown how international firms seek legitimacy in international markets by reinforcing their environmental disclosure (e.g., Aragón-Correa et al., 2016). There is also an open debate regarding the extent to which firms’ internationalization fosters a greater effort to implement environmental practices, policies and procedures and/or facilitates reaching better environmental performance records (Christmann & Taylor, 2001; Suárez-Perales, Garces-Ayerbe, Rivera-Torres, & Suarez-Galvez, 2017). Therefore, our study contributes to shedding light on this debate, analyzing whether and how a greater firm internationalization influences firms’ environmental management and performance. The analysis of both variables is important because while environmental management represents the effort undertaken by firms to implement changes in the “organizational structure, the responsibilities, practices, procedures, processes and resources meant to achieve and maintain a specific environmental behavior that can reduce the impact caused by enterprise operations on the natural milieu” (Claver, López, Molina & Tari, 2017: p. 606), environmental performance refers to “the environmental impact that the enterprise’s activity has on the natural milieu” (Claver et al., 2017: p. 606). Hence, the analysis of both variables helps us understand whether international firms display a dual strategy in which internationalization

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affects environmental management and performance in different ways or if, on the contrary, the influence is similar on both variables.

Additionally, in this paper, we study whether these relationships are the same when the internationalization of firms is directed towards developing countries. From an environmental point of view, firms face different levels of institutional pressures that firms face in developed and developing countries. In developed countries, wealth is a determinant of welfare schemes, which translates into general and specific social stakeholders influencing norms developed by firms in exchange for environmental protection (Dogl & Behnam, 2015). Some studies support the pollution haven hypothesis, which posits that firms search for business opportunities abroad in order to take advantage of lax laws and regulations to export their polluting activities (e.g., Li & Zhou, 2017). However, other authors argue that when firms expand their activities to international markets, they may be able to exploit the firm-specific advantages developed in their home country, therefore obtaining an advantage when they enter new markets (Ramanathan, He, Black, Ghobadian, & Gallear, 2017). Therefore, international firms' activities may have positive spillover effects to foreign countries because the cross-border transfer of environmental practices helps fill institutional voids and contributes to the diffusion of global behavioral norms (Pinkse & Kolk, 2012). Our interest in analyzing the relationship between internationalization and environmental management and performance is relevant because it can shed light on the open discussion regarding the pollution haven hypothesis.

Using data from firms in industries related to the production, transportation, innovation, handling and sale of energy products, we find answers to the proposed research questions. The energy and energy-related utilities industries are appropriate for the purposes of our study because institutional and competitive changes caused by market globalization and deregulation have greatly transformed them, exhibiting a high level of internationalization. According to the OECD, the energy supply industry needs to undergo an intense process of adaptation in the coming decades to achieve the emission goals because "80% of carbon emissions are related to energy supplies" (Martínez-Fernández, Sharpe, Hughes, & Avellaner de Santos, 2013: p. 12).

Our study offers new insights on the determinants of environmental management and performance within a more general understanding of firm behavior with regard to countries' economic development. Specifically, our paper adds new evidence to previous research that has highlighted that international firms adapt their environmental management (practices, policies and standards) to the most demanding legislation in the countries in which they operate (e.g., Aragón-Correa et al., 2016; Bansal, 2005; Christmann & Taylor, 2001; Delmas & Montes-Sancho, 2011; Garces-Ayerbe, Rivera-Torres, & Murillo-Luna 2012; Pinkse & Kolk, 2012). Our findings suggest that more internationalized firms look to address institutional complexity and gain legitimacy in an international context by exhibiting a stronger efforts to develop their environmental management. Internationalization increases the complexity of the environment in which a firm operates, so it may lead international firms to implement practices,

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procedures, processes and resources aimed to achieve and maintain a similar environmental behavior across its international markets and to meet the environmental expectations of international stakeholders. However, our results do not prove the existence of a relationship between firm internationalization and better environmental performance records. Hence, firms' internationalization (both generally and towards developing countries in particular) translates into greater environmental effort but not into improved environmental performance rates. This evidence goes beyond that found by other authors who do not provide support for the pollution haven hypothesis (Aragón-Correa et al., 2016; Kathuria, 2018; Strike, Gao, & Bansal, 2006). These results are also ground-breaking because developing economies accounted for a growing share of cross-border business operations (UNCTAD, 2018a), and thus, it is crucial to know the environmental management and performance of those firms deploying their activities in such markets. Finally, the context of our analysis (energy and energy-utilities sectors) also strengthens the relevance of the results of this paper because the environmental impact of the activities conducted by firms operating in these sectors is responsible for a considerable share of global environmental impacts (Markard, Raven, & Truffer, 2012; Moorhead & Nixon, 2015).

The structure of this paper is as follows. In the next section, we review the related literature and develop our hypotheses. Then, we present our data and methodology. Afterwards, we describe the results. Finally, we conclude by highlighting the main contributions as well as the limitations and future lines of research.

