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Is Strategic Proactivity a Driver of an Environmental Strategy? Effects of Innovation and Internationalization Leadership

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Abstract: This study analyses strategic proactivity as a driving factor in the implementation of an advanced environmental strategy in a firm. Strategic proactivity is defined as a firm's tendency to initiate voluntary changes instead of reacting to events in the environment and according to previous literature, can be interpreted as a combination of internal factors that characterise a firm's business strategy as that of a prospector firm. In this study, we measured this through innovation, with two variables related to the firm's entire production cycle: R&D expenditure and patents. However, we also considered two more strategic proactivity indicators: innovation proactivity and internationalisation proactivity. These two proactivity variables take into account the innovative and international actions of the firms, going beyond the actions usually taken by firms in the same sector. Using panel data methodology, we obtained results that show that firms who invest in R&D and patent their innovations achieve more advanced positions in their environmental strategies. Empirical evidence also shows that firms with a greater innovation effort throughout the production cycle (product, process, organisation and marketing) than their competitors also attain more advanced positions (proactivity) in environmental matters. In other words, innovation proactivity is a driver of environmental strategy. In relation to internationalization, the results also showed that firms that operate in a larger geographical area than their competitors adapt to the most demanding environmental legislation, placing them in a position of environmental leadership in their respective sectors. The inclusion of internationalization as an indicator of strategic proactivity, the measurement of proactivity variables and the correction of firms' specific unobserved aspects are some of this paper's contributions.

Keywords: environmental strategy; innovation; internationalization; leadership; strategic proactivity

1. Introduction

The interest in environmental topics, such as Green Economy or Sustainable Development, has been rising in recent years. For this reason, public and private institutions have been working and discussing the green economy concept and its application. For example, the United Nations Environmental Programme report entitled "Towards a Green Economy: Pathways to Sustainable Development and Poverty Eradication—A Synthesis for Policy Makers" [1] insists on the necessary transition of the economy to face the challenge of environmental issues, and more specifically, climate change.

In the academic literature, authors have been talking about sustainable economy for the last twenty years. In the "Natural-Resource-Based view of the Firm", Hart [2] proposed three principal strategies that facilitate sustainable economic activity: pollution prevention; product stewardship and sustainable development. Following this paper, the study of internal business factors that facilitate the

implantation of environmental practices and objectives attracted the interest of business management literature. The academic studies involved highlight the impact of factors, such as firm size [3,4], managerial attitudes [5–8], employee motivation and qualification [4,9], high-involvement work practices [10], innovation [11] or internationalization [12].

Indeed, some authors believe that an appropriate combination of these internal factors in the firm's business strategy is necessary to attain proactive or leadership positions in environmental matters. In this respect, Aragón-Correa [13] argued, and confirmed with empirical evidence, that environmental strategy is aligned with a firm's business strategy. This author established that environmental progress and development is determined by a firm's strategic proactivity, defined as the firm's tendency to initiate voluntary changes in their strategic policies, routines and organizational processes, instead of reacting to events in the environment. This means that those firms with advanced positions in their business strategies are supposed to also implement an advanced or proactive environmental strategy that is characterized by voluntary environmental routines and by going beyond regulatory demands and actions usually taken by firms in the same sector. The results obtained from a sample of 105 Spanish firms showed that firms with proactive business strategies (prospector firms) are more likely to adopt proactive environmental strategies. Sharma et al. [14], in a sample of 134 North American and European ski resorts, found that strategic proactivity and continuous innovation capabilities were associated with proactive environmental strategies. In a sample of 100 Dutch firms in the food and drink industry, Haverkamp et al. [11] obtained empirical evidence that different company profiles were connected with specific drivers and barriers for environmental proactivity. The results obtained by these authors show that prospector companies are also more proactive with respect to environmental capabilities. In short, according to previous literature, environmental strategies are aligned with business strategies. However, there are still many unknowns in the relationship between these two complex concepts: strategic proactivity and environmental proactivity or leadership. The previous empirical evidence is insufficient, the measurement of these variables is not well developed, and information about the specific aspects of strategic proactivity that most favour environmental proactivity are very imprecise.

