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***Stakeholder pressure and
environmental proactivity:
moderating effect on of
competitive advantage
expectations***



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Stakeholder pressure and environmental proactivity: moderating effect of competitive advantage expectations¹

Abstract

This study attempts to learn more about the relationship between managers' perception of stakeholder pressure related to environmental matters and the degree of proactivity of firms' environmental strategies. Arguments based on the cognitive approach enable the consideration of a possible moderating effect derived from managers' perception of environmental issues as opportunities or threats. Using a method based on structural equation models with the information available for a sample of 240 Spanish industrial firms, we obtain results that show that managers' expectations of competitive advantages derived from environmental management moderate the relationship between firms' degree of environmental proactivity and stakeholders' expectations in environmental matters.

Keywords: environmental proactivity, stakeholder pressure, managers' perception, competitive advantage expectations.

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1. INTRODUCTION

The first theoretical discussions regarding the relationship between organisations and the environment date from twenty years ago. The monographic issue on “Ecologically Sustainable Organisations”, published in 1995 by *The Academy of Management Review*, is probably one of the best-known references, as it helped to establish the conceptual foundation for literature about environmental management. Since then, such literature has abounded but, even so, considerable efforts continue to be made to include environmental considerations in business management theories. In this study, we focus on two of the research fields that have been developed within this theoretical framework: Stakeholder Theory and the Cognitive Perspective.

Stakeholder theory maintains that environmental strategies are the results of firms’ efforts to meet stakeholders’ environmental demands. Within this theoretical framework, Murillo *et al.* (2008: 1228) refer to environmental proactivity as the “*tendency to anticipate needs (related to environmental protection), introducing changes voluntarily rather than reacting to environmental requirements and demands*”. For a sample of 240 Spanish industrial firms, they find that the stakeholder pressure perceived by managers has a positive and significant impact on their degree of environmental proactivity. With this as our starting point, and using the same sample, we now attempt to learn more about the determinants of firms’ environmental proactivity based on the Cognitive Perspective.

The cognitive approach explains managers’ decisions based on their subjective perception of different issues as either threats or opportunities. Some authors have focused on how managers’ values, attitudes and subjective perceptions influence their environment-related decisions (Bansal, 2003; Sharma, 2000; Cordanano and Frieze, 2000). According to these arguments, managers who perceive environmental management not only as a way of satisfying stakeholders, but also as a source of competitive advantages, are relatively more

likely to invest more than is strictly necessary to respond to such demands. Managers who perceive a trade-off between environmental outcomes and firms' financial results, however, reduce the resources available for environmental protection to a minimum, designing strategies based on more reactive environmental positions.

Based on Stakeholder Theory and the Cognitive Perspective, and accepting that there is a positive relationship between stakeholder pressure and degree of environmental proactivity, the objective of our study is to analyse how managers' perception of environmental issues as opportunities or threats can alter this relationship. This is an original contribution to this field of research as, although there are studies analysing how stakeholder pressure (Buysse and Verbeke, 2003; Henriques and Sadosky, 1999; Sharma and Henriques, 2005; Turcotte and Pasquero, 2001; Murillo *et al.*, 2008) and managers' perceptions and values (Bansal, 2003; Cordano and Frieze, 2000; Sharma, 2000; Sharma, Pablo and Vredenburg, 1999) affect choice of environmental strategy, none of them analyse the combined impact of the two variables.

The paper is structured as follows: we first review previous literature and justify the hypotheses established based on Stakeholder Theory and the cognitive approach. The third section presents the characteristics of our sample and methodology, and defines our variables. The fourth describes the results obtained. Finally, section five summarises our principal conclusions.

2. THEORETICAL BACKGROUND

Murillo *et al.* (2008) find that stakeholder pressure perceived by managers has a positive and significant impact on firms' degree of environmental proactivity. Consistent with other authors such as Aragón-Correa (1998); Aragón-Correa and Sharma (2003) or Sharma and Vredenburg (1998), they define proactivity as the "*tendency to anticipate needs (related*

to environmental protection), introducing changes voluntarily rather than reacting to environmental requirements and demands". This study accepts that there is a positive relationship between perception of stakeholder pressure and environmental proactivity. Our interest is specifically focused on analysing whether managers' perception of environmental requirements and demands as either a competitive advantage opportunity or a threat for economic results, can have a moderating effect on firms' strategic responses to such demands. Our study is based on two theories: Stakeholder Theory and the Cognitive Perspective.