THEORY AND HYPOTHESES

Internationalization and the natural environment

International firms are exposed to the institutional pressures of all the countries in which they are present (Marano & Kostova, 2016; Meyer, Mudambi & Narula, 2011) together with global norms and global legitimating actors (Marano & Kostova, 2016; Marano & Tashman, 2012). Hence, firms need to deploy efforts aimed at attaining legitimacy and maintaining their competitive positions (Delmas & Montes-Sancho, 2010; Suddaby et al., 2017). Firms may use alternative practices to attain legitimacy in an international context, such as reinforcing their environmental disclosure (Aragón-Correa et al., 2016; Huang & Kung, 2010). Aragón-Correa et al. (2016) showed that top international firms have better records of environmental disclosure, but their environmental performance is worse than that of other firms in the industry. These findings suggest that the top international firms examined seek legitimation through their voluntary environmental disclosure, even though their environmental performance is worse than of other firms. Huang and Kung (2010) gathered environmental and financial information from a sample of 759 firms listed on the Taiwan Stock Exchange. They found a statistically significant positive relationship between stakeholders' expectations and claims and the environmental disclosure of firms,

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concluding that firms' motivation to disclose environmental information responds to their need to be legitimated by stakeholders' perceptions of their actions. Following Suchman (1995), we contend that environmental disclosure can be assimilated to the search for pragmatic legitimacy (based on audience self-interest).

Other studies have noted that firms can seek moral legitimacy based on normative approval in foreign markets (Suchman, 1995) by increasing their environmental proactivity in international operations (Babiak & Trendafilova, 2011; Bansal, 2005; Bansal & Clelland, 2004; Chen, Ong & Hsu, 2016; Christmann & Taylor, 2001; Suárez-Perales et al., 2017). Christmann and Taylor (2001) showed that multinational firms go beyond local environmental standards by transferring advanced environmental technology to their subsidiaries, thus coping with the regulatory demands of the strictest countries in which they operate. In her study, Bansal (2005) analyzed a sample of Canadian firms in the forestry, mining and oil and gas industries. Her results showed that firms' international experience has a significant positive relationship with corporate sustainable development. Another relevant finding of this study is that no time-related effects for international experience were found, so the influence of this variable is consistent in both the early and late stages of their internationalization process. Babiak and Trendafilova (2011) conducted a survey in which the participants believed that "addressing green management issues allowed them to simultaneously be good citizens and contribute to their business objectives" (p. 17). Chen et al. (2016) studied a sample of 63 publicly listed firms in the construction industry and found that higher levels of environmental strategy are associated with increased internationalization between the reactive and preventive firm strategy clusters. However, they did not find the same relationship for firms adopting the proactive environmental strategy approach. Nonetheless, they highlighted that firms aiming for a proactive environmental strategy are more prone to developing environmental innovations, which in turn could allow them to better plan their international portfolio and direct their business operations to countries in which they can exploit their environmental capabilities and take advantage of learning opportunities. In this vein, Suárez-Perales et al. (2017) contended that internationalized firms acquire know-how that allows them to implement advanced environmental strategies in line with the most demanding legislations worldwide.

It seems reasonable to conclude that a higher level of firms' internationalization increases firms' exposure to a wider range of stakeholders, global norms and global legitimating actors that monitor firms' social and environmental impacts. Thus, to face the higher complexity of international markets and obtain environmental so-called moral legitimacy (Suchman, 1995) and meet stakeholders' environmental demands, firms will adopt environmental management policies and practices. Therefore, we posit the following:

Hypothesis 1a: A firm's higher level of internationalization is positively related to better environmental management.

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Environmental management offers additional capacity to reduce waste and emissions in their processes and therefore may help achieve better environmental performance (Hartmann & Vachon, 2018). Developing these environmental capabilities could influence the costs and benefits of environmental compliance. Berchicci, Dowell and King (2012) showed that environmental technologies and more developed environmental capabilities are more effective in preventing pollution, thus enabling better environmental performance. Consequently, these environmental capabilities can reduce the need to take advantage of some countries' lax environmental standards to relocate their most polluting activities (Li & Zhou, 2017). Kennelly and Lewis (2002) showed that firms with a higher level of internationalization also exhibit better environmental performance scores. Sharfman, Shaft, and Tihanyi (2004) examined extensive literature on the topic, showing that firms with a higher level of internationalization find it more difficult to respond to the variety of demands and regulations with which they have to comply in host countries. Unfamiliar regulations in host countries and little knowledge of them entail higher litigation risks, as firms are more likely to accidentally break the law. They found that firms that adopt global environmental standards that match the strictest regulations of the countries in which they operate attain better environmental performance. Internationalization exposes firms to an even more thorough scrutiny by their stakeholders, which entails that firms go under a careful examination of their environmental impacts, increasing the likelihood of receiving negative assessments (Kostova & Zaheer, 1999; Marano, Tashman, & Kostova, 2017) and increases the need for moral legitimacy (Suchman, 1995). Therefore, we expect that a higher level of internationalization is positively related to environmental performance, as internationalization increases the risk that weak performance will be used by activists and stakeholder groups to tarnish the reputation of firms. Hence, we posit the following:

Hypothesis 1b: A firm's higher level of internationalization is positively related to its environmental performance.