In this paper, we refer to the contributions of authors, such as Sharma and Vreenderburg [15], Murillo-Luna et al. [16], Aragón-Correa et al. [17] or Valero-Gil et al. [18] to define proactive environmental strategy as a series of objectives, actions, practices and resources aimed at reducing environmental impact, including a degree of voluntarism and prevention, which go beyond regulatory demands and actions usually taken by firms in the same sector. Our objective then, is to analyse whether strategic proactivity is a driving factor of the adoption of such leadership positions in environmental matters (environmental proactivity). More specifically we studied the effects of two specific indicators of strategic proactivity, innovation and internationalization.

One of the strategic proactivity indicators, most commonly used in the empirical literature, is innovation, approached through different variables, such as R&D investment, number of new products, number of patents, acquisition of new technology or number of employed scientists. In our case, we measured strategic proactivity, with two indicators related to business strategy: innovation proactivity and internationalization proactivity. We also used two additional indicators related to the firm's entire production cycle to complement the way we measured strategic proactivity: R&D expenditure and patents.

Our objective was to analyse the impact of each of these four aspects on environmental proactivity. The effect of innovative attitude on environmental proactivity has been previously confirmed in the literature. Nevertheless, innovation has usually been studied in a specific area of the firm (product or process innovation, for example), instead of analysing a firm's innovation in the entire cycle as a whole. Also, there are some authors who have concluded that innovation investment, itself does not guarantee a strategy's success [19]. So, there are still some research questions left, related to the innovation and environmental strategy relationship. Based on authors, such as Hofmann et al. [20], we believe that the widespread application of innovative measures improves the functioning of the production cycle,

through the correction of inefficiencies and through reduced use of materials and energy, resulting ultimately in less environmental impact.

Compared with the effect of innovation, the effect of internationalization in environmental proactivity has been less studied. The inclusion of this variable as a strategic proactivity indicator and the analysis of its effect on environmental proactivity, represents one of this paper's contributions. The sign of the effect of internationalization on environmental proactivity is still subject to debate in the literature. More empirical research on the topic is required to determine whether internationalization can be classified as an environmental proactivity driver or not. In accordance with authors, such as González-Benito and González-Benito [21], we defend the hypothesis that firms that who operate in international markets are more advanced in their environmental strategies, because of the acquisition of know-how through experience and so, their environmental strategies are adapted to institutionalised practices in the countries with the most demanding legislations.

Another of this study's original contributions to the literature that analyses the relationship between strategic and environmental proactivity, is the measurement of proactivity variables. Proactivity refers to taking leadership positions, going beyond the usual practices. Talking about proactivity (in innovation, internationalization or environmental management) implies some willingness to participate in moves ahead of competitors [22], assuming risks and taking initiatives [23]. In order to capture this attitude, we designed three variables (innovation proactivity, internationalization proactivity and environmental proactivity), which consider that proactive behaviour requires willingness, above and beyond actions usually taken by firms in the same sector. This aspect was considered in the design of these variables and referenced to the mean values attained in the sector when determining whether a firm is proactive or not.

Finally, another aspect that added quality in this study was the availability of a panel of firms that enabled the use of panel data methodology to correct firm-specific aspects in the study of environmental proactivity. The correction of the impact of firm-specific effects such as managerial capability, know-how, organizational culture and other aspects not considered by explanatory variables is particularly important in an analysis of a firm's business strategy. The correction of these effects adds value to the results obtained in this study.

The paper thus proceeds as follows: The following section reviews the literature that analyses the relationship between innovation or internationalization and environmental proactivity, defining our hypotheses. The third section defines the design of the empirical study, specifies the hypothesis-testing model and presents the results of the estimation. The fourth section contains the study's conclusions.

