

RESEARCH NOTES

STRATEGIC PROACTIVITY AND FIRM APPROACH TO THE NATURAL ENVIRONMENT

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In a sample of 105 firms in Spain, a relationship was found between strategic proactivity and approaches to the natural environment. The firms with the most proactive business strategies ("prospectors") employed both traditional corrective and modern preventive natural environmental approaches. Firm size had a major impact on the amount of training relating to the natural environment in the sample firms and on their corrective approaches but made no difference to their preventive approaches.

A widespread feeling of concern for the natural environment necessarily affects the economy in general and firms in particular, but the topic has until recently received little attention in the business literature (Gladwin, Kennelly, & Krause, 1995: 875; Shrivastava, 1994a: 236). Organization theories concerning the need for firms to adapt to their contexts have consistently ignored the importance of the natural environment (Purser, Park, & Montuori, 1995: 1062; Shrivastava, 1994b: 708-711). Approaches to strategic management are not an exception. Despite the traditional propounding of the need to adjust organizational capabilities to the surrounding situation (e.g., Andrews, 1971; Hofer & Schendel, 1978), only in the past decade have researchers developed a program, grounded in resource-based theory, for examining how firms might make that adjustment. Hart (1995) proposed a basis for integrating firms' relationships to the natural environment into resource-based theory and indirectly into strategic management.

Theoretical integration of approaches to the natural environment can be based on research that involves (1) explicit or implicit definition of firms' environmental positions and (2) examination of how firms assimilate these positions (Jennings & Zandberger, 1995: 1020), a key aspect of which is the relationship of environmental positions to firms' overall strategic thinking (Beaumont, 1992:

202-204; Hopfenbeck, 1993: 313). The natural environmental concepts adopted by firms affect the design of each level of strategy (corporate, business, functional, and operative) and may even be central to them (Shrivastava, 1995: 190; Starik & Rands, 1995: 928). This study was focused on corporate approaches to the natural environment and their relationships to business strategy. The research question addressed can be stated thus: How do strategically proactive firms differ from other firms in their approaches to the natural environment?

To address this issue, I defined various kinds of corporate natural environmental postures before going on to focus on their relationships to business strategy proactivity. I attempted to establish a link between the strategic proactivity of firms and their natural environmental approaches.

TYPES OF CORPORATE APPROACHES TO MANAGING THE NATURAL ENVIRONMENT

Many researchers have developed typologies of corporate postures regarding the natural environment (e.g., Coddington, 1993; Greeno, 1994; Kent County Council Environmental Assessment Group, 1991; Roome, 1992; Sadgrove, 1993). The classification proposed by Roome has been the best known and the most widely used. Despite the differences between them, these classifications are based on making distinctions along a continuum ranging from the most reactive postures to the most proactive ones. The specific characterization of each type of posture may be based on firms' use of either traditional or modern approaches to improving their natural environmental performance (Evan, 1988: 31-32).

Traditional methods, also known as end-of-pipe solutions, are attempts to solve problems when

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they arise through procedures such as refuse destruction and chimney filters (Cairncross, 1991: 256–257; North, 1992: 128). Modern methods are mainly designed to prevent the occurrence of problems by dealing with their sources (Schmidheiny, 1992); doing this involves the identification and analysis of all natural environmental aspects of a firm's products and services and the establishment of comprehensive management programs. Buchholz (1993: 372–374) pointed out that normal regulations have usually required the use of traditional methods. Modern procedures are normally adopted on a firm's own initiative, as a result of a growing awareness of problems and perceptions of advantages.

Roome (1992) placed firms with the least advanced natural environmental postures in a category labeled "noncompliance," which refers to applying no natural environmental measures of any kind and not even conforming to regulatory requirements. The next category, "compliance," comprises firms whose postures are determined by prevailing legislation. "Compliance-plus" covers firms that not only abide by the law but also have approaches based on their own natural environmental management systems. They are surpassed by firms in the "commercial and natural environmental excellence" category; these firms systematically apply preventive methods based on principles of total quality management in their natural environmental and overall managerial practices. At the top end of the scale, the "leading edge" category comprises firms whose postures point the way for future development by others.