Internationalization in developing countries

Currently, international firms' operations in developing countries represent an important share of their global activities (UNCTAD, 2018a). International firms and host countries have a reciprocal influence on each other, as firms can adjust their activities to host countries' demands and host countries may learn from foreign firms' experience. From an environmental point of view, the varying levels of institutional pressure that firms face in host countries pose a challenge to them, as they have to decide how to approach the different settings. For example, Tatoglu, Bayraktar, Sahadev, Demirbag and Glaister (2014) described this challenge as a dichotomy between more centrally driven environmental management policies and subsidiaries' autonomy to adapt environmental policies to their institutional framework. Both alternatives seem to have rational arguments in their favor.

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Hence, firms could choose to behave in an opportunistic way by relocating their polluting activities to foreign countries with lax environmental regulations (Li, Zhang, Hu, Tao, Jiang & Kin, 2018). Developing countries often have weaker institutional settings than developed ones, so firms from developed countries will have a lower motivation to maintain the high environmental standards from their headquarters in developing countries. This phenomenon is commonly known as the pollution haven hypothesis, which suggests that firms turn to developing countries when they expand their operations abroad so that they can take advantage of more tolerant regulations that allow them to reduce costs and invest less in pollution reduction measures (Li & Zhou, 2017). However, there is extensive evidence that refutes this hypothesis or at least does not fully support it. Developing countries often suffer from institutional voids that undermine foreign firms when they try to enter the market (Pinkham & Peng, 2017). To mitigate weaker institutional contexts, Tatoglu et al. (2014) argued that firms must consider trying to fill institutional voids by adopting voluntary environmental management practices in their host country subsidiaries. Thus, international firms can be instrumental in cross-border transfers of environmental best practices and help fill institutional voids by leveraging expertise acquired in another context (Pinkse & Kolk, 2012). Eskeland and Harrison (2003) found evidence confirming that foreign firms pollute less than domestic firms in developing countries, which suggests that firms do not move to developing countries to take advantage of lax regulations, as they still maintain higher environmental standards than local peers. Thus, international firms self-regulate their environmental conduct when establishing environmental standards, highlighting firms' commitment to controlling their own conduct beyond what is required by law through voluntary environmental initiatives. Therefore, a higher level of environmental standards may be an effective tool to show their environmental commitment and achieve global moral legitimacy (Aguilera-Caracuel, Aragón-Correa, Hurtado-Torres, & Rugman, 2012; Christmann, 2004). In the same vein, Pinkse and Kolk (2012) noted that "since climate change is a global issue, the supranational context needs to be considered as well thus adding another level of complexity. In view of the global relevance of the issue, the multiple levels involved and the variety in policy approaches to climate change, MNEs (multinational enterprises) cannot approach it on a country-by-country basis" (p. 337–338). Therefore, a higher level of internationalization in developing countries also positively influences firms to adopt environmental management policies and practices. Therefore, we propose the following hypothesis:

Hypothesis 2a: A firm's higher level of internationalization in developing countries is positively related to better environmental management.

Furthermore, expanding their operations into developing countries also exposes firms to more thorough scrutiny by their stakeholders (Delgado-Márquez & Pedauga, 2017). This increased exposure may bring about criticism from interest groups and careful examination of the firms' environmental impacts, thereby increasing the likelihood of receiving negative assessments (Kostova & Zaheer, 1999; Marano et al.,

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2017). The global relevance of environmental issues can cause a potential spillover effect because an incident or bad reputation in one market can easily be transferred to other markets. The increase in social, legal, and economic pressures and nongovernmental organizations' (NGOs') activism have put international firms in the spotlight as their polluting activities are closely examined, thus encouraging firms to improve their environmental performance to reduce reputation-related risks and their associated financial costs (Dahlmann, Branicki, & Brammer, 2017; Ritala, Huotari, Bocken, Albareda, & Puumalainen, 2018).

Additionally, another powerful argument is that firms operating under strong business ethics may achieve better financial performance. Verschoor (1998) found that 26.8% of the 500 largest publicly traded firms in the U.S. were committed to ethical behavior. They obtained empirical evidence that the financial performance of these firms was higher in the *Business Week* ranking than that of the rest of the firms. Kim, Hoskisson, and Lee (2015) studied 436 publicly traded manufacturing firms from the developing economy of South Korea and found evidence that firms' internationalization into less developed host countries has a positive relationship with their profitability. In turn, profitability can influence environmental strategy because firms with better financial performance can afford environmental investments (e.g., Gallego-Alvarez, Ortas, Vicente-Villardón, & Álvarez Etxeberria, 2017). These results support those that argue that engaging in environmental actions can be positive for firms' competitiveness and are a significant argument against the pollution haven hypothesis.