Stakeholder Theory

Since stakeholder was defined in 1984 by Freeman (1984: 25) as "*any group or individual who can affect or be affected by the achievement of the organisational objectives*", stakeholder pressure demanding that firms minimise the impact of their operations on the environment has continued to grow (Hart, 1995). This trend is forcing firms to reconsider their strategic pillars in order to include environmental issues in the decision-making process (Kassinis and Vafeas, 2006). Based on these arguments, Stakeholder Theory explains that advanced or proactive environmental strategies result from firms' efforts to satisfy their stakeholders' environmental demands. Firms whose stakeholders demand minimisation of the environmental impact of their operations, and can also have a critical impact on their results, are therefore forced to establish proactive environmental strategies (Buysse and Verbeke, 2003). The more likely firms are to satisfy their stakeholders' demands, the more proactive their environmental strategies will be (Hart, 1995).

We now review the work of some of the authors who have analysed this relationship. Henriques and Sadorsky (1999), and subsequently Buysse and Verbeke (2003), try to identify principal stakeholders (table 1). Henriques and Sadorsky (1999) identify four groups:

regulatory stakeholders (governments, trade associations, informal networks, and competitors), organisational stakeholders (customers, suppliers, employees, and shareholders), community stakeholders (community groups, environmental organisations, and other potential lobbies), and the media. Similarly, Buysse and Verbeke (2003) refer to regulatory stakeholders, internal and external primary stakeholders (both equivalent to organisational stakeholders) and secondary stakeholders (basically the community stakeholders and the media in the classification proposed by Henriques and Sadorsky (1999)). After identifying these groups, both Henriques and Sadorsky (1999) and Buysse and Verbeke (2003) find that firms with a more proactive environmental response perceive greater pressure from each of the different groups of stakeholders even though, when it comes to prioritising those whose pressure is more important, firms with different environmental response patterns establish different priorities.

Mitchell, Agle and Wood (1997) approach the study of firms' environmental response to stakeholder demands from a perspective contemplating the possibility of conflicts of interest between the demands of different stakeholder groups. This forces firms to establish priorities. The key then lies in managers' perception of the importance of the different stakeholders for their firms, which is in turn determined by their perception of the cumulative impact of three intrinsic stakeholder characteristics: power, legitimacy and the urgency of their demands. Power is their ability to impose their will². Legitimacy refers to the socially accepted conduct which establishes the limits for corporate decisions regarding what is right and what is wrong. Finally, urgency involves the immediacy with which firms are bound to pay attention to stakeholder demands.

² In relation to power, Jawahar and McLaughlin (2001) use Resource Dependency Theory to explain that firms pay more attention to stakeholders capable of controlling critical resources, because they play a key role in their survival on the market. Frooman (1999) and Kassinis and Vafeas (2006) agree that the more firms depend on their stakeholders, the more powerful the latter will be, and firms will be more likely to attempt to satisfy their environmental demands.

In the same line of research, Frooman (1999) distinguishes between two types of stakeholder influence, direct or indirect, based on the interdependence of resources between the firm and its stakeholder groups (Pfeffer and Salancik, 1978). According to the degree of interdependence, he describes different types of relationships which determine stakeholder strategies for influencing firms' decisions: withholding strategies and usage strategies. The former refer to stakeholders' discretionarity to determine the use of firms' resources, while the latter refer to their discretionarity to determine how such resources are used. Based on this framework, Sharma and Henriques (2005) explain how different types of stakeholder influences lead to different types of sustainability practices, from initial matters such as pollution control and eco-efficiency, to advanced issues involving the redefinition of the business and industrial ecosystems, including intermediate phases related to material recycling and process redesign.

Murillo *et al.* (2008) also make a contribution to the recent development of Stakeholder Theory with a study based on a sample of Spanish industrial firms. The authors first measure managers' perception of the environmental pressure (in the form of demands and requirements) from different stakeholder groups and they then measure the impact of such perceived pressure on the degree of proactivity of firms' environmental strategies.

The results obtained in Murillo *et al.* (2008) are consistent with those of the previous studies (Henriques and Sadosky, 1999; Buysse and Verbeke, 2003), showing that the perception of environmental pressure from stakeholder groups has a positive and significant impact on the degree of proactivity of firms' environmental strategies. However, they also find a new, very interesting, phenomenon. They detect a positive correlation between the perceptions of pressure from different groups. In other words, managers who perceive more pressure from any stakeholder group also perceive more pressure from other groups. This does not contradict the fact that managers perceive different pressure intensity from different

groups. On the contrary, there are differences in the pressure perceived from different groups. It simply means that some managers perceive relatively more pressure from each group than other managers. Therefore, in Murillo *et al.* (2008) the perception of stakeholder pressure is measured by a single dimension which summarises the information related to the perception of pressure from 14 different stakeholder groups. To explain this, the authors refer to Sharma (2000) and Cordano and Frieze (2000), who emphasise the important role played by managers' values, attitudes and perceptions in decisions which affect firms' environmental commitment. Based on this line of research focusing on the Cognitive Perspective, Murillo *et al.* (2008) suggest that managers' perception of environmental issues have a moderating effect on firms' responses to their stakeholders' environmental demands.

