

Article

Assessment of the Impact of Business Activity in Sustainability Terms. Empirical Confirmation of its Determination in Spanish Companies

María Luisa Pajuelo Moreno

Financial Economy and Accounting Department, Faculty of Business and Tourism Studies, University of Extremadura, Avenida de la Universidad, s/n, 06071, Cáceres, Extremadura, Spain;

E-Mail: mpajmor@unex.es

Received: 30 March 2013; in revised form: 27 April 2013 / Accepted: 15 May 2013 /

Published: 31 May 2013

Abstract: Because the issue of sustainability presents urgent problems crucial to the future of mankind, there has been serious discussion of the role accounting should play. In this context, a new line of research, still at a relatively unexplored, embryonic stage, has arisen, which tries to establish measurement of business sustainability and so compensate for the lack of information currently existing about the net impact of the company's activity. Full Cost Accounting could allow sustainability to be translated into the language of business, together with analysis and comparison of its progress, so it might be the most appropriate vehicle for more participatory, democratic accounting, with greater dialogue, giving the accountant a much more active role, this being necessary in order to generalize the research, development and use. To analyze the current situation, a survey of 192 Spanish companies was carried out to obtain at first hand the perception of strategic positioning adopted with regard to Sustainable Development, measurement of the contribution of business activity to its achievement and the rendering of accounts carried out.

Keywords: sustainable development; externalities; manager's perceptions; theoretical model; measuring sustainable development performance; environmental management accounting; full cost accounting; reporting; theoretical model

1. Introduction

While the nature and seriousness of the threat are not confirmed, there is a general awareness of deterioration in the planet's health [1], because, essentially, reputable scientific sources are in

agreement that we are faced with a cocktail of serious environmental problems, which do not respect the borders between countries. The Earth's ecosystems cannot sustain present levels of economic activity and consumption, and new management frameworks are necessary to alleviate this pressure and ensure social integrity [2].

In this context, because companies cause many environmental impacts and even catastrophes, society has begun to demand that they accept their responsibility, so driving the expansion of corporate responsibilities in social and environmental matters [3]. As a consequence, the legitimization described by Shocker & Sheti [4], has been proposed as an alternative to the profit model, and offers companies the opportunity to legitimate their behaviour and procedures in the eyes of society. So, by virtue of a "social contract" [5], companies begin to assume that, unless they want to see their survival threatened, they need to operate with a value system in accordance with that of the society in whose eyes they are being legitimated [6]. This will shape their strategies as well as one of the basic functions of Social and Environmental Accounting [7], such as the publication of social and environmental information [8].

So, no-one, *i.e.*, neither corporations, individuals (including managers and accountants), or governments [9,10], can stand aside given the legal and moral responsibility we have to our environment, because the environment provides resources and satisfaction to everyone, accumulates waste and supports life [11]. This awareness has been reflected in profound political, economic and social changes and in a call to action [12] in a global framework (even a binding one like the Kyoto Protocol).

In this context, if we accept the above, the limited traditional model becomes the "*new model of sustainability*", producing a necessary, radical reorientation of human relationships, and therefore, relationships of companies, with their environment, where Sustainable Development (hereafter SD) becomes the immediate goal, because, as Pearce *et al.* [13] identify, from a realistic point of view this is a pragmatic, practical response, allowing more radical reorientations to be sought later and undertaken as long-term goals.

Therefore, from both the anthropocentric and non-anthropocentric points of view, consensus recommends that the Earth's resources must be protected [14] to guarantee at a minimum, a "sustaining level of activity." Essentially, sustainability is the maintenance of at least a certain stock of resources such as natural habitats, fauna, water or air, and worldwide global sustainability should be attained [15]. In the business context, this means at a minimum that companies should not leave the environment worse than it was at the beginning of the accounting period ("maintaining the capital stock") [10,16]. It is, therefore, imperative that the impact of their activity be measured, because companies may have positive indicators of success in the shape of growth and profits, while at the same time they pollute the air and water, fire employees, destroy habitats and devastate communities [17]. To carry out this measurement and provide the decisive answers to the environmental threat, it will be necessary to influence economic decision making and involve accounting [18]. So if this need is accepted, there are two interrelated premises:

- (a). *Conventional accounting is inadequate*: Traditional accounting practices are deficient because they do not include sustainability quantitatively, a situation which has endured because of its capitalist orientation, business focus, confidence in neoclassical economics, the predominance of numerical quantification, monetary dependence and various technical aspects of these

practices [17]. This has caused unsustainable decisions due to the existence of incorrect prices [19], or cost-saving opportunities to be missed because of lack of information [20] or aggregation in general expense accounts [21].

- (b). *Need for active, participatory, democratic, dialogic accounting*: The increase in research and development in Social and Environmental Accounting has developed internationally in parallel with the international debate about the phenomena of greenhouse gases, global warming, human rights, deforestation, land degradation and pollution [22]. Therefore we advocate a form of accounting which can give a suitable, up-to-date view of the world, models reality and can be a participant in company strategy as well as in the creation of its information systems, which cannot be separated from the company's internal and external social processes. For all these reasons, a proactive and participatory [23], multidimensional (integrating economic, social and environmental aspects) and dialogic (taking not only shareholders but also a wide variety of stakeholders into account) [24], and, therefore much more democratic and pluralist form of accounting needs to be developed. The goal will be the search for transparency and the discharge of accountability, which will be achieved by combining the functions of financial accounting, to guarantee that this form of accounting is minimally obligatory, and general accounting, to guarantee the necessary willingness to achieve "self-regulation", with flexibility.