2. Theoretical Framework

The research on proactive environmental strategies exploits different theoretical perspectives, like institutional theory [24] or stakeholders theory [25]. Numerous studies have utilized a resource-based view to study the adoption of proactive environmental strategies, including a dynamic capability perspective [2,26,27]. This perspective identifies the dimensions of firm-specific capabilities that can be sources of advantage and tries to explain how combinations of internal competences and resources can be developed, deployed, and protected [28]. In this sense, we think that prospector firms (those that possess the capability for strategic proactivity) will also develop an internationalization strategy capability. Therefore, the dynamic capability perspective seems to be the most useful in the context of this study.

In Aragón-Correa's work [13] "strategic proactivity" is defined as "*a firm's tendency to initiate changes in its various strategic policies rather than to react to events*". This author defined prospector firms as those that analyze all aspects of their contexts and grow by developing new products and markets, those prepared to invest heavily in order to enhance technological leadership and those who try to reduce uncertainty and permit innovation. In this sense, very important roles are played by R&D, marketing and the choice of structures and organizational processes for reducing uncertainty and permitting innovation. Sharma et al. [14] defined a strategic proactivity capability as being embedded in a firm's routines and processes, designed to maintain a leadership position via monitoring the external environment,

including competitor's strategies. Firms with this capability develop processes and routines to recognize ideas, in order to actively seize and capitalize on new opportunities, rather than merely react to change. In their work, Haverkamp et al. [11] measured the business strategy of food and drink companies, with a defender-prospector scale. Prospector companies aim to dynamically move towards new strategic positions by means of continuous innovation, in order to outperform competitors. From these definitions, we can draw commonalities: developing the capability of strategic capability implies investing in innovation, having a leadership attitude and developing know-how that enables further improvement. Regarding these common elements, strategic proactivity should be measured firstly by innovation.

According to Hitt et al. [29] (p. 298), "International diversification may be defined as expanding across country borders into geographic locations (e.g., markets) that are new to the firm". This includes searching for new opportunities, moving in uncertain environments, developing know-how and trying to achieve a leadership position relative to competitors. Those firms that move toward an international position need to analyze all aspects of their contexts, developing new markets, investing heavily in new technology and trying to reduce uncertainty. This is why in this work, we use innovation as a measure of strategic proactivity and we also introduce internationalization, to complete and improve measurement of this concept.

2.1. Innovation as an Environmental Proactivity Driver

As early as 1991, Michael Porter argued that business pollution is due to inefficient use of resources, referring to the need for environmental legislation as a way of encouraging innovation in firms. Such innovation would be associated with the implantation of environmental practices and objectives all over the value chain, that would improve productivity, reduce costs and increase competitiveness. These economic benefits obtained through the implementation of environmental innovation are based on the idea that strategy is manifested in the way that activities are configured and linked together all over a firm's value chain [30]. This is why environmental innovation should be associated with a firm's business strategy.

Nowadays, concepts like eco-innovation, green, ecological or environmental innovation are used indistinctly. These concepts refer to the production, application or exploitation of a good, service, production process, organizational structure, or management or business method, that is novel to the firm or user and which result, throughout its life cycle, in a reduction of environmental risk, pollution and the negative impacts of resource use (including energy use), compared to relevant alternatives [31–33]. Definitely, it is the application of innovative techniques in order to improve environmental performance. Innovative firms are generally characterized by being the first to identify opportunities to create value [34], have flexible organizational structures that enable fluid internal communications and tend to run risks and withstand a greater stakeholder pressure [20]. So, innovative processes enable companies to operate in new markets where uncertainty exists and funding and human resources are necessary assets [35]. Several authors have tried to identify behavioural patterns relating to business innovation strategies [36,37]. Some of the factors most commonly associated with innovative firms are the use of new technologies, number of new products and patents, R&D investment or number of employed engineers or scientists [38]. Lederman [39], for instance, identified innovative firms as those that invest in R&D and are willing to acquire foreign technology licenses. All these characteristics, typical of a strategic attitude to innovation and risk-taking, can be drivers of advanced environmental measures. Some authors have tried to show this relationship; Haverkamp et al. [11] obtained empirical evidence that firms that attempt to move dynamically towards new strategic positions are more likely to adopt environmental measures. Firstly, such firms are more interested in ecological product design; secondly, their executives are more committed to the environment and, thirdly, they have a clearer perception of environmental opportunities in the market. Along the same lines, González-Benito & González-Benito [40] determined that firms that are proactive in production, defined as being interested in adopting new practices in the production area, are more likely to voluntarily (proactively) implement environmental practices. In this sense, [26] concluded