Cognitive Perspective

The cognitive approach helps to explain managers' environmental decisions based on their subjective perception of the different issues affecting firms as either threats or opportunities (Bansal, 2003). The decision of how many resources to spend on protecting the environment is a good example of a decision based on subjectivity, as the expectations of obtaining associated competitive advantages are varied, and often contradictory. Sharma (2000) describes such decisions as loaded with ambiguity and subjective connotations, as they can be seen by managers in terms of opportunities or threats (Sharma, 2000). According to this argument, when managers see environmental issues as threats, the strategic response of firms will be reactive. A proactive strategy will result, however, when they are seen as a source of potential competitive advantages (Sharma *et al.*, 1999).

Sharma (2000: 684) explains that the perception of issues in one sense or the other (threats or opportunities) depends on three factors: positive or negative emotional associations, considerations related to profit or loss and the perception of such issues as

controllable or uncontrollable. Furthermore, following Sharma (2000), managers' perceptions are influenced by the organisational context, specifically by factors related to: first, whether environmental protection is an integral aspect of corporate identity, second, whether there is a margin for managing environmental matters (in terms of time and resources available for application at managers' discretion), and third, the use of result-based criteria to evaluate employees' environmental results. Bansal (2003) proposes a similar approach, identifying two critical factors which determine firms' responses to environmental matters: on the one hand, individual concern for such matters, which could facilitate the organisational response and, on the other, the association between such matters and the organisation's values, which determine whether they can be seen as a source of a competitive advantage.

The degree of proactivity of a firm's environmental strategy can therefore be partly explained by managers' perception of environmental matters. When managers see them as opportunities to obtain a competitive advantage, they will actively foster the development and application of proactive environmental strategies to maximise potential earnings (Anderson and Bateman, 2000; Bansal and Penner, 2002; Sharma and Henriques, 2005). When managers perceive environmental issues as threats, however, they are unwilling to spend time and resources on them and the result will be a reactive environmental strategy (Sharma *et al.*, 1999).

Based on the above arguments, and in order to further analyse the influence of perceived stakeholder pressure on the proactivity of firms' environmental strategies, as found by Murillo *et al.* (2008), we consider two questions: Do expectations of competitive advantages have an impact on the degree of proactivity of firms' environmental strategies? Do such expectations have a moderating effect on the impact of stakeholder pressure on the degree of proactivity of firms' environmental strategies? To answer these questions, we make assumption 1 and test hypotheses 1 and 2 (see Figure 1).

Assumption 1: The greater the stakeholder pressure perceived by managers for improving environmental practices is, the more proactive firms' environmental responses will be.

Hypothesis 1: The greater the expectations of obtaining competitive advantages by improving environmental practices are, the more proactive firms' environmental responses will be.

Hypothesis 2: Expectations of obtaining competitive advantages have a moderating effect on the impact of stakeholder pressure on the degree of proactivity of firms' environmental strategies.

3. SAMPLE, METHODOLOGY, AND VARIABLES

Sample

The study population comprises industrial firms with at least three employees, located in Aragón (a medium-sized industrialised region in north-east Spain). We obtained information about these firms from a questionnaire mailed in 2003 to the 3984 firms in the study population³. We addressed the questionnaire to the person responsible for environmental affairs or, failing that, to the managing director. The survey included questions aimed at obtaining information about stakeholder pressure, expectations of obtaining competitive advantages and the firms' environmental strategies, based on literature on the subject. We requested the collaboration of a panel of experts to validate the content of the questionnaire's different items, with whom we maintained a fluid exchange of ideas⁴.

³ We had access to this population thanks to the collaboration of the Industrial Development Department of *Diputación General de Aragón*, which provided us with a directory of all the firms registered in the Aragón region to date.

⁴ The panel consisted of 11 experts familiar with environmental management: 6 business management professionals (managers), 4 representatives of national and regional public institutions and 1 academic. The experts' contribution consisted of evaluating two aspects of the initial questionnaire using 11-point Likert scales (from 0 to 10): how easily understood the items were and their relevance for our study. We also invited them to suggest new items of interest for our research.

We received 240 valid questionnaires. A questionnaire was classified as valid when the interviewee had answered at least 75% of the questions relevant for our analysis. Table 2 provides descriptive information about the sample.