THE RELATIONSHIP BETWEEN APPROACHES TO THE NATURAL ENVIRONMENT AND BUSINESS STRATEGY: A HYPOTHESIS

The importance of firms' adopting consistent approaches to contextual, structural, and strategic issues is well known. Publications on the influence of business strategy and the way it meshes with particular aspects of an organization include Doty, Glick, and Huber (1993) and Ginsberg and Venkatraman (1985). On the same lines, but more specifically, Elkington, Knight, and Hailes (1991), the International Chamber of Commerce (1991), Sadgrove (1993), and Welford and Gouldson (1993) stated that consistency in regard to the natural environment is bound to be diluted in the normal running of firms. Their environmental postures have to be integrated into their business strategies without conflicting with other aspects.

Jennings and Zandberger stated the following: "Organizational theoreticians concerned for the

natural environment have modified previous organizational strategy models to incorporate natural environmental pressures and organizational responses, with a view to making firms more proactive. This is supposed to make proactive firms more sustainable" (1995: 1020). The above ideas suggest that firms with proactive business strategies are also those responding most decisively to the new natural environmental challenges.

My argument draws from three strategic dimensions based on a scheme proposed by Miles and Snow (1978): the entrepreneurial, the engineering, and the administrative dimensions. Miles and Snow's typology has been widely interpreted as a continuum on which "prospectors" and "defenders" represent extreme positions (Doty et al., 1993; Hambrick, 1981, 1983; Zajac & Shortell, 1989). Prospectors are the most proactive firms in their postures on the three strategic dimensions, defenders are the least proactive, and analyzers occupy an intermediate position. I therefore defined strategic proactivity as a firm's tendency to initiate changes in its various strategic policies rather than to react to events. Next, I examined the three strategic dimensions trying to show that proactive characteristics encourage firms to adopt advanced natural environmental postures.

The entrepreneurial dimension refers to choices about products, markets, and ways of competing. According to Miles and Snow (1978), prospectors analyze all aspects of their contexts and grow by developing new products and markets. Similarly, firms with advanced environmental postures have to consider the whole of their contexts and reconcile the points of view of all participants (Gladwin et al., 1995: 897; Hart, 1995: 1001). Such an approach will lead to the development of new products and designs with minimal negative impacts on the natural environment. Firms have to manage natural environmental marketing programs "carefully, but not defensively" (Coddington, 1993: 2) by backing sustainable new products in order to create and expand the markets for them (Starik & Rands, 1995: 925). The characteristics and objectives of prospectors on this dimension are very similar to those required for being environmentally advanced. Prospectors are better able to apply all kinds of measures for modifying their products and markets for natural environmental reasons.

The engineering dimension refers to the technology used for developing competitiveness. Defenders might well use natural environmental improvements in technological processes to reduce their costs and improve their efficiency, but several reasons suggest that prospectors will achieve more

natural environmental progress on the production and technology side.

First, according to Dvir, Segev, and Shenhar (1993), the most proactive firms are prepared to invest heavily in order to enhance their technological leadership. Those authors found that the least proactive firms only invested in new technology when they were convinced of its potential benefits. The effectiveness, implications, and costs of technologies that protect the natural environment are currently subject to doubt and disbelief (Shrivastava, 1995: 196), making it difficult for less proactive firms to have confidence in them.

Second, prospectors have flexible technologies capable of responding quickly to change, and people play a crucial part in the way they operate (Miles & Snow, 1978). Similarly, Shrivastava (1995) stressed the importance of highly innovative technologies for the proper functioning of an advanced natural environmental posture. Nevertheless, despite the great technological effort involved, natural environmental strategy is "people intensive and depends upon tacit skill development through employee involvement" (Hart, 1995: 993).

Third, Dvir and colleagues (1993: 156) argued that a firm's adaptive cycle starts with identifying new opportunities during the "entrepreneurial" phase, after which the "engineering" phase will provide the necessary solutions. Veliyath and Shortell (1993) found that prospectors went in for more innovation than firms following other kinds of strategies. This means that, compared to other firms' approaches, the environmentally advanced technological improvements made by proactive firms can be expected to act more quickly and to be more advanced and time-sensitive (because of the firms' marketing requirements), so prospectors' characteristics are more appropriate to making such improvements.