In conclusion, international firms that expand their operations into developing countries face more thorough scrutiny by their stakeholders, which intensifies the search for moral legitimacy. As firms' stakeholders are aware of their activities, international firms find fewer incentives to behave opportunistically by relocating their polluting activities to foreign countries with lax environmental regulations. Hence, a higher level of internationalization in developing countries may also improve firms' environmental performance as firms pursue global legitimacy. Therefore, we propose the following hypothesis:

Hypothesis 2b: A firm's higher level of internationalization in developing countries is positively related to its environmental performance.

DATA AND METHODOLOGY

The sample comprises firms from industries related to the production, transportation, innovation, handling and sale of energy products. The energy sector represents an ideal setting in which to analyze the relationship between firms' internationalization and their environmental issues for several reasons.

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First, institutional and competitive changes caused by market globalization and deregulation have greatly transformed the energy sector. A considerable proportion of the energy industry is populated by firms that operate simultaneously in various regions (Americas, Europe, Asia, and Oceania), exhibiting a high level of internationalization. Second, the energy sector faces sustainability challenges linked to massive natural resource utilization worldwide and consequent environmental implications (Markard et al., 2012). Third, the energy industry's environmental practices play a crucial role in solving environmental issues, e.g., just 32 energy firms from the Fortune Global 500 emitted 31% of the world's total greenhouse gases, including the emissions from the use of their products (Moorhead & Nixon, 2015). Furthermore, according to the OECD, the energy supply industry needs to go through an intense process of adaptation in the coming decades to achieve the emission goals because "80% of carbon emissions are related to energy supplies" (Martínez-Fernández et al., 2013: p. 12). Fourth, emerging markets are becoming center of global economic growth and pollution; while large developing countries typically garner the most attention, even small developing countries have become key international players in the energy industry (Cumming, Hou & Lee, 2016). Given our interest in addressing how internationalization towards developing countries affects environmental issues, the focus on the energy industry is deemed appropriate.

We analyzed a subset of firms from the energy and energy-related utilities industries using information available in the Thomson Reuters Eikon database. This source of data collects comprehensive information on firms' operations and computes numerous indicators of their environmental management practices and policies. Although designed primarily for professional purposes, the Thomson Reuters Eikon database is also used by academics with an interest in sustainability-related topics (Hartmann & Vachon, 2018). In this database, we identified the environmental and financial information of 2,919 firms in the energy sector and 1,013 firms in the energy-related utilities sector. Then, a number of firms that lacked information on their main environmental indicators relevant for this work were discarded. Furthermore, firms that belong to a parent company already included in the data set were not considered because their operations are accounted for in the parent company's information. Lastly, only firms that reported the geographic origin of more than 60% of their revenue were considered. Thus, there remain 287 firms from the selected industries with environmental information for the last fiscal year available as of the date of retrieval (March 2018) and internationalization information for the previous year, which comply with the aforementioned requirements. The final sample makes up approximately 50% of the total revenue of firms of energy and energy-related utilities industries in the Thomson Reuters Eikon database. We lagged the independent and control variables by 1 year to rule out reverse causality.

Table 1 shows the composition of the sample based on firms' headquarters region, country of origin and industry. The regions with the most data points are America, Europe and Asia, with 126, 84 and 46 cases, respectively. On the other hand, only 1 firm from Africa and 30 firms from Oceania were included in our sample. Out of the 287 observations, 67 companies had their headquarters in the United States,

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which is the country of origin with the strongest presence in the sample. In terms of country representation in the sample, the United States is followed by Canada (43), Australia (26), the United Kingdom (20) and China (12).

INSERT TABLE 1 ABOUT HERE

Dependent variables

Environmental management is “the part of the management system that includes the organizational structure, the responsibilities, practices, procedures, processes and resources meant to achieve and maintain a specific environmental behavior that can reduce the impact caused by enterprise operations on the natural milieu” (Claver et al. 2017: p. 606). Therefore, as a measurement of environmental management, we used indicators of *environmental management practices and policies*, understood as the activities a firm undertakes to improve its environmental performance. These indicators provide information on whether a company engages in a series of environmental management practices or policies. A dummy variable was created for each of the considered environmental management practices and policies to represent if a firm has (value 1) or has not (value 0) implemented it. The number of these actions that a company implements has already been used as a proxy for firms’ environmental management (Hartmann & Vachon, 2018; Hawn & Ioannou, 2016). In line with previous literature, we compiled an index that represents the percentage of environmental management practices and policies that a company adopts out of the total number of practices and policies considered. The definitions of the environmental management practices and policies used in the study are shown in Table 2.