Methodology

The hypotheses were tested with the Structural Equation Model (SEM) method. SEM provides a series of advantages relative to other methodological approaches. One of the most important is that it enables the investigator to both enter information *a priori* and to reformulate the models based on goodness of fit statistics and indices. In other words, SEM enables both deductive and inductive research (Jöreskog, 1993). Another of the advantages of SEM is the wide variety of estimation methods available in the respective statistical programs, LISREL (Jöreskog and Sörbom, 1996), MPLUS (Muthén and Muthén, 1998-2007) and EQS (Bentler, 2004).

We analysed the models with both EQS and MPLUS. We estimated the model under missing data theory using all available data and a maximum likelihood estimator with robust standard errors using a numerical integration algorithm (Muthén and Muthén, 1998-2007). Given the large number of observed variables involved in concept measurement and the size of our sample, we tested the hypotheses in two phases. In the first, we analysed the measurement models of the constructs and estimated their respective factor scores (Muthén and Muthén, 1998-2007). We then formulated and tested the models representing our hypotheses. Finally, in view of the results obtained, we applied a multi-sample analysis.

Measuring the variables

In order to analyse both the impact of expectations of obtaining competitive advantages on the proactivity of a firm's environmental strategy and the impact of stakeholder pressure

on this proactivity, we first needed a variable to measure this degree of proactivity. As explained in Murillo *et al.* (2008), we constructed the variable considering four strategic conduct categories, Pasivity strategy, Attention to legislation strategy, Attention to stakeholder strategy, and Total environmental quality strategy, which were assigned values of 1 to 4, respectively. Table 3 shows the definition of each of these strategies by listing the environmental practices associated to each level of proactivity. Firms were classified according to these categories through a controlled auto-classification system. We specifically asked the interviewees to chose the description best applicable to their firms' environmental management, and to identify why they had chosen that description. We told them that at least three of the characteristics of a description had to be met for that description to be selected.

Secondly, in order to measure the intensity of stakeholder pressure, we created a variable from the scores obtained in Murillo *et al.* (2008). In this study, the pressure from 14 stakeholders (managers, shareholders/owners, employees, labour unions, customers, suppliers, financial institutions, insurance companies, competitors, environmental legislation, administration control, the media, citizens/communities, ecologist organizations) were aggregated in five groups (corporate government stakeholders, internal economic stakeholders, external economic stakeholders, regulatory stakeholders and external social stakeholders) which were then synthesised in a second-order factor (perceived environmental pressure).

Thirdly, in order to measure the expectations of competitive advantages associated to the environmental measures adopted by firms, we proceeded in the same way as is described in the previous paragraph. We identified a series of competitive advantages, considering the arguments found in the theoretical literature and the opinion of the panel of experts. We identified a total of 11 competitive advantages⁵ (better returns, increased productivity, better

⁵ Both the 14 original variables used to measure stakeholder pressure and the 11 original variables used to measure competitive advantage expectations were measured by 7-point Likert scales. In the first case, a value of

use of resources, cost saving, improved internal management, product differentiation, better product quality, better image, prevention of penalties for non-compliance with legislation, subsidies and tax exemptions). After performing different exploratory and confirmatory tests, we obtained three first-order latent variables (improved efficiency, market advantages, and benefits from public administrations). These four were finally aggregated in a latent variable called “competitive advantage expectations” (in the Appendix we describe the analyses that generated this model in greater detail).

Finally, in order to test hypothesis 2, we defined a new variable resulting from the product of the second-order latent variables “perceived environmental pressure” and “competitive advantage expectations”.

4. RESULTS

As table 4 shows, we used three alternative models to explain the behaviour of the endogenous variable “degree of proactivity of the firm’s environmental strategy”. Model 1 refers to the impact of stakeholder pressure on the dependent variable, based on Murillo *et al.* (2008). Model 2 refers to a new explanatory variable, competitive advantage expectations. Finally, Model 3 also includes the moderating effect of competitive advantage expectations on the impact of stakeholder pressure on the endogenous variable.