The administrative dimension refers to the choice of structures and organizational processes for reducing uncertainty and permitting innovation. According to Miles and Snow (1978), prospectors go in for extensive project-oriented plans. A very important role is played by R&D and marketing, although there is a need for decentralized control to permit the involvement of all personnel. Starik and Rands stressed the need for sustainable firms to design their internal processes to "empower individuals to engage in sustainability-oriented innovation" (1995: 921). Bringer and Benforado (1994), describing 3M's organization, stressed the importance of environmentally advanced firms' investing in R&D, backing and understanding natural environmental aims at all levels, and organizing in terms of projects.

On the basis that the most proactive firms seem to have better facilities for natural environmental development in several organizational aspects, I formulated the following general hypothesis:

Hypothesis 1. Firms with more proactive business strategies will have more advanced approaches to the natural environment than their competitors with less proactive business strategies.

METHODS

Sample Selection and Response Rate

The CEOs of 210 firms operating in Spain were sent two survey questionnaires, one on their firms' business strategies, the other on their natural environmental practices. Six weeks later, the same material was sent again to the firms that had not responded. The sample covered the firms with the largest turnover in ten of the business sectors suggested in the classification described by the Spanish business magazine *Actualidad Económica* (1994). Table 1 gives some details. As in previous studies (e.g., Hambrick, 1981; Shortell & Zajac, 1990; Snow & Hrebiniak, 1980), the questionnaires were sent to CEOs because of their great knowledge of their firms' strategic situations. The covering letter indicated the possibility that a staff member familiar with a firm's natural environmental approaches might answer the questionnaire on the natural environment. A subsequent telephone survey and the answers to some questionnaires showed that in the majority of cases, CEOs or their deputies answered the questionnaire on strategy and the person responsible for the natural environment answered the other one. In every case but one, the answers to both questionnaires were returned together. One firm that sent its answers twice was eliminated from the process.

The final respondents numbered 112 (53.33 percent of the original group). There were no significant differences in size between the firms that responded before and after the repeat mailing or between the firms originally contacted and the final respondents. During the interval between sending the first questionnaire and receiving the last response, there were no natural environment-related events that might have significantly influenced the response rate. Of the 112 responses received, 105 (50%) were considered usable. This response rate has to be considered very satisfactory, given the usually low levels of response to mailed organizational surveys. Table 1 shows major differences in response between sectors. The petroleum and automotive industries and banks accounted for over

TABLE 1
Details of Sample and Response Rates^a

Business Sector	Firms in Sample ^b	Average Sales ^c	Average Employees	Response Rate	Responses	Usable Rate	Usable Responses
1. Food, beverages, and tobacco	25	804.74 (995.12)	2,044.28 (2,220.54)	48.00%	12	44.00%	11
2. Automotive and allied	25	909.61 (1,166.10)	3,651.13 (4,585.96)	76.00	19	76.00	19
3. Banks and savings banks	25	2,908.29 (3,177.01)	8,273.80 (9,174.56)	72.00	18	68.00	17
4. Construction and allied	25	667.34 (681.54)	4,412.64 (7,124.43)	36.00	9	32.00	8
5. Electricity, water, and natural gas	15	1,566.21 (1,935.44)	4,870.60 (5,378.23)	66.66	10	66.66	10
6. Petroleum and derivatives	5	5,075.90 (6,334.82)	5,809.20 (7,222.20)	80.00	4	80.00	4
7. Information technology	15	276.89 (416.64)	1,155.40 (1,021.32)	40.00	6	33.33	5
8. Electronic equipment	25	282.38 (270.20)	1,074.28 (1,333.24)	40.00	10	40.00	10
9. Chemicals	25	370.01 (224.14)	1,155.40 (1,021.32)	40.00	10	36.00	9
10. Retail trade	25	959.50 (1,631.98)	5,040.24 (9,578.78)	56.00	14	48.00	12
Total	210	1,074.15 (995.12)	3,610.00 (6,259.93)	53.30	112	50.00	105

^a Figures in parentheses are standard deviations.

^b The 25 firms with the largest turnover in each sector were selected, except in information technology, electricity, and petroleum, in which all the firms in the database were included.

^c In millions of U.S. dollars.

70 percent of the responding firms, and the construction industry, under 40 percent.