that a proactive environmental strategy seems to be a crucial capability for the implementation of environmentally friendly products, processes and technologies.

Other authors have defined continuous innovation as an organizational capability, obtained through a learning process in the search for new routines and combinations of resources [41], and through the improvement, reconfiguration and re-design of products, services, processes and business models, or the creation of new ones [14]. Hofmann et al. [20] also interpreted the use of advanced technology and product innovation as specific capabilities that facilitate the adoption of environmental practices. These authors obtained empirical evidence that the use of advanced technology helps firms to become leaders in the use of environmental practices, and that the most innovative firms are those that have more environmental initiatives, although they were unable to determine the causality direction in this relationship. In a study of the service sector, Sharma et al. [14] also found a positive relationship between the organizational capabilities of strategic proactivity and continuous innovation and the development of a proactive environmental strategy, with the impact of said capabilities increasing in the presence of uncertainty.

Therefore, an innovative firm, defined as one that follows a proactive strategy regarding innovation (tending to voluntarily initiate innovation activities), can be expected to also be proactive in environmental matters, going beyond the usual environmental practices in their sectors of interest. Our first working hypothesis is as follows:

More innovative firms are more likely to be proactive in their environmental strategies.

2.2. Internationalization as an Environmental Proactivity Driver

International diversification has not been considered much in the literature that analyses advanced environmental strategy drivers. However, operations on open, competitive and international markets, which foster innovation, efficiency and the creation of wealth, are favourable for the development of environmental aspects [42]. According to Hitt et al. [29] (p. 298), "International diversification may be defined as expanding across country borders into geographic locations (e.g., markets) that are new to the firm". Despite the little interest found in the literature for analysing its impact on environmental management, there appear to be contradictory opinions. On one hand, there are arguments that internationalised firms are established at points where environmental legislation is less strict, resulting in a greater environmental impact [43,44]. De Marchi [45] and Chiarvesio et al. [46] found a negative relationship between international strategy and environmental innovation. This position supports the idea that globalisation promotes aggressive business behaviour as far as the environment is concerned [47]. According to this idea, internationalised firms adopt convenient positions, operating wherever legislation is less demanding and there is minimal stakeholder pressure. According to this point of view, international trade and foreign direct investments are assumed to be channels through which firms exploit asymmetries in international environmental regulations [48]. However, others believe that firms with a global presence develop environmental practices, policies and standards adapted to the most demanding legislation [49,50]. This perspective is based on the idea that firms operating in different markets learn more know-how [51]. Internationalization fosters the development of some organizational capabilities, due to greater resource availability and diversity, which could foster the development of an advanced environmental strategy [52].

Kennelly and Lewis [43] conducted a study in this regard. They studied the relationship between the degree of internationalization and corporate environmental performance in a sample of 138 firms, obtaining results that pointed to a positive relationship. Despite this, the authors suggested that future research in this area is needed. Christmann and Taylor [53] showed a "self-regulation" attitude among internationalised firms, defining this concept as the implantation of environmental standards or environmental management systems that go beyond legal requirements. Their study obtained results that showed that multinational firms have a positive effect on environmental performance and the likelihood of adopting ISO (International Organization of Standardization) 14000 standards. These authors defended the idea that multinational corporations transfer advanced environmental