Table 4 shows the results of estimating these three models in our sample of 240 firms. According to these results, both stakeholder pressure and competitive advantage expectations have a significant, individual effect on the degree of proactivity of firms’ environmental strategies (Model 2). However, according to Model 3, competitive advantage expectations do not have a moderating effect on the impact of stakeholder pressure on the degree of

1 indicated “*Not at all important pressure*” and a value of 7 indicated “*Extremely important pressure*”. In the second case, a value of 1 meant “*Few expectations of obtaining a competitive advantage*” and a value of 7 meant “*High expectations of obtaining a competitive advantage*”.

environmental proactivity. Furthermore, from a comparison of the parameters estimated in Model 1 and Model 2, we can conclude that the dominant variable is stakeholder pressure (0.471 versus 0.173). However, the introduction of competitive advantage expectations as an explanatory variable has a positive impact on the percentage of explained variance (9%). Logically, when this variable is included in Model 2, there is a slight reduction in the individual impact of stakeholder pressure on the degree of environmental proactivity. However, as the “competitive advantage expectations” variable has a significant individual effect and helps to increase the model’s explained variance, we can affirm that Model 2 is better than Model 1 (and, obviously, Model 3). These results therefore lead us to accept Hypothesis 1, while rejecting Hypothesis 2.

Nevertheless, considering that we had information about the activities of the sample firms, we repeated this analysis distinguishing two groups of firms, according to the pollution intensity implicit in their industrial activities: firms from high polluting sectors and firms from moderately polluting sectors⁶. We defined a dummy variable in order to divide the sample into two sub-samples: sub-sample 1, comprising moderately polluting firms ($N_1=157$), and sub-sample 2, consisting of high polluting firms ($N_2=73$).

Table 5 shows the estimated parameters and respective R^2 values in this new analysis. We can see that the three models show higher R^2 values in sub-sample 1. Moreover, Model 3 is the best fit for this sub-sample. This means that, in the moderately polluting firms (sub-sample 1), the degree of proactivity of their environmental strategies is determined by both stakeholder pressure and competitive advantage expectations. But these expectations also have a moderating effect on the impact of stakeholder pressure on the degree of

⁶ The division of CNAE (National Classification of Economic Activities) industrial sectors into the high polluting and moderately polluting categories was established as follows: high pollution sectors ($n=73$): Paper – DE; Chemicals-DG; Metallurgy-DJ. Moderate pollution sectors: ($n=157$): Food-DA; Textile-DB; Wood and cork-DD; Machine manufacture-DK; Electric and electronic equipment-DL; Transport material-DM; Miscellaneous manufactures-DN.

environmental proactivity. In the high polluting firms (sub-sample 2), however, stakeholder pressure is the only variable determining the degree of proactivity of environmental strategy (Model 1).

Finally, in view of the results obtained so far, we thought that this study should be completed with a multi-sample analysis of the three models, with an equality constraint for each of the different parameters. Table 6 shows that the results point in the same direction as the previous individual analyses.

5. CONCLUSIONS

The objective of this study was to learn more about how firms respond to or anticipate internal and external environmental requirements. The diversity of such responses has given rise to numerous classification proposals in the literature, and the term strategy is commonly used to refer to each response category (Roome 1992; Schot, 1992; Steger, 1993; Post and Altman, 1994; Hart, 1995; Henriques and Sadosky, 1999; Buysse and Verbeke, 2003; Murillo *et al.*, 2008). In general, each of these classification proposals is based on a continuum of internally consistent patterns of environmental practice ranging from the least (which are not involved in protecting the environment or limited to reacting to mandatory legislative requirements) to the most advanced (which voluntarily make environmental protection a focal point in the creation of competitive advantages). Hence the term “environmental proactivity”.

Murillo *et al.* (2008) refer to the degree of proactivity to propose four types of environmental response pattern (Passivity Response, Attention to Legislation Response, Attention to Stakeholders Response and Total Environmental Quality Response), finding that stakeholder pressure perceived by managers has a significant, positive impact on the degree of proactivity of the chosen response. This is accepted as a starting point in this study and,

using the same sample of firms as Murillo *et al.* (2008), it enables us to learn more about this relationship.

The study attempts to enrich the arguments provided by Stakeholder Theory with others based on the Cognitive Perspective. Stakeholder Theory explains firms' degree of environmental proactivity as a response to stakeholders' requirements, expectations and preferences. Consistent with the previous literature, Murillo *et al.* (2008) confirm this for a sample of 240 Spanish industrial firms. The results of our study, for the same sample of firms, show the impact of including a new variable in the analysis of the relationship between perception of stakeholders' environmental pressure and degree of environmental proactivity. Based on the Cognitive Perspective, we include a variable which represents managers' expectations of competitive advantages derived from a proactive environmental response.

The results obtained are consistent with the arguments of the Cognitive Approach, confirming the relevance of managers' subjective perception of different issues affecting firms as either opportunities or threats. Indeed, they show that the degree of proactivity of a firm's environmental strategy is greater when managers expect to obtain competitive advantages. On the other hand, as previously found by Murillo *et al.* (2008), the degree of proactivity is also greater when managers perceive more stakeholder pressure.