- a.a.1. *External or obligatory accounting: financial accounting*: Because of this deficiency, and the disparity of criteria [25], heterogeneousness and lack of comparability of traditional accounting systems, numerous authors (e.g., [26,27]) and international organizations of various kinds have declared the need for this information to be included in annual accounts, as well progressive international harmonization (European, IASSB and FASB).

- a.a.2. *Internal or voluntary accounting: management accounting*: Because the traditional accounting system does not cover what is required [26,28], environmental management systems and environmental management accounting can provide the opportunity to adapt knowledge to new realities and increase the social utility of relationships between business and nature. This subdiscipline of management accounting will therefore cover both monetary and physical aspects, making it suitable for performing a huge variety of relevant functions in company management [29], one of which is measurement of the net impact of its activity, which has aroused great interest among managers [5,17,30,31]. In addition, it can provide different perspectives and indicators, the Full Cost Accounting (hereafter FCA) being a perfect tool for monetary measurement of the sustainability of an activity and the net social result.

It should not be forgotten that accounting and all its disciplines is essentially a field of applied research, so it is difficult to imagine such research without detailed examination of current practices [32]. Therefore, there is a need for new forms of participation in accounting, which is provided by administrative and management functions [24,26,33–37]. To achieve this, it is essential that managers help to develop and implement environmental management accounting and its different tools [38], which will integrate and seek sustainability through performance of these functions:

- (a). *Planning and decision making*: Information is not an end in itself, but rather its purpose is to be useful for planning and decision making (operative, tactical and strategic decisions) (FASB, 1991) in the field of environmental management [39].
- (b). *Rendering of accounts*: As Meadows *et al.* [40] remark, “Information is key to transformation.” For this reason, in recent years the rendering of sustainability accounts and transparency in Corporate Social Responsibility [41,42] has been developed and has spread rapidly in recent years, as companies have been required to act more coherently with SD and social and management accounting.

For this reason, empirical analysis was carried out using the survey method. In this way, although most studies have focused on analysis of the environmental information published in the companies, annual reports, in recent decades, study of the role of accounting as a support for environmental management has also been empirically analyzed [43], and mainly covers the following subjects:

- *The links existing between accounting and environmental management.*
- *Management accounting system elements used in environmental management.*
- *The active role of accounting in the organizational change related with interaction with society and the introduction of environmental management practices.*
- *Definition of Environmental Management Accounting and information about its current practices.*

From these studies, it can be concluded that the traditional accounting model, with its narrow focus on accounting figures, does not adequately capture the consequences of the company’s activities on the environment. Consequently, there has been a recent increase in the number of studies proposing different *models to try to assess the contribution of business activity to Sustainable Development* (hereafter SD) (for example, [9,10,14,16,17,19,44–62], which highlight the need for more critical reflection about the consideration and internalization of external factors.

It should not be forgotten that accounting and all its disciplines is essentially a field of applied research, so it is difficult to imagine such research without detailed examination of current practices [32]. As a result, after the previous literature had been developed, empirical analysis was carried out using the survey method.

With the aim of contributing towards this recent line of research, this analysis has been carried out on a survey sent to Spanish companies in sectors whose activity has an important impact on the environment, where it is hoped to establish the determinants of business sustainability strategy, reporting and measurement. The reason for this study was the fact that the literature considers the effects of legislation and specific experiments [63] (in sustainability research, innovation and experiments are not very common in academic work [64]) but not the perception of the main stakeholders in the integration of sustainability in business management, culture and philosophy, *i.e.*, the managers. After presenting the main results, we end with a series of conclusions.

2. Previous Literature

2.1. Strategic Positioning With Regard to Sustainability Development

Three groups of variables used in the literature have been taken into account in order to try to establish groups of differentiating environmental behavior [10,64–66]:

- (1). *The responsibility towards the environment shown by the company*: It is not an easy task to define companies' environmental behavior or characterize it as environmentally proactive [67]. The work of authors like Hunt & Auster [68], Roome [69], Winsemius & Guntram [70], Sadgrove [71] or Vastag *et al.* [72], shows how the response of companies to these demands varies significantly from one to another, there being a range of behaviors running from a reactive attitude to external pressure to another more proactive one involving willingness to integrate the impacts of the company's economic activity on the environment, with different intermediate tactics [66]. Because of this, the pressure of legislation [10,65,73–75], and the moral responsibility [76] assumed are considered determinant factors in environmental strategy.
- (2). *Environmental commitment*: Most empirical research considers and concludes that environmental proactivity is greater with increased implementation of an extensive series of environmental practices, introduced coherently so that, in relation with other decisions, they shape environmental strategy and commitment [64,65,77–79].
- (3). *Managers' perception of the impacts the company's activity has*: Although this perception has not been found significant in some studies [10], there are many which conclude that management's environmental perception, attitude and commitment affect environmental responsibility and the level of integration in the business philosophy [66,77,80–83], occurring at different strategic levels according to this perception [84,85], because it corresponds to management leading this change [86].