Measures

Measurement of proactivity in business strategy. After considering the alternative ways of measuring strategy types suggested by Miles and Snow (1978; see Conant, Mokwa, and Varadarajan [1990] for a discussion of this issue), I opted for a multi-item scheme. The questionnaire on business strategy had 18 items: 6 on the entrepreneurial dimension, 4 on the engineering dimension, and 8 on the administrative dimension. On each question, respondents were asked to position their firms on a scale of 1 to 7 that was initially constructed so that low values matched a defender strategy and high values, a prospector strategy. I broke this pattern by inverting it for questions 3, 5, 6, 9, 13, 15, and 16, to avoid skewing the answers. Some sample items that measured business strategy proactivity are shown in the Appendix.

Verification of the hypothesis required rating business strategy proactivity. I did this by calculating the arithmetical mean of the ratings for the items, after eliminating two that displayed negative correlations with the total score. In each sector, a high score would indicate a high degree of proactivity on each dimension. Another study (Aragón-Correa, forthcoming) contains an in-depth examination of the validity and reliability of this procedure based on the conventions proposed by Churchill (1979). For that study, 32 management experts answered a questionnaire about some of the paradigmatic cases presented

in Miles and Snow (1978). I examined several aspects of the answers: first, internal consistency, involving not only calculation of the reliability of the linear combination of variables concerning the total construct (Nunnally, 1967) and Cronbach's alpha, but also a factor analysis conducted to detect dimensionality; second, predictive validity, assessing whether the scores differentiated known groups (correct classification by the K-means [McQueen, 1967] of four groups in 84.37 percent of the cases); and third, validity of convergence, with results obtained by applying the procedures of Shortell and Zajac (1990), which showed a correlation of .70 ($p < .002$). Reliability was proved by similar results from repeated measurement by different analysts. Neither my previous study nor the data from the present one confirmed the occurrence of the three dimensions proposed by Miles and Snow (1978). This finding is in line with the conclusions of Zahra and Pearce (1990).

The multi-industry sample used in the present study involved problems in interpreting the significance of similar strategic scores in different sectors (Ginsberg & Venkatraman, 1985: 429; Snow & Hambrick, 1980: 531). Hambrick (1983: 8) and Dess, Newport, and Rasheed (1993: 786–787) described such difficulties in detail. To overcome them without losing the advantages of using a multi-item rather than a nominal scheme (Conant et al., 1990: 379; Doty et al., 1993: 1239), I standardized the strategic proactivity scores in each sector. The standardized scores were more comparable between sectors in that they provided a relative indicator of proactivity (mea-

TABLE 2
Factor Loadings of Natural Environmental Management Items^a

Variable	Label	Factor 1: Information and Education	Factor 2: Traditional/ Regulated/ Correction	Factor 3: Modern/ Voluntary Prevention
V1	Sponsorship of natural environmental events	.39	.32	.38
V2	Use of natural environmental arguments in marketing	.32	.29	.40
V3	Natural environmental aspects in administrative work	.06	-.03	.80
V4	Periodic natural environmental audits	.73	.20	.13
V5	Residue recycling	.24	.69	.06
V6	Purchasing manual with ecological guidelines	.47	.56	.11
V7	Natural environmental seminars for executives	.79	.05	.33
V8	Natural environmental training for firm's employees	.75	.13	.32
V9	Total quality program with natural environmental aspects	.28	.32	.64
V10	Pollution damage insurance	-.03	.79	.15
V11	Natural environmental management manual for internal use	.52	.48	.31
V12	Filters and controls on emissions and discharges	.25	.73	.23
V13	Natural environmental analysis of product life cycle	.12	.47	.63
V14	Participation in government-subsidized natural environmental programs	.72	.17	-.06
	Eigenvalue	5.79	1.38	1.10
	Percentage of variance explained	41.41	9.90	7.88

^a Standardized "varimax" rotation was performed.

sured as a function of competitors' approaches) that helped to reduce the skewing caused by a different average situation in each sector.

Approaches to the natural environment. The natural environment questionnaire included 14 items on natural environment-related practices (Table 2). The variables used, which were identified through an extensive review of the literature and through consultation with experts in the area, were designed to cover the range of natural environmental approaches that a firm might adopt. Possible answers ranged from 0, for "We have not addressed this issue at all and have no plans to do so in the near future," to 7, for "We are the leaders on this in our sector." I standardized ratings by sector in the same way as the strategic proactivity ratings in order to render the natural environmental approaches of firms in different sectors comparable.