technology to their subsidiaries, together with environmental management systems, that meet the regulatory demands of the strictest countries, showing that globalization increases institutional (and client) pressure for firms to go beyond local environmental standards. Aguilera-Caracuel et al. [52] showed how firms can benefit from the internationalization process by acquiring advanced environmental capabilities that foster a proactive environmental strategy. A hierarchical regression analysis showed how a presence on different markets enables firms to be in contact with different stakeholders, which leads to the generation of environmental resources and capabilities. They also found that international experience favours the acquisition of environmental skills. All this, they argue, materialises in a firm's internal management, strengthening product and process innovation, internal flexibility and the ability to adapt to new changes.

Despite the little attention paid in the literature to internationalization as a driver of proactive environmental strategies, the impact of international presence on the development of organizational capabilities is enough to justify a more in-depth study. We therefore contemplated the idea that internationalization fosters certain organizational capabilities, taking firms to positions of sectoral leadership in the development of advanced environmental practices, objectives and activities. This is our second hypothesis:

The most international firms are more likely to be proactive in their environmental strategies.

3. Methodology

In this section, after describing the sample, the design of the variables and the analytical methods, we specify the model used to test the hypotheses and present the results of the estimation.

3.1. Sample

This study is based on information obtained from the Spanish Technological Innovation Panel (PITEC) (The PITEC is the database of reference in Spain, due to numerous advantages, such as easy access, comparability with the statistics of other OECD countries (those that belong to the Organization for Economic Cooperation and Development), the panel structure, etc. The data set is available free of charge at the website <http://icono.fecyt.es>) conducted by the Spanish National Statistics Institute (INE) in collaboration with the Spanish Science and Technology Foundation (FECYT) and the Foundation for Technological Innovation (COTEC). The data have been collected yearly since 2003, and the last available year is 2013. This study used data from 2008 to 2013, as some of the survey questions that were relevant for our research were modified in 2008. The sample consisted of a non-balanced panel of firms, with different numbers of firms in each of the six years considered, giving rise to a data pool with 41,710 observations from 8922 firms. (The original data set was a data pool with 60,612 observations from 10,982 firms) The sample contained firms of different sizes, measured by number of employees, and covered 18 sectors, according to the Spanish Economic Activities Classification (CNAE-2009 classification).

3.2. Design of Variables

Three proactivity variables were designed to measure the leadership positions in environmental management, innovation and internationalization, and were considered as references to overcome the regular practices in the sector concerned. Following is a description of each of these variables. (For a better understanding of the proactivity variables, see the original items available in "Encuesta sobre Innovación en las Empresas 2013").

Environmental proactivity: This variable considered the importance given by firms to four proposed environmental goals: "use less materials per produced unit", "use less energy per produced unit", "reduce environmental impact" and "meet environmental, health or safety requirements". This information was first used to design four variables with whole values in a range of 1–3, depending on whether the importance given to the proposed environmental goal was "irrelevant", "low", "medium" or "high", respectively. Secondly, in order to capture leading positions these four variables were used to construct four dummy variables that had a value of 1 when the importance granted by the firm to a specific environmental goal was above average for the sector, and 0 otherwise. Finally,

the environmental proactivity ordinal variable was constructed as the sum of the four dummy variables. This variable had whole values in the range of 0–4.

Innovation proactivity: Four dummy variables were first designed; they had a value of 1 when the firm had implanted measures to improve its products, processes, internal organization or marketing system, in the last two years. Secondly, the sum variable was constructed as the sum of the four dummy variables and had whole values in the range of 0–4. Finally, the innovation proactivity dummy variable had a value of 1 when a firm’s innovative activity was above average for the sector, and 0 otherwise.

Internationalization proactivity: A qualitative variable was first designed, with whole values in the range of 1–4, depending on whether the markets on which the firm operated were “local”, “national”, “European” or “global”. This qualitative variable was then used to construct the internationalization proactivity dummy variable, which had a value of 1 when the firm operated in a larger than average geographic area in its sector, and 0 otherwise.