Given the theoretical proposition of the search for sustainable development as an immediate aim, three new variables are included which we think identify current environmental behavior:

- (1). *The corporate strategy applied by the company*: The influence of the environment on the company's future is clear, and the need for its integration in strategic planning has been analyzed in depth [79,87–94]. For example, Epstein & Roy [75] identify strategic differentiation and cost strategy as determinants of greater and less proactivity, respectively. Based on the literature, we propose encouragement of more advanced environmental positions starting from innovative, proactive strategies (this is the conclusion of Aragón-Correa [64] from a sample of 105 large Spanish companies, and Sharma & Vredenburg [79], from a study of 99 Canadian gas and oil companies).
- (2). *The position of the Head of Environmental Management*: Authors like Banerjee *et al.* [81] highlight the naming of an environment manager as the main reflection of greater commitment. Moroncini [95] also concludes that, unless there is an environmental policy of inaction, the existence of an environment department is necessary and required for proper implementation. In the same way, its hierarchical position also affects the importance and ambiguity of the environmental information issued [96].

- (3). *Matters related with achievement of Sustainable Development*: Because of the pressure exerted by interest groups [65,97,98], three different dimensions were integrated in the company [13,90]: fairness (intergenerational and intragenerational), the environment (natural resources) and future trajectory (long-term decisions). So SD is considered indispensable to achieve sustainable competitive advantages over time [87], based on real environmental commitments [99].

2.2. Measurement of the Sustainability of Business Activity

It could be argued that SD is the unifying element or regulatory ideal used to motivate and integrate social, environmental and ethical concerns in companies' social responsibility and social and environmental accounting. With this approach, the extent to which the company is contributing towards the achievement of SD needs to be determined, which is where the accountant has a crucial role [100], needing to develop new environmental accounting tools and systems (see Cost-Benefit Analysis (e.g., Almansa & Calatrava [101]; Bromley [102]; Goulder & Kennedy [103]; Brower & Vanek [104]; Pearce & Turner [90]; Sagoff [105]; Navrud [106]; Neumayer [107]; Lind [108]; Vatn & Bromley [109]; Life Cycle Costing (e.g., Baumann & Cowell [110]; Bennett & James [111,112]; Clift & Bourke [113]; Gauthier [23]; Spitzer *et al.* [114]; Sterner [115]; Curran [116]; Total Quality Management (e.g., Lämsiluoto & Järvenpää [117]; Balanced Scorecard (e.g., Choi & Gray [118]; Marrewijk & Were [119]; Schaltegger & Wagner [120]; Hopwood [121]; Lämsiluoto & Järvenpää [117]); use of indicators (Global Reporting Institute TM [122]; Lange [123]; Fowler & Hope [124]; Walter & Stützel [125]; Lamberton [126]; Jones & Matthews [127]; Jones [128]); Full Cost Accounting (e.g., Antheaune [53,54]; Baxter *et al.* [52]; Bebbington [129]; Bebbington *et al.* [130]; Bebbington *et al.* [19]; Boone & Rubinstein [50]; Figge & Hahn [55]; Frame & Cavanagh [62]; Griffiths [131]; Herborn [57]; Howes [51]; Rubenstein [48]; Taplin *et al.* [59]; Xing *et al.*, [61]).

However, although much has been said about SD performance, there are very few organizations making decisions and carrying out actions on the common basis of any SD assessment system, which means that empirical research is scarce.

In addition, SD is so “politically plastic” that it can be interpreted in very different ways and, as a result, very different actions established. This means that examination of sustainable performance from the accounting point of view is not very clear and is sometimes controversial and that research is therefore unstable and shifting over the still embryonic set of practices.

Immediate measures need to be promoted, such as more research where companies collaborate closely with academics, research institutes, environmental groups or government organizations, in all fields and all parts of the world, to produce international exchanges of information and experience. This is why research into the different systems of monetary and non-monetary valuation needs to be encouraged, to achieve a broad consensus, which does not currently exist, about the different accounting tools involved, both in measurement of the activity's sustainability and in the subsequent publication of results (Table 1).

Table 1. Different environmental management accounting tools. 9. (Fuente: [132].)