Control variables. Spanish regulations classified all the sample firms as large, but the fact that they varied in size suggested the need for a control for size. The size indicators used were annual turnover and number of employees. Data on financial performance might have been used to provide control variables and to indicate the soundness of the various fits between strategic type and environmental approach. Unfortunately, the financial data that were available were insufficient to include in the study.

ANALYSIS AND RESULTS

My first aim was to group the firms into several categories according to their positions on the natural environmental issues raised. The option preferred for this analysis was grouping based on strategic factors, or taxonomic grouping (Galbraith & Schendel, 1983).

Each firm's standardized scores on the 14 natural environmental practices defined in Table 2 were subjected to principal components analysis. I factor-analyzed the items to capture the correlations between them and analyze whether it was possible to reduce the number of environmental positioning variables. A standardized varimax rotation resulted in three significant factors (with eigenvalues greater than 1) that together explained a variance of 60 percent. Twelve of the variables exhibited factor loadings of $\pm .50$ or more on at least one factor; Dess and Davis (1984) regarded such a value as conservative. The high ratio of cases to variables (105 to 14) ensured the stability of factor loadings and supported the reliability and validity of the factor analysis results.

The factor analysis indicated that the 14 natural environmental practices could be grouped into three approaches. The variables with high loadings on approach 1 were V7 and V8 (natural environmental training for executives and for other personnel, respectively) and, to a lesser extent, V4 (natural environmental audits) and V14 (participation in

government-subsidized natural environmental programs). The key loadings on approach 2 were V10 (pollution damage insurance), V12 (discharge controls and filters), and V5 (residue recycling). Finally, the main influences on approach 3 were V3 (natural environmental aspects in administrative work), V9 (total quality program with natural environmental aspects), and V13 (product-life-cycle analyses). This discussion of factor loadings is useful for interpreting approaches, but it is not so relevant for obtaining factor scores on each case (firm) because factor scores are the weighted averages of values on all the original variables using factor score coefficients as weightings.

Given the above results, approach 1 relates to in-house natural environmental training and information (courses, manuals, and audits). Participation in government-subsidized natural environmental programs reflects the fact that, in Spain, 10 percent of such programs have been devoted to training workers about the natural environment. Approach 2 relates to traditional natural environmental methods generally subject to public regulations (insurance, filters, residue recycling). Approach 3 relates to modern voluntary and preventive improvements (natural environmental programs in offices, total quality programs, and product-life-cycle analyses). I therefore placed greater emphasis on those variables with higher loadings and assigned each approach a name that reflected as accurately as possible what the several variables pertaining to it represented. Approach 1 was labeled "information and education," ap-

proach 2, "traditional/regulated correction," and approach 3, "modern/voluntary prevention."

The scores of all the firms on these three natural environmental approaches were then calculated and subjected to cluster analysis. Because the combination of proximity scores and methods is liable to produce a great variety of results in cluster analyses, it was desirable to apply a number of procedures for comparing the results (Dillon & Goldstein, 1984: 205–206). I obtained the final results by applying the nonhierarchical procedure known as K-means (McQueen, 1967), with the number of groups to be adopted defined in the light of the results of two different hierarchical procedures (Hair, Anderson, & Tatham, 1987: 237) and on the basis of the five categories defined by Roome (1992). These procedures are based on Euclidean distance measurements.

Table 3 shows the number of cases in each group and their mean scores and standard deviations on each of the three approaches identified in Table 2. Variance analysis of the scores showed highly significant values on all three approaches ($p < .001$). After identifying the firms that related to each natural environmental configuration, I calculated the mean score on strategic proactivity in each group. The average annual turnover and number of employees of the firms in each group were also calculated, and values appear in Table 3.

An *F*-test (analysis of variance [ANOVA] with "pairwise" comparisons) showed that the mean