INSERT TABLE 2 ABOUT HERE

Environmental performance refers to “the environmental impact that the enterprise’s activity has on the natural milieu” (Claver et al., 2017: p. 606), and it could also be assessed through emission reduction, waste elimination or resource conservation (Aragón-Correa et al., 2016; Hartmann & Vachon, 2018; Sharfman et al., 2004). Hartmann and Vachon (2018), using data from Asset4 (currently Thomson Reuters Eikon database), proposed the percentage of improvement in standardized-carbon emission reduction for each year as a proxy for environmental performance. In line with this, we chose the Thomson Reuters Environmental Social and Governance Emissions Score (TRESG emission score) as a proxy for *environmental performance*. The TRESG emission score measures “a company’s commitment and effectiveness towards reducing environmental emissions in the production and operational processes” (Thomson Reuters ESG Score Methodology, 2019). The percentile rank scoring methodology is adopted from the Thomson Reuters Eikon database to calculate the TRESG emission score, which includes metrics such as “estimated CO₂ Equivalents Emission Total”, “Total Waste” or “Hazardous Waste”, among others. This measurement of environmental performance is especially relevant in the context of this study because the focus is on energy and energy-related utilities industries.

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When interpreting the results of the models, it is important to keep in mind that higher values represent better performance.

Independent variables

The *internationalization* of a firm refers to the extent to which its activities are conducted outside the home country (Hitt, Tihanyi, Miller, & Connelly, 2006). Similar to other studies, we calculate an internationalization index as the ratio of foreign revenue to total revenue (Marano et al., 2017). The information was obtained from the variable “Countries of Risk Revenue Fraction by Country” in the Thomson Reuters Eikon database.

The *internationalization in developing countries* is calculated as the ratio of foreign revenue from developing countries to total foreign revenue. In this study, we explore the relationships between internationalization and both environmental management and environmental performance. To assess whether these relationships are affected when firms’ growth is oriented towards developing countries, this variable was defined and incorporated into the analysis. Similar to the previous variable, in this case, the information is also obtained from the variable “Countries of Risk Revenue Fraction by Country” available in the Thomson Reuters Eikon database. To identify the degree of development of each country, we used the UNCTAD (2018b) classification.

Control variables

Control variables are added to the model to take into account a number of factors that have been previously confirmed to affect the dependent variables. *Firm size and financial slack* have been found to affect environmental activity in prior studies (Aguilera-Caracuel et al., 2012; Aragón-Correa, 1998). Therefore, we included firm size and financial slack as control variables. Firm size was measured as the natural logarithm of total revenue. *Profitability* has been proven to positively affect firms’ environmental strategy, as firms with superior financial performance have more resources to invest in environmental actions (e.g., Gallego-Alvarez et al., 2017). We measure profitability as return on equity (ROE). To control for *industry* effects, we use a dummy variable to represent two industry categories, energy (value 0) and energy-utilities (value 1). Furthermore, *R&D expense to total revenue* was considered in the analysis because it has been found to be related to environmental issues (Suárez-Perales et al., 2017). Finally, to control for *home country development*, we use a dummy variable to represent two categories according to the UNCTAD (2018b) classification, developing and emerging countries (value 0) and developed countries (value 1).

RESULTS

Table 3 presents Pearson correlation coefficients for all dependent, independent and control variables included in the models. The mean, standard deviation and minimum and maximum values for all

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variables are also reported. The correlation values between the control variables included simultaneously in all four models are relatively low. This suggests that there are no multicollinearity problems in our model; nevertheless, we tested our data set for this issue and other possible statistical issues that might distort the results.

INSERT TABLE 3 ABOUT HERE

The data were further analyzed with Stata 13 software to detect outliers, multicollinearity, and heteroskedasticity problems. No observations were noted as outliers per Cook's distance criteria. To check for multicollinearity, we computed the variance inflation factors (VIFs). All VIFs were lower than 1.15, which is much lower than the threshold of 10 generally accepted in previous literature (Kim et al., 2015; Strike et al., 2006). The Breusch-Pagan test revealed heteroskedasticity problems, so we corrected for this by using robust standard errors in the models. Ordinary least squares (OLS) regressions were used for our analyses. Table 4 displays the results of the OLS regression analyses performed.

INSERT TABLE 4 ABOUT HERE

Model 1a ($R^2=0.289$, $p<0.001$) supports Hypothesis 1, as there is a significant positive linear relationship between internationalization and environmental management at a $p=0.014$ significance level ($b=0.123$, $p=0.014$). Regarding the control variables, firm size ($b=0.076$, $p<0.001$) was found to have a positive significant effect on environmental management, whereas the coefficients for the rest of the control variables did not reach a minimum significance level of $p<0.1$.

Model 1b ($R^2=0.261$, $p<0.001$) does not confirm a positive linear relationship between internationalization and environmental performance ($b=2.947$, $p>0.1$), thus rejecting Hypothesis 2. Firm size ($b=6.892$, $p<0.001$) shows a positive significant effect on environmental management. The coefficients of the rest of the control variables are found to be nonsignificant.

In Model 2a ($R^2=0.283$, $p<0.001$), we replace internationalization with internationalization in developing countries as an independent variable. The regression provides statistically significant evidence of a positive linear relationship between internationalization in developing countries and environmental management ($b=0.093$, $p<0.1$), supporting Hypothesis 2a. The control variables have a similar behavior to that of the previous models. Only firm size ($b=0.008$, $p<0.001$) is found to have a positive significant effect on environmental management, while again the rest of the control variables are found to be nonsignificant.