This study is concerned with industrial and therefore potentially polluting firms. The results, however, can be qualified when the high or moderate pollution derived from a firm's activity is included as a control variable. Indeed, the impact of managers' perception of environmental issues as opportunities or threats is less important in high polluting firms. Managers' perception of stakeholder pressure has a positive impact on environmental proactivity in high polluting firms, but competitive advantage expectations have no impact at all. For moderately polluting firms, however, managers' perception of environmental issues as opportunities for obtaining competitive advantages not only has a direct impact on

environmental proactivity, but also positively moderates the relationship between perception of stakeholder pressure and degree of proactivity.

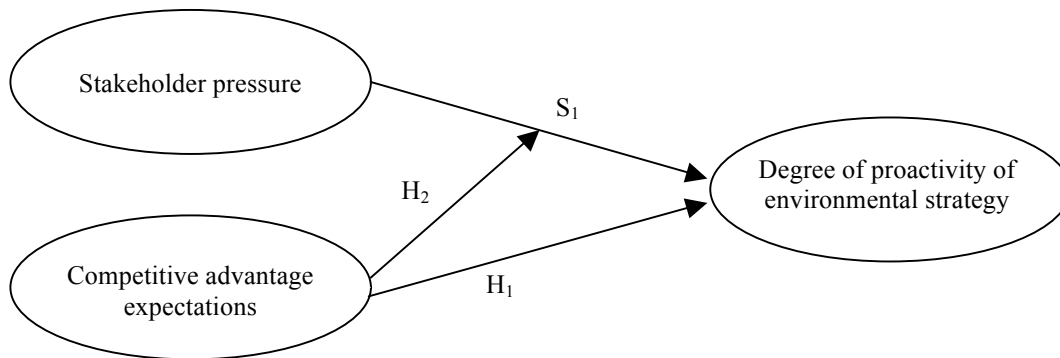
For the first time, therefore, this study provides empirical evidence that competitive advantage expectations have a moderating effect on the impact of stakeholder pressure on environmental proactivity. It could also be a starting point for future studies in one of the following areas. Firstly, the need to include information about firms' sectors of activity in order to find this moderating effect suggests that it would be a good idea to include other descriptive variables that could enrich the results of our analysis, such as, for instance, the size of the firms. This information was available in this study, but we were unable to perform the analysis by sub-group due to the small number of cases in some of them, and the high differential between the number of cases in each sub-group. Secondly, we have been studying the possibility of competitive advantage expectations having a moderating effect on the impact of stakeholder pressure on environmental proactivity. This hypothesis was based on the theoretical literature. However, in view of our analyses, could stakeholder pressure be the moderating variable? In other words, could the impact of competitive advantage expectations on degree of environmental proactivity be moderated by perception of stakeholder pressure?

TABLE 1
Environmental Stakeholders

<i>Henriques and Sadorsky (1999)</i>	<i>Environmental stakeholders</i>	<i>Buyse and Verbeke (2003)</i>
Regulatory stakeholders	Governments	Regulatory stakeholders
	Trade associations	
	Informal networks	
	Competitors	Secondary stakeholders
Community stakeholders	Community groups	
	Environmental organisations	
	Other potential lobbies	
The media	The media	
Organisational stakeholders	Customers	Primary external stakeholders
	Suppliers	
	Employees	Primary internal stakeholders
	Shareholders	
	Financial institutions	

Source: the authors.

FIGURE 1
Theoretical Model



Source: the authors.

TABLE 2
Description of the sample^a

Variable	Description	%
SIZE: Number of employees (N=193)	Less than 50 workers	73.58%
	From 50 to 250 workers	18.13%
	More than 250 workers	8.29%
SECTOR^c (N=230)	Food, beverage and tobacco	16.52%
	Textiles and tailored goods	7.83%
	Wood and cork	4.35%
	Paper; printing, graphic arts	5.65%
	Chemicals	6.09%
	Metallurgy	20.00%
	Machinery manufacturing	6.96%
	Electrical, electronics and optical materials / equipment	9.13%
	Manufacturing of transport materials	4.78%
	Various manufacturing industries and recycling	7.39%
Others ^b	11.30%	
FIRM OWNERSHIP (N=235)	A single owner	11.49%
	Small number of partners	80.85%
	Large number of partners/shareholders	7.66%

^a Percentages calculated based on the number of responses obtained for each variable.

^b The “Others” category includes those sectors whose representation in the sample is below 4%.