TABLE 3
Natural Environmental Clusters^a

Variable	G1: Environmental Excellence Category		G2: Leading Edge Category		G3: Compliance Category		G4: Compliance-Plus Category		G5: Noncompliance Category	
Information and education	-0.60	(0.77)	-0.02	(0.52)	-0.85	(0.63)	1.10	(0.60)	0.62	(0.75)
Traditional/regulated correction	-0.98	(0.71)	0.58	(0.65)	0.54	(0.74)	0.33	(0.66)	-0.76	(0.96)
Modern/voluntary prevention	0.41	(0.67)	1.06	(0.49)	-0.73	(0.65)	-0.02	(0.37)	-1.32	(0.55)
Annual turnover ^b	385.06	(319.62)	1,267.01	(1,656.16)	913.71	(1,951.60)	1,522.83	(1,951.60)	1,893.61	(4,306.90)
Employees	1,542.16	(1,432.20)	4,713.81	(5,756.38)	4,242.40	(6,756.95)	5,517.70	(5,326.33)	4,582.07	(7,231.10)
Business strategy proactivity	-0.01	(1.00)	0.20	(0.87)	0.04	(1.00)	0.06	(0.99)	-0.47	(0.94)
Differences in business strategy proactivity										
1. Environmental excellence category			0.16		0.16		0.86		1.81 [†]	
2. Leading edge category					0.14		0.48		4.54 [*]	
3. Compliance category							0.07		2.78 [†]	
4. Compliance plus category									2.16 [†]	
5. Noncompliance category										
Number of cases	24		22		20		20		13	

^a Figures in parentheses are standard deviations.

^b In millions of U.S. dollars.

[†] $p < .10$

^{*} $p < .05$

proactivity of the firms in group 5 was significantly lower than that in the other four groups (ranging from $p < .03$ to $p < .1$), with no significant differences in proactivity among the latter. The ANOVA included annual turnover and number of employees as covariates.

Group 4 was significantly more advanced than the others on information and education, followed by group 5 and then by group 2, which took an intermediate position, and finally by groups 1 and 3 (there was no significant difference between these two). The ranking by firm size followed a very similar order, since groups 5 and 4 included the largest firms, group 2, the medium-sized ones, and groups 3 and 1, the smallest.

The situation on the traditional/regulated correction and the modern/voluntary prevention approaches was rather different. The leading group was group 2, comprising firms clearly more advanced than their competitors (particularly in modern/voluntary prevention aspects). Group 4 came next, with high traditional/regulated correction and intermediate modern/voluntary prevention ratings, followed by group 3 (highly rated on traditional/regulated correction but poorly rated on modern/voluntary prevention) and group 1 (the opposite situation). Group 5, with low values on both factors, had the worst natural environmental position. Ranking by average proactivity showed that the most proactive group was group 2, followed by groups 4 and 3; group 1 was rather unproactive, and group 5 was the least proactive (there were no significant differences in proactivity among groups 1, 2, 3, and 4).

Table 4 shows the linear correlations between the scores of all the firms on the three natural environmental approaches and their proactivity, annual turnover, and number of employees. The proactivity correlation was positive and significant with respect to the scores on traditional/regulated cor-

rection and modern/voluntary prevention. There were also positive and significant correlations between information and education and annual turnover and number of employees and between number of employees and a traditional approach.

The correlations themselves did not provide a usable analysis of the relationship between business proactivity and each of the three approaches to the natural environment, because control for the effect of company size was absent. I therefore supplemented the correlational analysis by carrying out three regression analyses. The dependent variable in each was a natural environmental approach, with the assumption being that such approaches were not likely to influence business strategy. Table 5 shows regression results. Model 1 includes the control variable. In view of the lack of correlation between the values of the three natural environmental factors, the values considered as control variables were size indicators; however, the only control variable used was number of employees, so the multicollinearity problems likely to be caused by the high degree of correlation between this variable and annual turnover were avoided. Number of employees was a significant predictor of information and education and of traditional/regulated correction. Model 2 tested Hypothesis 1 by including a direct effect for business strategy proactivity. Table 5 shows that the regression coefficients for strategic proactivity were positive and statistically significant on traditional/regulated correction and modern/voluntary prevention. The increase in the equation's R^2 was modest but comparable to levels obtained in other studies about environmental management (e.g., Russo & Fouts, 1997). As with the addition of business strategy proactivity, the variance explained rose modestly but significantly, and the results show that although the contribution to explained variance in environmental approaches

TABLE 4
Descriptive Statistics and Correlations^a

Variable	Mean	s.d.	1	2	3	4	5
1. Information and education	-0.01	0.98					
2. Traditional/regulated correction	-0.03	0.99	-.00				
3. Modern/voluntary prevention	0.01	0.97	-.02	.00			
4. Annual turnover	1,115.79	2,070.33	.23*	.11	-.06		
5. Number of employees	3,994.70	5,518.83	.29**	.24*	-.04	.81***	
6. Business strategy proactivity	3.62	0.56	-.06	.16 [†]	.17*	.07	.04

^a $N = 99$.