Lastly, Model 2b ($R^2=0.262$, $p<0.001$) rejects Hypothesis 2b because it does not provide statistically significant evidence of a positive relationship between internationalization in developing countries and

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environmental performance ($b=-3.756$, $p>0.1$). Firm size ($b=6.736$, $p<0.001$) has a positive significant effect on environmental performance, whereas the rest of the coefficients for control variables are not statistically significant.

However, to better understand the effects of firms' internationalization of firms towards developing countries on their environmental performance, we performed a one-way ANOVA. Three groups of firms were considered based on the terciles of the degree of internationalization towards developing countries that they fall into. Terciles were deemed adequate to analyze if there are significant variations in the environmental management and performance of firms among the three groups, especially between firms with high and low internationalization towards developing countries. Table 5 shows the results of the one-way ANOVA using Tukey's HSD post hoc test.

INSERT TABLE 5 ABOUT HERE

The analysis shows no significant differences in the environmental management and performance between firms with different levels of internationalization towards developing countries.

DISCUSSION

The existing literature has failed to find consensus on how firms' internationalization and their environmental management and performance affect each other. Our findings shed light on the details relationships by offering an innovative approach to analyze whether these relationships change when firms move their operations abroad to developing countries. Our models showed that firms' internationalization and environmental management are positively related. We provide support to the line of research that has found a relationship between environmental management and firms' internationalization (e.g., Bansal, 2005; Delmas & Montes-Sancho, 2011). Firms with a significant share of their business in foreign countries face institutional complexity and seek legitimacy in an international context by exhibiting a stronger effort to develop environmental management. The higher visibility of firms engaging in international operations exposes them to a more thorough scrutiny of their activities by their stakeholders (Yu, Lo, Li, 2017), and in these circumstances, firms improve their environmental policies and practices even without having better environmental performance (Aragón et al., 2016), which could be seen as merely search for pragmatic legitimacy (Suchman, 1995).

Our results show how the relationship between internationalization and environmental management remains significant when firms' internationalization is oriented towards developing countries. These findings are important because, according to the information in the World Investment Report of the UNCTAD (2018a), "developing economies accounted for a growing share of global FDI inflows in 2017,

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absorbing 47 percent of the total, compared with 36 percent in 2016” (p. 2). Therefore, international firms can be instrumental in cross-border transfers of environmental best practices and help fill institutional voids by leveraging expertise acquired in other contexts. Thus, a higher level of environmental management may be an effective tool to achieve global legitimacy when firms have a higher volume of their operations in developing countries. These results do not support the pollution haven hypothesis, following the line of previous research (Aragón-Correa et al., 2016; Kathuria, 2018; Strike et al., 2006).

Nonetheless, we do not find evidence proving the existence of a positive relationship between stronger internationalization and better environmental performance in the context of international firms operating in the energy sector. Following Schuman’s (1995) seminal works on legitimacy, we contend that this result may be in line with a potential dual strategy displayed by these firms. Put differently, international firms, when going more international, focus their environmental efforts on deploying more environmental management rather than attaining better environmental performance records. This phenomenon poses an interesting crossroad for future analyses.

The findings in this paper allow practitioners and scholars to explore a new perspective from which to study environmental management and internationalization. First, our paper contributes new insights into the factors that may affect firms’ decisions to implement environmental management. Among these, we can cite firms’ internationalization strategy and the level of economic development of the targeted countries. Managers must be aware that expanding to developing countries implies more intense environmental management within the firm, as this international expansion can also serve to consolidate a solid green image of the firm. In other words, managers should see the internationalization strategy towards developing countries as an opportunity to establish an environmental management strategy that goes beyond the national standards, given that climate change is a global issue that should not be addressed on a country-by-country basis.

Second, our analysis can be especially relevant because it was performed on a sample of firms in energy-related sectors, which are responsible for a major share of global GHG emissions, therefore these sectors have a substantial environmental impact (Moorhead & Nixon, 2015), and need to undergo an intense process of adaptation in the coming decades to achieve the emissions goals (Martínez-Fernández et al., 2013). Furthermore, we must acknowledge that our focus on the energy industry may also be seen as a drawback for our analyses, given the impossibility of directly extrapolating our conclusions to other sectors characterized by different, among others, dynamics, industry structures and levels of regulations, among other factors. In fact, the deregulation processes undergone by the energy sector over the last few years have shaped changing legitimacy trajectories of both conventional and new energy technologies. While fossil fuel technologies dominate the sector, which accounts for nearly 70% of all greenhouse gas emissions (IEA, 2014), conventional energy technologies are rapidly losing their legitimacy (Patala, Korpivaara, Jalkala, Kuitunen, & Soppe, 2019). An example of this legitimating

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loss can be found in the 2015 Paris climate change conference, known as COP21, in which 195 countries committed to work to achieve zero net emissions in the second half of the century. Hence, we call for additional empirical studies that test the total or partial generalization of our findings across industries. Nevertheless, we understand that an industry-specific approach to this issue is appropriate, as environmental actions and international business opportunities vary between industries.