	Definiciones/Descripciones	Categoría de Costes
Full Cost Accounting	Identify and quantify the full range of costs throughout the product life cycle, product line, process, service or activity	Identifies and quantifies (1) direct, (2) indirect and (3) intangible costs
Full Cost Environmental Accounting	It embodies the same concept as the FCA but emphasizes environmental elements	Variants
Total Cost Assessment	Long term financial analysis comprises the entire range of internal costs and investment savings	(1) Internal costs and savings
Total Cost Accounting	A term used as a synonym for either of the two definitions given for FCA or as synonymous with TCA	(1) conventional costs, (2) hidden costs, (3) liability costs, (4) less tangible costs
Life Cycle Accounting	The delimitation or specific cost analysis product within a life cycle framework	(1) common costs, (2) Hidden costs, (3) liability costs, (4) less tangible costs
Life Cycle Cost Assessment	A systematic process for evaluating life cycle costs of a product or service to identify the environmental consequences and assigning monetary value measures for those consequences. LCCA is a term that highlights the cost aspects of life cycle assessment (LCA)	Add information costs LCA
Life Cycle Costing	Summary of the total costs of a product, process or activity updated during its lifetime	Variants
Life Cycle Costing	A technique which allows to compare cost assessments that were made in a specific period of time, taking into account all economic factors both in terms of initial costs and future operational costs (ISO 15686)	Variants
Full Cost Pricing	A term used as a synonym for FCA or LCC (Spitzer <i>et al.</i> , 1993)	See FCA and LCC
Whole Life Costing	Term used synonymously with TCA (I) or LCC (Sternier, 2002). More specifically defined by Clift & Bourke (1999) as “the systematic consideration of all relevant costs and revenues associated with the acquisition and ownership of an asset”	(1) Initial costs and (2) operational costs

Of all of them, FCA is vaguely seen as a very important management tool [133,134], which has made it a common subject of discussion in academic and business circles [135,136]. We summarize its main advantages and drawbacks in Table 2 [9,16,17,19,137] that FCA could get to achieve if FCA investigate further information, thus making its development widespread for forms to be disclosed to make possible widespread comparison and understanding.

Table 2. FCA's main advantages and drawbacks. (Fuente: [10].)

ADVANTAGES	DRAWBACKS
It allows comparability between companies	Determination of the scope of the company's operations
It uses some concepts from traditional accounting and information about the current cost which, though not easy to obtain, is relatively honest	Get the information necessary for measurement and assessment of impacts
It translates sustainability into business language	The different assessment methods give a wide range of values
It helps to gain better knowledge of the company's operation and to change different ways of doing business which were taken for granted	Lack of company personnel training and knowledge for its introduction
It encourages companies' self-regulation and stimulates their proactivity to anticipate more demanding legal standards and regulations	Lack of incentives to its adoption
It demonstrates corporate commitment to SD and environmental matters	Ethical and moral questions
It relates all the company's actions, being reflected in the company's social benefit.	

It is therefore evident that it has the ability to provide accounting data or indicators to suggest which business activities were unsustainable [19], expressing sustainability in business language, monetary terms [9], making it a very useful tool for correct establishment of prices [19] or transfer rates.

In addition, by establishing a numerical value for sustainability, this will act like a radar by which the red light for the most polluting activities will be lit, which will help decision making and act as an indicator of where to focus attention to work for continuous improvement. In this context it would be like a kind of Activity Based Management (ABM), where activities which do not add value because their negative impact is greater than their positive impact from an economic, social and environmental point of view would be reduced and, so far as possible, eliminated.

However, the sign obtained in this result (net social profit or loss), has made companies reluctant to experiment with it and other measurement tools, due to fear of the foreseeable non-sustainability result and the negative impact on their reputation and image. We need to promote awareness that the costs generated by the FCA are not "real" in the sense that they need to be defrayed by the owners of the project [62], because unilateral assumption of these costs by companies would bring them unsupportable disadvantages. So we should encourage interest and experimentation because, as Bebbington & Gray [17] suggest, simply the whole process of working with a company to calculate its external benefits and costs can be more valuable than the financial datum obtained.

Even so, as Utne [35] points out, this monetary valuation can provide an important added value in a decision making context, by highlighting the economic importance of the situation of the systems, so becoming the best way to make decision makers and through them, the rest of society, aware of the value of conservation of the environment.

However, although these SD performance assessments can be carried out transparently and defensibly as can be seen from the literature, their application is difficult.

2.3. Publication of Social and Environmental Information: Rendering of Accounts

The degree of importance of information flow to the stakeholders will depend on the company's will to provide it, as well as the power the stakeholders have to demand it Gray *et al.* [35].

Based on the theoretical model presented, in order to identify any environmental problems and improvements, a sequential process needs to be followed consisting of applying a series of accounting techniques to measure the environmental performance, followed by auditing of the information obtained, after which accounts are rendered and the information reported to the stakeholders [29].

In this context, the concept of rendering sustainability accounts and Social Corporate Responsibility transparency has been swiftly developed and spread in recent decades [138], though revelation of sustainability, while becoming more important, it is still a relatively unexplored aspect of this [139]. Companies publish this kind of information not only to satisfy the needs of interest groups (stakeholder theory) [140–142], but also with the eventual goal of legitimation of their activities (legitimacy theory) [16,143–149]; to discharge the company's responsibility by presenting this social and environmental information voluntarily (accountability theory) [10,150]; because of institutional pressure (institutional sociology) [27,151,152]; to improve its reputation [153]; or the distribution of wealth and power to society (theory of political economics) [154–157].

Therefore, as Brown [24] indicates, there is a general recognition of the need for “new forms of rendering of accounts”, as well as new forms of participation, facilitating, as well as information, decision making by the groups affected by the company's activity [26,33–37], where the discursive importance of accounting is fundamental. Research into the form of dissemination of social and environmental assessments should be encouraged, and we will now attempt to consider this matter [22].