^b In millions of U.S. dollars.

[†] $p < .10$

* $p < .05$

** $p < .01$

*** $p < .001$

TABLE 5
Results of Regression Analysis of the Relationship between Business Strategy Proactivity and Firms' Natural Environmental Dimensions^a

Variable	Information and Education		Traditional/Regulated Correction		Modern/Voluntary Prevention	
	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2
Control variable: Number of employees	.29**	.29**	.24*	.23*	-.04	-.05
Independent variable: Business strategy proactivity		-.07		.15 [†]		.17*
R^2	.08	.09	.05	.08	.00	.03
ΔR^2		.01		.03		.03
F for ΔR^2		4.86**		4.25*		2.96 [†]

^a $N = 99$. Significance levels are based on two-tailed tests (F s for ΔR^2 are one-tailed).

[†] $p < .10$

* $p < .05$

** $p < .01$

*** $p < .001$

was modest, higher strategic proactivity was associated with the development of traditional/regulated and modern/voluntary environmental approaches.

DISCUSSION

Business Strategy and Approaches to the Natural Environment: General Conclusions

Findings can be grouped in terms of (1) the three approaches to the natural environment derived from the factor analysis, (2) the five firm postures based on these three approaches, and (3) the relationship between business strategy and each approach.

The approaches identified confirm the traditional distinction between corrective and preventive measures that has usually been accepted in the literature on the natural environment (e.g., Cairncross, 1991; Evan, 1988; North, 1992; Russo & Fouts, 1997). Corrective measures, also known as end-of-pipe solutions, relate to the traditional/regulated correction approach. Preventive measures, which have points in common with advanced preventive and operational techniques such as total quality management, relate to the modern/voluntary prevention approach. The factor analysis showed that the two types of approaches had different characteristics, resulting in specific organizational implications and requirements. Future work on the issue should therefore establish the natural environmental development of firms in terms of the two types of approaches.

The results also proved the occurrence of the information and education approach. Some authors have indicated the importance of proper consider-

ation of the variables covered by this factor to the achievement of natural environmental progress (Beaumont, 1992: 190–202; Ledgerwood, Street, & Therivel, 1992: 152–153; Sadgrove, 1993: 267). Yet no natural environmental typology has ever used this factor as such. The high degree of correlation between its scoring and the size of the firms analyzed and the fact that a larger or smaller amount of natural environmental training can be associated with different levels of corporate performance in relation to the natural environment (planning initial measures, improving existing programs, profound and systematic changes) made it difficult to interpret firms' ratings on the information and education approach. Besides, particular features of the sample may also have played a part in the occurrence and magnitude of these ratings. It should be noted that the Spanish government was subsidizing up to 100 percent of firms' investments in programs of natural environmental training or sensitization for their personnel. All this suggests that a high information and education score does not necessarily mean that a firm is more advanced in its posture toward the natural environment, unlike high traditional/regulated correction and modern/voluntary prevention scores.

The clusters show the usefulness of the typology of natural environmental postures proposed by Roome (1992), although firms' natural environmental development cannot be fully described in terms of just one dimension, as Roome suggested. The absolute minimum is two factors, one for measuring the positions of groups on traditional approaches, the other for measuring their positions on modern ones. Intermediate categories can be described particularly well on this basis.

Group 2 of the sample exhibited high values on the traditional/regulated correction approach and very high values on modern/voluntary prevention, and it matched the leading edge category proposed by Roome (the most advanced category). Group 1 showed little evidence of attention to the corrective measures covered by the traditional/regulated correction approach but plenty of development of systematic modern procedures (modern/voluntary prevention), and was thus comparable to the natural environmental excellence category.

Group 3 was similar to the compliance category, presenting satisfactory performance on the traditional/regulated correction approach but little development of the modern/voluntary prevention approach. Group 4 differed from group 3 in exhibiting some development of voluntary measures, as in the compliance-plus posture. Group 5 had low values on both approaches and approximated the noncompliance posture.