Finally, while governments and supra-institutions establish environmental policies and agreements with underwhelming objectives and compliance, we find evidence that more internationalized firms have the goodwill to operate responsibly in a more proactive way in terms of adopting environmental policies and practices, even though these efforts are not translated into a significant decrease in their environmental emissions. Therefore, no conclusions can be drawn either for or against the pollution haven hypothesis in terms of environmental performance, highlighting the complexity of the topic and the need for further research into the environmental behavior of international firms to clarify the ongoing controversy.

Our analysis is subject to some limitations. We performed our analysis on cross-sectional data. Further research could be conducted over a longitudinal panel data sample and could reveal trends in the evolution of firms in time. Additionally, although the Thomson Reuters Eikon database is considered a reliable source of information and offers extensive insights into a very large number of firms, it can only include the information that firms are willing to disclose. Future research could aim to obtain a more complete sample by matching different databases. The use of the Thomson Reuters Emission Score as a proxy for environmental performance presents a limitation as well. Although it “*measures a company’s commitment and effectiveness towards reducing environmental emissions in the production and operational processes*” (Thomson Reuters, 2019) and is therefore appropriate for our analyses, it is not possible to customize its components. Finally, the variable “Countries of Risk Revenue Fraction by Country”, which we used to calculate the independent variables of our analysis, was available only for that year. This prevented us from performing a data panel analysis.

Moreover, future research could examine the moderating effect of firms’ home country on the relationship between internationalization and environmental management and performance.

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TABLES

Table 1 Sample composition

| Headquarters Region | | Sub-Industry | | | |
|---------------------|---------|----------------------------|------------------|-------|----|
| | | Energy | Energy-Utilities | Total | |
| Africa | Country | Egypt | 1 | 0 | 1 |
| | Total | | 1 | 0 | 1 |
| America | Country | Argentina | 1 | 0 | 1 |
| | | Bermuda | 3 | 1 | 4 |
| | | Brazil | 4 | 0 | 4 |
| | | Canada | 33 | 10 | 43 |
| | | Chile | 1 | 2 | 3 |
| | | Colombia | 1 | 3 | 4 |
| | | United States of America | 56 | 11 | 67 |
| Total | | 99 | 27 | 126 | |
| Asia | Country | China | 7 | 5 | 12 |
| | | Hong Kong | 3 | 4 | 7 |
| | | India | 4 | 1 | 5 |
| | | Indonesia | 3 | 0 | 3 |
| | | Israel | 1 | 0 | 1 |
| | | Japan | 4 | 1 | 5 |
| | | Korea; Republic (S. Korea) | 2 | 0 | 2 |
| | | Malaysia | 4 | 2 | 6 |
| | | Singapore | 0 | 1 | 1 |
| | | Taiwan | 1 | 0 | 1 |
| | | Thailand | 1 | 1 | 2 |
| Total | | 31 | 15 | 46 | |
| Europe | Country | Austria | 1 | 1 | 2 |
| | | Belgium | 0 | 1 | 1 |
| | | Cyprus | 1 | 0 | 1 |
| | | Czech Republic | 0 | 1 | 1 |
| | | Denmark | 1 | 1 | 2 |
| | | Finland | 1 | 1 | 2 |
| | | France | 5 | 1 | 6 |
| | | Germany | 1 | 3 | 4 |
| | | Greece | 1 | 0 | 1 |
| | | Guernsey | 1 | 0 | 1 |
| | | Hungary | 1 | 0 | 1 |
| | | Ireland; Republic of | 1 | 0 | 1 |
| | | Italy | 2 | 0 | 2 |
| | | Jersey | 1 | 0 | 1 |
| | | Luxembourg | 1 | 0 | 1 |
| | | Netherlands | 5 | 0 | 5 |
| | | Norway | 6 | 0 | 6 |
| | | Poland | 4 | 2 | 6 |
| | | Portugal | 0 | 1 | 1 |
| | | Russia | 8 | 1 | 9 |
| Spain | 2 | 4 | 6 | | |
| Sweden | 1 | 0 | 1 | | |
| Switzerland | 2 | 1 | 3 | | |
| United Kingdom | 15 | 5 | 20 | | |
| Total | | 61 | 23 | 84 | |
| Oceania | Country | Australia | 23 | 3 | 26 |
| | | New Zealand | 0 | 3 | 3 |

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| | Papua New Guinea | 1 | 0 | 1 |
|--------------|------------------|-----|----|------------|
| Total | | 24 | 6 | 30 |
| TOTAL | | 216 | 71 | 287 |

Table 2. Environmental Management Practices and Policies

Environmental Supply Chain Management: Does the company use environmental criteria (ISO 14000, energy consumption, etc.) in the selection process of its suppliers or sourcing partners?

Energy Efficiency Policy: Does the company have a policy to improve its energy efficiency?