^c National Classification of Economic Activities (CNAE-93)

TABLE 3
Levels of proactivity of “strategic environmental behavior” variable

Description 1: Passivity Strategy (N = 45)

- The environmental objective is not an objective currently pursued by your firm.
- Your firm hardly dedicates any time and financial resources to environmental protection.
- Your firm does not adopt any kind of technical or organizational environmental protection measure.
- Your firm does not plan on obtaining environmental kinds of certifications.
- Your firm does not have any person who is responsible for dealing with environmental matters.

Description 2: Attention to Legislation Strategy (N = 112)^a

- The environmental objective of your firm only consists of complying with legislation on environmental matters.
- Your firm only dedicates the time and financial resources necessary to environmental protection in order to comply with legislation.
- The environmental measures adopted by your firm have not involved any significant change in the production and work methods, or in the organizational structure.
- The environmental measures adopted by your firm are not certified.
- The environmental matters of your firm are resolved by external professionals and/or by internal personnel who are not exclusively dedicated to the environment.

Description 3: Attention to Stakeholders Strategy (N = 53)^a

- The environmental objective of your firm is not just limited to complying with legislation on the environment, but rather it also attends to the requirements of customers, suppliers... on the subject.
- Your firm dedicates the necessary time and resources to environmental protection in order to comply with legislation and, furthermore, in order to attend to the environmental pressures from other agents.
- The environmental measures adopted by your firm have required the modification of the production and work methods and/or the modification of the organizational structure.
- Some of the environmental measures adopted by your firm are certified or are in the process of being certified.
- The firm regularly requests the services of external professionals specialized in environmental matters and/or has qualified internal personnel to take care of these matters.

Description 4: Total Environmental Quality Strategy (N = 21)^a

- The environmental objective is one of the priority objectives of your firm.
- Your firm dedicates important budgets to environmental protection for reasons that go beyond complying with legislation and attending to pressures from other agents.
- The environmental measures adopted by your firm are highly relevant to conditioning both the production processes as well as the organizational structure and how work is performed at your firm.
- The environmental measures adopted by your firm are certified.
- The responsibility for environmental matters is clearly assigned to one or various persons of your firm who are specialized in this matter and/or to a department.

^a Absent cases are excluded according to the variable.

Source: Murillo *et al.* (2008).

TABLE 4
Estimated parameters and R² in the sample (N= 240)

	Model 1		Model 2		Model 3	
	Non-stand.	Stand.	Non-stand.	Stand.	Non-stand.	Stand.
Pressure	0.314	0.527	0.280	0.471	0.272	0.458
Advantages			0.139	0.173	0.144	0.180
Pressure*Advantages					0.038*	0.069*
R ²	0.281		0.308		0.313	
N	224		223		223	

* p-value>0.05.

TABLE 5
Estimated parameters and R² in the sub-samples
FIRMS FROM MODERATELY POLLUTING SECTORS (N₁=157)

	Model 1		Model 2		Model 3	
	Non-stand.	Stand.	Non-stand.	Stand.	Non-stand.	Stand.
Pressure	0.396	0.632	0.342	0.546	0.329	0.526
Advantages			0.202	0.241	0.227	0.270
Pressure*Advantages					0.066	0.112
R ²	0.400		0.450		0.462	
N	146		146		146	

FIRMS FROM HIGH POLLUTING SECTORS (N₂=73)

	Model 1		Model 2		Model 3	
	Non-stand.	Stand.	Non-stand.	Stand.	Non-stand.	Stand.
Pressure	0.212	0.383	0.195	0.351	0.183	0.331
Advantages			0.071*	0.096*	0.057*	0.077*
Pressure*Advantages					0.053*	0.112*
R ²	0.147		0.155		0.167	
N	68		68		68	

* p-value>0.05.

TABLE 6
Estimated parameters and R² in the multi-sample analysis

	MODEL 1				MODEL 2				MODELO 3			
	Group 1		Group 2		Group 1		Group 2		Group 1		Group 2	
	Non-stand.	Stand.	Non-stand.	Stand.	Non-stand.	Stand.	Non-stand.	Stand.	Non-stand.	Stand.	Non-stand.	Stand.
Pressures	0.396	0.625	0.213	0.395	0.342	0.537	0.195	0.369	0.329	0.512	0.184	0.351
Advantages					0.202	0.237	0.071*	0.101*	0.227	0.263	0.055*	0.078*
Pressures*Advantages									0.066	0.113	0.052*	0.108*
R ²	0.390		0.156		0.432		0.172		0.452		0.171	
χ s-B		2.7621				4.5831				10.7323		
Degrees of freedom		(2)				(4)				(7)		
P-value		0.2513				0.3328				0.1567		
N _{Group 1} /N _{Group 2}		146/68				146/68				146/68		

* p-value>0.05.