As well as these proactivity variables that denote the leading positions in the considered aspects, the specific model also included some of what have traditionally been used as proxy variables, for a firm’s innovative, and hence strategic, proactivity:

Expenditure in R&D: this expressed whether the firm had internal expenditure in R&D and was designed as a dummy variable with a value of 1 when the firm presented R&D expenditure in the annual period considered, and 0 otherwise.

Patents: this was a dummy variable with a value of 1 if the firm had applied for a patent to protect its technological inventions or innovations in the last two years, and 0 otherwise.

Finally, two control variables were considered in the model, in order to correct the effects of firm size and age on environmental proactivity. These two variables were measured, respectively, through the number of employees Napierian logarithm and the firm’s age Napierian logarithm. The descriptive statistics of the variables are shown in Table 1 and the correlation matrix is shown in Table 2.

Table 1. Descriptive statistics of the variables.

Dependent Variable		Independent Variables	
Environmental Proactivity		Innovation Proactivity	
0 = No proactivity	31.88%	1 = Yes	49.45%
1 = Low proactivity	11.10%	Internationalization Proactivity	
2 = Medium–Low proactivity	17.85%	1 = Yes	56.08%
3 = Medium–High Proactivity	11.54%	Expenditures in R&D	
4 = High proactivity	27.62%	1 = Yes	43.36%
		Patents	
		1 = Yes	9.12%
		Age	26.79 (20.16) *
		Size	318.18 (1531.49) *

* Mean and standard deviation (between brackets).

Table 2. Correlation matrix.

	Innovation Proactivity	Expenditures in R&D	Patents	Internationalization Proactivity	Log (Age)	Log (Size)
Innovation Proactivity	1.000					
Expenditures in R&D	0.159	1.000				
Patents	0.110	0.209	1.000			
Internationalization Proactivity	0.099	0.182	0.129	1.000		
Log(Age)	0.047	−0.008	0.000	0.147	1.000	
Log(Size)	0.179	0.045	0.078	0.180	0.354	1.000

All correlations are significant at 1%.

3.3. Methodology

The objective was to analyse firms’ environmental proactivities (Yit); this was a qualitative ordered variable, as explained in the previous section.

A widely used approach for estimating models of this type is an ordered probit model (see [54] for an extensive overview and analysis). One advantage of using this data is that allows us to exploit the panel structure; the equation is written as follows:

$$Y_{it}^* = \beta'X_{it} + v_i + \epsilon_{it} \quad (1)$$

where Y_{it}^* is a latent measure of environmental proactivity; X_{it} is a vector of factors that influence the firms' proactivity; β is a vector of parameters to be estimated; v_i is the unobserved characteristics (managerial capability, etc., which are not included among the regressors but are likely to affect a firm's environmental proactivity) and ϵ_{it} is the error term and is assumed to have a standard normal distribution. As we cannot observe Y_{it}^* , we can only observe the categories of responses as follows:

$$Y_{it} = \begin{cases} 0 & \text{if } -\infty < Y_{it}^* < \mu_1 \\ 1 & \text{if } \mu_1 < Y_{it}^* < \mu_2 \\ 2 & \text{if } \mu_2 < Y_{it}^* < \mu_3 \\ 3 & \text{if } \mu_3 < Y_{it}^* < \mu_4 \\ 4 & \text{if } \mu_4 < Y_{it}^* < \infty \end{cases} \quad (2)$$

The maximum likelihood technique, which provides consistent and asymptotic estimators, can be used to jointly estimate the vectors of parameters (β) and thresholds (μ). The thresholds (μ) indicate an array of normal distribution related to the definite values of the explanatory variables. Parameters (β) denote the influence of variation in response variables on the principal scale. A positive sign for a parameter (β) implies greater environmental proactivity as the value of the related variable increases.