Water Efficiency Policy: Does the company have a policy to improve its water efficiency?

Emission Policy: Does the company have a policy to improve emission reduction?

Environmental Supply Chain Policy: Does the company have a policy to include its supply chain in the company's efforts to lessen its overall environmental impact?

Sustainable Packaging Policy: Does the company have a policy to improve its use of sustainable packaging?

Resource Reduction Policy: Does the company have a policy for reducing the use of natural resources or to lessen the environmental impact of its supply chain?

Environment Management Team: Does the company have an environmental management team?

Environment Management Training: Does the company train its employees on environmental issues?

Environmental Supply Chain Monitoring: Does the company conduct surveys of the environmental performance of its suppliers?

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Table 3 Correlation matrix and descriptive statistics

| Variables | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---------------------------------------|--------|--------|---------|---------|--------|---------|--------|-------|-------|-------|
| 1. Environmental management | | | | | | | | | | |
| 2. Environmental performance | .674** | | | | | | | | | |
| 3. International revenue | .015 | -.046 | | | | | | | | |
| 4. Intl. revenue developing countries | .053 | -.087 | .147* | | | | | | | |
| 5. Industry | .095 | -.014 | -.165** | -.075 | | | | | | |
| 6. Firm size | .517** | .501** | -.187** | -.082 | .131* | | | | | |
| 7. Profitability | .167** | .144* | -.053 | .106 | .104 | .316** | | | | |
| 8. Home country development | -.109 | -.016 | .149* | -.196** | -.086 | -.146* | -.147* | | | |
| 9. R&D Expense to Total Revenue | -.079 | -.078 | .054 | .050 | -.103 | -.195** | -.095 | .075 | | |
| 10. Financial slack | -.108* | -.149* | .059 | -.018 | -.135* | -.315** | -.048 | .085 | .008 | |
| Min | .000 | .000 | .000 | .000 | .000 | 13.408 | -4.683 | .000 | -.007 | .070 |
| Max | 1.000 | 99.583 | 1.000 | 1.000 | 1.000 | 26.444 | .883 | 1.000 | 1.149 | 41.41 |
| Mean | .497 | 54.270 | .469 | .402 | .247 | 21.463 | -.009 | .780 | .015 | 2.299 |
| Standard deviation | .310 | 29.474 | .326 | .334 | .432 | 2.259 | .379 | .415 | .077 | 4.062 |
| † p < 0.1 | | | | | | | | | | |
| * p < 0.05 | | | | | | | | | | |
| ** p < 0.01 | | | | | | | | | | |

Table 4 Results of OLS regression analysis

| Independent Variables | Dependent variables | | | |
|------------------------------|---------------------|---------------------|------------------|---------------------|
| | E. Management | E. Performance | E. Management | E. Performance |
| | Model 1a | Model 1b | Model 2a | Model 2b |
| Internationalization | .123* (.050) | 2.947 (4.829) | - | - |
| Intl.in developing countries | - | - | .093† (.049) | -3.756 (4.726) |
| Industry | .038 (.037) | -4.911 (3.619) | .031 (.037) | -5.480 (3.597) |
| Firm size | .076*** (.008) | 6.892*** (.771) | .076*** (.008) | 6.736*** (.769) |
| Profitability | -.008 (.043) | -.429 (4.267) | -.016 (.045) | .097 (4.300) |
| Home country development | -.039 (.039) | 3.410 (3.760) | -.012 (.039) | 3.068 (3.811) |
| R&D Expense to Total Revenue | .121 (.208) | 4.478 (20.142) | .106 (.209) | 5.146 (20.149) |
| Financial slack | .005 (.004) | .014 (.398) | .006 (.004) | -.007 (.398) |
| Constant | -1.195*** (.184) | -96.584*** (17.824) | -1.176*** (.185) | -89.892*** (17.910) |
| Observations (N) | 287 | 287 | 287 | 287 |
| R ² | .289*** | .261*** | .283*** | .262*** |

† p < 0.1
* . p < 0.05
** . p < 0.01
*** . p < 0.001

Table 5 One-way ANOVA analysis for internationalization in developing countries

| Dependent Variables | 1 st Tercile - Low INTL | | 2 nd Tercile Mid - INTL | | 3 rd Tercile High - INTL | | ANOVA | Tukey's HSD | | |
|---------------------------|------------------------------------|----|------------------------------------|----|-------------------------------------|----|--------------|-------------|------|------|
| | Mean (s.d.) | N | Mean (s.d.) | N | Mean (s.d.) | N | F-value (p) | 1-2 | 2-3 | 1-3 |
| Environmental Management | .453 (.306) | 96 | .531 (.309) | 95 | .506 (.312) | 96 | 1.570 (.210) | n.s. | n.s. | n.s. |
| Environmental Performance | 54.371 (30.444) | 96 | 57.576 (28.049) | 95 | 50.898 (29.792) | 96 | 1.228 (.294) | n.s. | n.s. | n.s. |

n.s.: non-significant; s.d.: standard deviation