APPENDIX

Dimensional structure of the “Competitive advantage expectations” construct

The set of variables found to represent competitive advantage expectations were 11 (table 1A). We defined the categories of these 11 from the scores assigned by managers to each of the expectations proposed in the questionnaire, using 7-point Likert scales in which a value of 1 meant “Few expectations of obtaining the competitive advantage” and a value of 7 meant “High expectations of obtaining the competitive advantage”.

After analysing the correlations matrix among the 11 variables, we then analysed their underlying structure. The first step consisted of performing exploratory tests by Principal Component Analysis on the set of variables (table 1A). The results suggested the existence of an underlying structure in the set of variables. This means that a smaller number of variables can be defined which are capable of describing or synthesising the relationships between the original variables.

Considering the results of the exploratory tests, referring to the literature on the subject and assuming both the principle of parsimony⁷ as well as the principle of reasonably explaining observed reality, a structure arose *a priori*, consisting of three dimensions which synthesised competitive advantage expectations. Consistent with the items they represented, we denoted the three dimensions related to competitive advantage expectations as follows: F1- Improved efficiency (v₁-v₅), F2- Market advantages (v₆-v₈), F3- Benefits from the public administrations (v₉-v₁₁).

Once this possible structure *a priori* had been determined, and in order to judge its suitability, we proposed a First-Order Confirmatory Analysis Model with 3 dimensions (MAFCPO: 3FPO). Table 1A shows the statistics and goodness of fit indices, while table 2A

⁷ The decision between two possible models is based on the χ^2 differences test, which implies accepting the models with more parsimony (those with more degrees of freedom), providing they present reasonable adjustment statistics.

shows the parameters and reliability coefficients. In view of the high values of the correlation matrix between the model's three dimensions or factors, we contemplated a Confirmatory Factor Analysis Model with a second-order factor. As tables 1A and 2A show, the adjustment statistics and reliability coefficients of this second model presented appropriate values. With regards to the estimated parameters, all the factor loadings were more than 0.7, so all the reliability coefficients of the observed variables (R^2) exceeded 0.5. Furthermore, the reliability coefficients of the latent variables or dimensions (CF1= Fornell and Larcker and CF2= Omega) indicated reliability and convergent validity.

TABLE 1A
Goodness-of-fit statistics and indices

Equivalent Estimated models	d. f.	χ^2	S-B	R-RMSEA	SRMR	GFI	AGFI	R-BBN	R-CFI
FOCFA-3D or SOCFA-3D	41	111.7783		0.097	0.057	0.844	0.750	0.934	0.956

FOCFA-3D: First-Order Confirmatory Factor Analysis Model with 3 Dimensions.

SOCFA-3D: Second-Order Confirmatory Factor Analysis Model with 1 Second-Order Dimension and 3 First-Order Dimensions.

TABLE 2A
Competitive advantage expectations: Parameters and reliability coefficients

	FOCFA-3D				SOCFA-3D					
	F ₁	F ₂	F ₃	R ²	V ₁	F ₁	F ₂	F ₃	F ₄ *	R ²
V ₁ - Better returns	0.80			0.64	V ₁	0.80				0.64
V ₂ - Increased productivity	0.87			0.76	V ₂	0.87				0.76
V ₃ - Better use of resources	0.89			0.80	V ₃	0.89				0.80
V ₄ - Cost saving	0.92			0.85	V ₄	0.92				0.85
V ₅ - Improved internal management	0.82			0.68	V ₅	0.82				0.68
V ₆ - Product differentiation		0.84		0.70	V ₆		0.84			0.70
V ₇ - Better product quality		0.92		0.84	V ₇		0.92			0.84
V ₈ - Better image		0.60		0.40	V ₈		0.60			0.40
V ₉ - Prevention of non-compliance penalties			0.45	0.22	V ₉			0.45		0.22
V ₁₀ - Subsidies			0.91	0.82	V ₁₀			0.91		0.82
V ₁₁ - Tax exemptions			0.90	0.81	V ₁₁			0.90		0.81
CF1 (Fornell and Larker)	0.75	0.61	0.63		CF ₁	0.75	0.61	0.63	0.68	
CF2 (Omega)	0.94	0.82	0.83		CF ₂	0.94	0.82	0.83	0.86	
F ₁ - Improved efficiency	1				F ₁				0.95	0.90
F ₂ - Market advantages	0.77	1			F ₂				0.81	0.66
F ₃ - Benefits from public administrations	0.65	0.55	1		F ₃				0.70	0.49

All parameters are significant: p<0.001

* F₄: Competitive advantage expectations

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