A further remark is that standardization by sector of the items on natural environmental practices resulted in a number of groups that included firms with similar levels of development in terms of the natural environment. The groups exhibited no sectorial peculiarities (there were no significant differences in the numbers of firms from different sectors), and the standardizations applied show the relationship between some proactive business strategies (relative to sector averages) and some advanced natural environmental approaches (relative to the sector's usual ones).

The results of the regression analyses on the natural environmental approaches were very interesting from a strategic point of view. There turned out to be a significant relationship between firms' strategic proactivity and their natural environmental development relative to others in their sector. This relationship applied both to the development of the natural environmental approaches most closely associated with traditional measures (corrective and regulated) and to those relating to modern ones (preventive and voluntary). Within the sample, this relationship showed up most clearly in the fact that the proactivity of the least developed group was significantly lower than that of the others. Large size also had an impact on the extent to which traditional approaches were used.

Results thus support the hypothesis formulated for the study. The relationship between firms' business strategies and their approaches to the natural environment point to a useful way of integrating natural environmental issues into the organizational literature. The positive effects of proactivity on the development of natural environmental approaches (both preventive and corrective) define a

new area of possible competitive advantage. This competitive advantage will result from consistency among strategic proactivity, approach to the natural environment, and other organizational characteristics (such as contextual, structural, and strategic factors). An extension of this research could be an assessment of whether a rising average level of natural environmental development by sector affects the nature of this relationship. If it does, proactive firms might be in the lead on preventive measures, and defensive firms might be the most advanced on certain traditional measures.

The extent of natural environmental training in the sample firms seemed to relate primarily to potential resources, with large firms having more resources than smaller ones. The larger firms in the sample even seemed to find it easier to take advantage of government funding for such training. As the amount of natural environmental training may be associated with the more or less developed natural environmental position of a particular firm, the lack of correlation between this parameter and proactivity cannot be regarded as conflicting with the hypothesis posed. Assessing the exact role of natural environmental training would require specific in-depth research.

Limitations

Interpretation of the results presented is subject to a number of limitations. First is that the nature of the present sample makes it difficult to generalize the results. Most of the sampled firms were large, and it is possible that fewer responses were received from those with less developed natural environmental postures. Although this possibility did not prevent verification of the hypothesis formulated, the relativity of the positions of the firms analyzed needs emphasizing. Their positions were defined with respect to the others surveyed in the same sector. The small number of usable responses per sector means that the results cannot describe the situation in every sector but are valid for verifying the generalizing potential of the relationship proposed. The problem of heterogeneity was partly solved by standardization.

A second limitation to be considered is the risk involved in converting verbal classification scales into interval scales (Martilla & Carvey, 1975). The procedure adopted follows the usual practice of treating classification scales as interval scales, so they were used as the basis for computing means and standard deviations (Kinnear & Taylor, 1987). This is the conventional procedure Seltiz, Jahoda, Deutsch, and Cook (1959: 367-368) described for using Likert scales.

The problem of common method variance should not have been significant here for these reasons: (1) Each of the two questionnaires delivered to the CEOs was independent (a separate set of pages) and, typically, a firm's CEO answered the strategy questionnaire and the person responsible for natural environmental matters answered the natural environment questionnaire. (2) It is unlikely that respondents were able to give answers according to an intentional pattern, since the information was processed into indexes and factors.

Finally, as previously mentioned, data on the financial performance of firms were not available. Several studies have shown significant links between measures of environmental performance and profitability (e.g., Russo & Fouts, 1997). Further research is required to study the impact of the relationship discussed on this variable, because level of strategic proactivity could moderate the relationship between firms' environmental performance and profitability.

The empirical evidence reported here may provide a stimulus for the study of relationships between the natural environment and business. The value of this potential is enhanced by the incipient and yet already significant attention being paid to the issues raised.

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APPENDIX

Some Sample Items Measuring Business Strategy Proactivity

For each item, respondents positioned their firms on a 1–7 scale anchored by the responses given here.

The field within which the firm currently conducts its business is:

Narrow (related areas with prospect of change) 1 2 3 4 5 6 7 Broad (diversified and continuing to develop)

The main focus of concern in relation to the firm's technological process is:

Having cost-efficient technologies 1 2 3 4 5 6 7 Having flexible and innovative technologies.

Planning in the firm is:

Tremendously rigorous and predetermined 1 2 3 4 5 6 7 Tremendously open, impossible to complete before acting