This model is estimated using a random-effects panel ordered probit, which takes unobserved effects into account and requires that firm-specific unobserved effects be uncorrelated with regressors, and, using a fixed-effects panel ordered probit, allows the regressors and the firm-specific effects of the error term to be correlated. Finally, we tested the fixed-effects type against the random-effects specification of the model, in accordance with Hausman [55]: under the null hypothesis of correct specification of the joint distributions of v_i and ϵ_{it} , both the fixed-effects and the random-effects estimators are consistent, but the latter is more efficient; under the alternative, only the fixed-effects estimator is consistent.

We now turn to a more formal analysis by introducing the regressions for the likelihood of environmental proactivity. The variables were selected according to data availability and the theoretical arguments on the determinants of the endogenous variable.

4. Results

The results of Equation (1) are presented in Table 3. Table 3 shows the two different alternatives previously discussed. According to Hausman's test, the most appropriate is the fixed effects model.

Table 3. Parameter Estimates for Environmental Proactivity.

	Fixed Effects Panel Data			Random Effects Panel Data		
	Coefficient	Standard Error		Coefficient	Standard Error	
Innovation Proactivity Expenditures in R&D	0.418	(0.020)	***	0.472	(0.018)	***
Patents	0.699	(0.023)	***	0.775	(0.019)	***
Internationalization Proactivity	0.134	(0.031)	***	0.207	(0.026)	***
Log(Age)	0.113	(0.027)	***	0.095	(0.021)	***
Log(Size)	−0.134	(0.060)	**	0.004	(0.022)	
Hausman Test	0.175	(0.023)	***	0.101	(0.009)	***
Obs.	88.98	***				
Log pseudolikelihood	41,710			−53,896.8		
	−41,321.4					

Note: *** significant coefficient at 1%; ** significant coefficient at 5%.

Note that the variables related to firm innovation support hypothesis one. The estimated coefficients of the two variables that consider whether the firm was innovative—R&D expenditure and patents—were positive and significant. These coefficients show that the likelihood of high environmental proactivity values is greater in innovative than in non-innovative firms. This is so both when comparing firms that invest in R&D and those that do not, and when comparing firms with and without patents. These results prevent us from rejecting the hypothesis that most innovative firms are more likely to have a proactive environmental strategy.

Regarding the *Innovation proactivity* variable, the estimated coefficient is positive and significant. This result provides additional empirical evidence for not rejecting hypothesis one. The estimate coefficient shows that the likelihood of a proactive environmental strategy is greater in firms that innovate more than usual in their sectors in processes, products, organization and/or marketing systems.

The estimated coefficient of the *Internationalization proactivity* variable was positive and significant. This result supports hypothesis two and shows that firms that operate on international markets to a greater than usual extent in their sectors, are more likely to present greater degrees of proactivity in their environmental strategies.

Regarding the control variables, the significance of the estimated coefficients of the Log(Age) and Log(Size) variables shows that both firm age and size affect the likelihood of a firm's environmental strategy being proactive. The results show that there is a positive relationship between environmental proactivity and size and a negative one with respect to firms' ages.

5. Discussion and Conclusions

This study analysed how strategic leadership affects environmental proactivity. According to the previous literature, strategic proactivity (leadership) can be interpreted as a combination of the internal factors that characterise a firm's business strategy as that of an innovative firm. This study's conclusions support the prevailing idea that a firm's environmental strategy is in line with their business strategy; in other words, prospector firms are more likely to be environmentally advanced: One of the characteristics most commonly associated with proactive business strategies is innovation. The results of this study show that firms that invest in R&D and patent their innovations achieve more advanced positions in their environmental strategies. The empirical evidence obtained for hypothesis one supports the theory, which was already accepted in the seminal paper by Porter [56], that innovation generates better environmental performances. Also, Nidumolu et al. [57] agreed with this argument in their theoretical paper, where they argued that sustainability is a mother lode of organizational and technological innovations. Consequences of this are a reduction of costs, caused by minimizing the use of inputs and additional revenues from better products. Because these are the goals of corporate innovation, Nidumolu et al. [57] declared that smart companies should treat sustainability as innovation's new frontier.