3. Results and Discussion

3.1. Study Design

To extend evidence of the innovation of these new management accounting systems beyond Britain, America and Scandinavia [158,159], a survey has been used, and distributed among the managers of the large Spanish companies (which report and integrate the Social Corporate Responsibility model to the greatest extent reported by Bhattacharya [160], Brundtland [161], Horváth & Partners [162], Bogsnes [163]), belonging to the sectors affected by the regulations of the Kyoto Protocol (Annex I to Directive 2003/87/CE), identified in the National Classification of Economic Activities 2009 (Royal Decree 475/2007) as electrical power, oil refining, coke plants, metallurgy, cement, glass, ceramic products and paper and cardboard manufacturing. After consultation of the SABI database, the questionnaire was supplied through a web site created for the purpose or sent by post to the 440 companies, which had been contacted by telephone to obtain their e-mail address or, failing this, postal address.

The purpose of this study being to test the theoretical model in order to find out about (i) strategic positioning with regard to SD; (ii) the introduction of and possibilities of experimentation with measurement of companies' sustainability, and, (iii) the publication of social and environmental information, in accordance with the study by Fernández & Larrinaga [10], the *design of the questionnaire* is divided into three different blocks. Most previous studies of the role of the

Environmental Management Accounting have mainly been carried out by mail questionnaires and focusing especially on companies in sectors with an important effect on the environment (such as chemicals, electricity, *etc.*) [164–168] and case studies [18,169–173]. It is also made up of a total of 15 questions, most using Likert scales from 1 (totally disagree) to 7 (totally agree) or dichotomic (YES/NO) questions (the values of which were changed into a 0–1 scale). It was subjected to a measurement scale reliability analysis, which returned a Cronbach's alpha of 0.963, which, being above 0.9 indicates excellent overall reliability of the measurement scale.

With regard to the *methods used*, the data series obtained was subjected to Harman's one-factor test to discount the existence of a single pattern on the variation caused by the existence of a single data source [10,174].

Univariate analysis was carried out on the frequency of the variables, and bivariate analysis was carried out using Pearson's *r* correlation coefficient to try to find out the relationships between the values of the variables in two's, so obtaining a host of correlations (positive and negative) which show a high degree of internal coherence of the replies obtained and the hypotheses posed.

Cluster analysis was carried out to determine groups of companies which are internally homogeneous with regard to strategic positioning in terms of the environment, but different from each other [10,64–66]. Non-hierarchical procedures were preferred for this purpose because they have two main advantages over hierarchical ones [10]: results are less susceptible to outliers and, by an iterative process, cases are progressively assigned to each group so that, in the final solution, the dispersion among the individuals in the same group is as low as possible while the difference between groups is maximum [174].

ANOVA or analysis of variance analysis was then carried out on each of the clusters obtained, followed by analysis of the *F* statistic to check whether the differences between groups of the variables chosen for the classification were significant and so identify whether they are really effective in characterization of the clusters. Also to check whether the variables used in the study to define the different clusters explain the probability of a company belonging to one group or another, various LOGIT analyses or logistic regressions were carried out.

Considering the results obtained with these techniques and in the previous literature, we proposed a series of hypothesis tests to verify them. In addition, the confidence intervals were calculated from the results in order to obtain the limits for each category or group identified within which the quantitative values of the variables fell.

3.2. Results

3.2.1. Response Rate

From the 440 companies comprising the population, 195 correct replies were received, making a response rate of 44.32%, which can be considered a fairly acceptable proportion. In addition, looking at the people who replied to the questionnaire, just as happened to Fernández & Larrinaga [10], we found that not all the respondents were the executive managers to whom the survey had been directed, but had a wide range of positions (we suppose this is because of time restraints). Furthermore, more important than this high response rate is the fact that a representative sample of the population was

obtained [10], with the companies which control the market or occupy the top places in terms of sales, market share, capital and number of employees in each sector. Nevertheless, the survey respondents belonged to management, although only 10.2% of them occupied the top position. The position of 8.2% of the survey respondents was Accounting and/or Administration Manager, and 47.2% were Environment Managers (compared with 22% for the previous authors).

3.2.2. Representation of the Sectors of Activity

By sector of activity, the replies obtained are related to the proportion of companies comprising the initial population of 440 companies, also being representative of the companies with most strategic capacity in each of the sectors analyzed. In this regard, the sector with the greatest specific weight, “*Energy Activities*”, in which are the various forms of electrical power activities, represent 53.3% of the final configuration of replies obtained, and oil refining represents 2.6%. The sectors which have less specific weight are: “*Industrial Minerals*” 18%, “*Metallurgy*” 16.9% and “*Other Activities*” (“*Paper Pulp, Paper and Cardboard*” and “*Chemicals*”) 9.2%.