The current study's results are also consistent with the previous literature that has concluded that there is a positive relationship between innovative and environmental proactivity [17,20]. Empirical evidence shows that firms with greater innovation efforts throughout the production cycle (product, process, organization and marketing) than the average for their sectors also attain more advanced positions in environmental matters. In other words, innovation leadership is another driver of an advanced environmental strategy. This suggests that innovative firms have more flexible organizational structures and more technological know-how, and are more likely to run risks. These firms, characterised as proactive in their strategies, have a more appropriate attitude for the implementation of advanced environmental strategies.

Another characteristic associated with strategic proactivity in firms is the tendency to extend markets across local and national borders. This study shows that firms with more than an average presence on different geographical markets for the same sector favour environmental proactivity. The results obtained in the current study suggest that firms that operate on different markets adapt to the most demanding environmental legislation, placing them in a position of environmental leadership in their respective sectors. These results are consistent with those obtained by authors, such as

Christmann and Taylor [55], Kennelly and Lewis [43] or Aguilera-Caracuel et al. [52], and have led us to support the idea that operating on an international scale facilitates the ability to adopt environmental strategies above and beyond those of competitors. This could be explained by the fact that globalised firms obtain different know-how, through their transfer between subsidiaries, and are more likely to make better use of resources and capabilities, becoming better at adapting to external circumstances.

The results obtained regarding hypotheses one and two show that firms with more proactive business strategies are more proactive in environmental matters, confirming the conclusions reached in the same geographic context by Aragón-Correa [13] and for other regions by Sharma et al. [14] and Haverkamp et al. [11].

The conclusions obtained show that a proactive strategic attitude, either in innovation or internationalization, is often also accompanied by a proactive attitude to environmental matters. This suggests that firms configure their strategies through consistent combinations of resources and capabilities, with a common bond between their general and environmental strategies.

The consideration of age and size as control variables enables us to reach further conclusions. In the case of age, the negative sign shows that young firms are very likely to implant environmental measures, but this likelihood diminishes over time. Pereira and Vence [58] provided arguments that justify this negative relationship. In accordance with Rehfeld et al. [59] they maintain that, in a young firm, any new strategy implantation or decision (including environmental strategy) can be considered an improvement. They therefore consider that the relationship between age and environmental proactivity has a U shape. The curve moves downwards until the firm reaches a mature age after developing know-how and internal routines in order to survive. From that point on, age will represent an improvement in environmental practices, and the curve becomes U-shaped.

As for size, the results show that the larger the firm, the greater the likelihood that it will be environmentally proactive. These results are consistent with previous studies [13,25,60,61]. This positive relationship is explained by the greater resource availability in large firms [13]. Del Río [62] associated environmental proactivity with larger size, due to the economic ability to make investments in internal organization and human resources, or the possibility of having a specific R&D department. In conclusion, the empirical evidence shows the likelihood of firms being proactive in their environmental strategies is greater in young than in more mature firms. Secondly, the larger the firm, the greater the likelihood of having proactive environmental strategies.

All the results shown in this work could be a great help for managers of big and small and medium-sized enterprises (SMEs). The development of a proactive environmental strategy not only results in better environmental performances because of the reduction in environmental impact, but also results in a competitive advantage. This positive relationship between the implementation of environmental objectives, practices and resources and the acquisition of a competitive advantage has been broadly accepted in the literature. Since Hart [2] proposed the "Natural Resource-Based view of the Firm", lots of authors have contributed, with empirical evidence, to this assertion [6,20,25,63]. Definitely, the inclusion of environmental actions in the firm is a helpful way of improving financial results by reducing costs and gaining a competitive advantage. In this respect, Nidumolu et al. [57] argued that *by treating sustainability as a goal today, early movers will develop competencies that rivals will hard-pressed to match. That competitive advantage will stand them in good stead, because sustainability will always be an integral part of development.*

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