3.2.3. Identification of Business Groups by Sustainable Environmental Behavior Adopted. Result of the Cluster Analysis

With the aim of establishing groups with differentiating environmental behavior, the first step was to apply non-hierarchical K-mean cluster analysis (Quick Cluster) to these variables: (1) hierarchical position of the Environment Manager (PRM); (2) business strategy (PE); (3) environmental commitment (PAS); (4) perception of the managers (PS); (5) legal and moral responsibility (PN); and, (6) aspects related to the achievement of SD (PDS). Four differentiated conglomerates were obtained as a result of the cluster analysis, the largest concentration of the 192 cases which were valid being in Cluster 3, which contains 48.96% of the companies comprising the study (Table 3).

Table 3. Cluster Quick results on environmental strategic positioning. Number of cases per cluster. (Source: Authors.)

Number of cases per cluster	
CLUSTER	Number of cases
1	34
2	23
3	94
4	41
Valid	192
Lost	3

Next, to establish the relationships between different variables and environmental behavior, the ANOVA results were examined. These results indicate that all the statistical variables used were significant to a confidence level of 95%, except PN_3 (environmental regulations must be complied with), PDS_3 (SD is mainly the responsibility of public administrations) and PDS_7 (SD is achieved in my company) (Table 4).

Table 4. Cluster Quick results on environmental strategic positioning: ANOVA.
(Source: Authors.)

Resultados del Quick Clúster: ANOVA						
VARIABLES	Conglomerado		Error		F	Sig.
	Media cuadrática	gl	Media cuadrática	gl		
REC_PRM	35.330	3	2.830	188	12.485	0.000
REC_PE	217.049	3	3.916	188	55.429	0.000
REC_PAS_1	2.520	3	0.119	188	21.239	0.000
REC_PAS_2	0.799	3	0.143	188	5.598	0.001
REC_PAS_3	2.878	3	0.129	188	22.377	0.000
REC_PAS_4	2.429	3	0.110	188	22.072	0.000
REC_PAS_5	0.115	3	0.014	188	8.274	0.000
REC_PAS_6	2.756	3	0.105	188	26.280	0.000
REC_PAS_7	1.008	3	0.034	188	29.375	0.000
REC_PAS_8	2.292	3	0.149	188	15.334	0.000
REC_PAS_9	0.961	3	0.092	188	10.406	0.000
REC_PAS_10	3.964	3	0.190	188	20.885	0.000
REC_PAS_11	1.924	3	0.220	188	8.748	0.000
REC_PAS_12	0.979	3	0.067	188	14.657	0.000
PS_1	75.281	3	1.676	188	44.910	0.000
PS_2	81.199	3	2.640	188	30.753	0.000
PN_1	25.272	3	1.995	188	12.670	0.000
PN_2	79.581	3	4.118	188	19.324	0.000
PN_3	1.402	3	1.164	188	1.205	0.309
PN_4	58.031	3	1.637	188	35.452	0.000
PN_5	33.066	3	0.706	188	46.827	0.000
PDS_1	29.785	3	1.231	188	24.192	0.000
PDS_2	51.102	3	1.204	188	42.442	0.000
PDS_3	1.192	3	1.531	188	0.779	0.507
PDS_4	8.623	3	2.061	188	4.185	0.007
PDS_5	11.708	3	0.586	188	19.988	0.000
PDS_6	16.374	3	0.976	188	16.775	0.000
PDS_7	3.147	3	1.598	188	1.969	0.120
PDS_8	19.174	3	1.062	188	18.052	0.000
PDS_9	45.345	3	1.886	188	24.039	0.000
PDS_10	11.933	3	1.169	188	10.211	0.000
PDS_11	14.091	3	2.069	188	6.809	0.000
PDS_12	19.694	3	2.832	188	6.953	0.000
PDS_13	11.469	3	1.139	188	10.066	0.000
PDS_14	12.579	3	1.111	188	11.321	0.000
PDS_15	13.194	3	0.736	188	17.932	0.000

This significance shows that all these variables contribute to the same extent towards the formation of the four strategic environmental positioning groups we have identified, which also means better determination of environmental positioning than in previous literature. This was significant even with

regard to the perception of managers of the environmental problem (PS) which was not significant in Fernández & Larrinaga [10], and the position of the environment manager, the general strategy followed by the company and aspects related with achieving SD, variables added to previous studies.. So we can conclude that the four groups obtained quantitatively were well discriminated, *i.e.*, they have different behavior from one another.

To corroborate this statement still further, we applied different ANOVA (Tables 5 and 6) and LOGIT (Table 6) analyses to all the variables analyzed in all the groups, both qualitative (data series obtained from the survey) and quantitative (data obtained from the SABI). Comparing the results of the two analyses, there is, in general, a great coincidence in the results obtained.

Table 5. Summary of the mean values for the significant variables for each of the different groups identified in the cluster analysis. (Source: Authors.)

ENVIRONMENTAL STRATEGY FACTORS		PROACTIVE	DEFENSIVE	LEADERSHIP	LEGALISTIC
STRATEGIC POSITIONING WITH REGARD TO SUSTAINABILITY DEVELOPMENT					
Predisposition of Management (PS)		7	3	4.50	4
RESPONSABILITY (PN)	Legal	7	4.70	6	6
	Moral	6.50	5	7	5.50
SPECIFIC INITIATIVES (PAS)	Administrative	0.75	0.58	0.92	0.82
	Analysis-Diagnostic	0.81	0.48	0.90	0.78
	Certification	0.69	0.28	0.81	0.53
ACHIEVING SUSTAINABLE DEVELOPMENT (PDS)	Imagen	6.67	5.33	5.67	5.33
	Responsability	5.86	4.70	5.57	5.40
	Changes Structure	6.50	5	6.50	6
	Internal processes	5	4	6	5
	Adverse attitude	2.50	3.50	3.50	3
DISCLOSURE SOCIAL AND ENVIRONMENTAL INFORMATION					
REASONS (DMO)		5.36	3.20	4.10	3.98
MEANS USED (DME)	Conventional	4.93	3.24	5.52	4.17
	Focus on the environment	5.20	2.52	5.40	3.36
	Alternatives	6	2.40	5.60	3.88
POSSITIVE EFFECTS (DPO)	Corporate Image	6.76	5.10	6.09	6.02
	Accountability	6.97	5.63	6.21	6.18
	Homogeneity	5.99	5.22	5.56	5.46
NEGATIVE EFFECTS (DPO)		2.38	3.58	3.81	2.96
ISSUES DISCLOSED	Known (DQC)	0.99	0.79	0.97	0.88
	Disclosed (DQI)	0.54	0.32	0.78	0.51
STAKEHOLDERS (DGI)	Regulators	6.76	3.21	5.43	4.34
	Lobbies	6.58	4.19	5.69	5.36
	Organizational	6.90	5.06	6.38	5.52
	Financial	6.81	3.67	5.29	4.53

Table 5. Cont.

ENVIRONMENTAL STRATEGY FACTORS		PROACTIVE	DEFENSIVE	LEADERSHIP	LEGALISTIC
MEASUREMENT OF COMPANY SUSTAINABILITY					
FCA (MI)	Implementation	0.06	0	0.33	0.18
	Interest	0.38	0.22	0.47	0.42
ENVIRONMENTAL IMPACTS (MIMA)	Signification	5.55	3.56	5.42	4.92
	Assessment	5.35	3.55	5.13	4.67
SOCIAL IMPACTS (MIES)	Signification	6.53	4.76	6.23	5.88
	Assessment	6.44	4.66	5.88	5.64
BENEFITS (MSPO)	Utility	5.36	4.16	5.48	5.05
	Availability	5.06	3.58	5	4.60
	Possibility	3.94	3.71	4.60	4.21
DIFFICULTIES (MSPO)	Assessment/Imputation	3.43	4.16	3.65	3.70
	Formation	4.65	4.83	4.36	4.47
	Financial aspects primacy	2.72	4.50	3.46	3.53
	Acceptance	2.85	3.90	3.49	3.47
	Inadecuacy	3.92	3.97	3.63	3.71
COMPANY CHARACTERISTICS					
Assets (mill. €)		2.62	99	1440	325
EBIT (mill. €)		117.5	1.70	51.98	11.6
Revenue (mill. €)		1074	71	1304	320
Number of employees		614	153	423	441
Liquidity		99	122	1456	165
Financial Strength		1.06	0.53	0.34	1.07
Debt Ratio		63	59	46	37
Incorporation Date		1997	1991	1988	1979
Stock Market Trading		2.9%	4.3%	6.4%	4.9%
Return On Investment		74.24%	1.21%	19.60%	12.99%
Type of corporation		Inc. (58.8%); Ltd. (41.2%)	Inc. (73.4%); Ltd. (17.4%)	Inc. (72.3%); Ltd. (27.4%)	Inc. (73.2%); Ltd. (24.4%)
Corporate Strategy (PE)		Excellence production process (55.9%); Customer focus (38.2%)	Product Leadership (30.9%); Cost Leadership (26.1%)	Competitive advantage (57.4%); Excellence production process (20.2%)	Product Leadership (43.9%); Customer focus (26.8%)
COMPANY CHARACTERISTICS					
Environment Manager (PRM)		Mid-level Management (58.8%) y High- level Management (38.2%)	Assistant Manager (47.8%); Department Director (21.7%)	Dirección (47.8%); Department High-level Management (28.7%)	Department Director (46.3%); Mid-Level Management (14.6%); Assistant Manager(14.6%)
TOTAL : 192		34 (17.7%)	23 (11.98%)	94 (48.96%)	41 (21.35%)

Table 6. Results of ANOVA analysis of the variables that were significant with a confidence level of 95% with respect to disclosure, sustainability measurement and quantitative characteristics or variables of each firms cluster. (Source: Authors.)

VARIABLES	CONGLOMERADO 1	CONGLOMERADO 2	CONGLOMERADO 3	CONGLOMERADO 4
DISCLOSURE SOCIAL AND ENVIRONMENTAL INFORMATION				
REASONS (DMO)	All significant except <i>DMO_1</i>	All significant except <i>DMO_1</i>	<i>DMO_2; DMO_5</i>	<i>DMO_5</i>
MEANS USED (DME)	All significant except <i>DME_1; DME_6;</i> <i>DME_11</i>	All significant	All significant except <i>DME_7</i>	All significant except <i>DME_4; DME_5</i>
POSSITIVE AND NEGATIVE EFFECTS (DPO)	All significant except <i>DPO_3</i>	All significant except <i>DPO_2; DPO_4</i>	<i>DPO_2; DPO_4;</i> <i>DPO_10</i>	<i>DPO_4; DPO_10</i>
SOCIAL AND ENVIRONMENTAL KNOWLEDGE (REC_DQC)	<i>REC_DQC_11 y</i> <i>REC_DQC_13</i>	All significant except <i>REC_DQC_1,</i> <i>REC_DQC_9;</i> <i>REC_DQC_10</i>	<i>REC_DQC_1;</i> <i>REC_DQC_5;</i> <i>REC_DQC_9;</i> <i>REC_DQC_11;</i> <i>REC_DQC_12;</i> <i>REC_DQC_13;</i> <i>REC_DQC_14</i>	<i>REC_DQC_1;</i> <i>REC_DQC_5;</i> <i>REC_DQC_7;</i> <i>REC_DQC_9;</i> <i>REC_DQC_10;</i> <i>REC_DQC_11;</i> <i>REC_DQC_13</i>
INFORMATION ON SOCIAL AND ENVIRONMENTAL ASPECTS (REC_DQI)	All significant except <i>REC_DQI_1;</i> <i>REC_DQI_2;</i> <i>REC_DQI_3;</i> <i>REC_DQI_11;</i> <i>REC_DQI_13</i>	All significant except <i>REC_DQI_14</i>	All significant	<i>REC_DQI_1;</i> <i>REC_DQI_2;</i> <i>REC_DQI_3;</i> <i>REC_DQI_10;</i> <i>REC_DQI_11;</i> <i>REC_DQI_13;</i> <i>REC_DQI_14</i>
STAKEHOLDERS (DGI)	All significant	All significant	<i>DGI_1; DGI_5; DGI_9;</i> <i>DGI_11</i>	<i>DGI_1; DGI_2; DGI_3;</i> <i>DGI_5; DGI_6; DGI_7;</i> <i>DGI_10; DGI_11</i>
MEASUREMENT OF COMPANY SUSTAINABILITY				
SIGNIFICANCE OF ENVIRONMENTAL IMPACTS (MIMA_S)	All significant except <i>MIMA_S2; MIMA_S3;</i> <i>MIMA_S5</i>	All significant except <i>MIMA_S4; MIMA_S5;</i> <i>IMA_S11</i>	All significant except <i>MIMA_S1; MIMA_S5;</i> <i>MIMA_S7; MIMA_S8</i>	All significant except <i>MIMA_S1; MIMA_S3;</i> <i>MIMA_S5</i>
QUANTIFICATION OF ENVIRONMENTAL IMPACTS (MIMA_V)	All significant except <i>MIMA_V2; MIMA_V3;</i> <i>MIMA_V4; MIMA_V5</i>	All significant except <i>MIMA_V4; MIMA_V5;</i> <i>MIMA_V10</i>	All significant except <i>MIMA_V5; MIMA_V7;</i> <i>MIMA_V8; MIMA_V9</i>	All significant except <i>MIMA_V5</i>
SIGNIFICANCE OF ECONOMIC AND SOCIAL IMPACTS (MIES_S)	All significant except <i>MIES_S3</i>	All significant except <i>MIES_S2</i>	All significant except <i>MIES_S2</i>	All significant
QUANTIFICATION OF ECONOMIC AND SOCIAL IMPACTS (MIES_V)	All significant except <i>MIES_V3</i>	All significant except <i>MIES_V2</i>	All significant except <i>MIES_V1; MIES_V2;</i> <i>MIES_V6</i>	All significant
IMPLEMENTATION AND INTEREST OF FCA (MI)	<i>MI_1</i>	<i>MI_1; MI_2; MI_3</i>	<i>MI_1; MI_2</i>	<i>MI_1; MI_2</i>

Table 6. Cont.

VARIABLES	CONGLOMERADO 1	CONGLOMERADO 2	CONGLOMERADO 3	CONGLOMERADO 4
MEASUREMENT OF COMPANY SUSTAINABILITY				
POSSITIVE ASPECTS OF FCA (MSPO)	<i>MSPO_2; MSPO_3; MSPO_4; MSPO_5; MSPO_6 y MSPO_13</i>	All significant except <i>MSPO_6; MSPO_14; MSPO_15</i>	All significant except <i>MSPO_2; MSPO_3</i>	All significant except <i>MSPO_6</i>
DIFFICULTIES IN IMPLEMENTING THE FCA (MSDI)	All significant except <i>MSDI_1; MSDI_8; MSDI_10 y MSDI_14</i>	<i>MSDI_1; MSDI_6; MSDI_7</i>	<i>MSDI_1; MSDI_4</i>	<i>MSDI_3; MSDI_7</i>
COMPANY CHARACTERISTICS				
Company Characteristics	LEGAL FORM; SECTOR, WORKING CAPITAL, STRENGTH, LIQUIDITY, FINANCIAL PERFORMANCE, DATE OF INCORPORATION	AMORTIZATION; ACTIVE	AMORTIZATION; NUMBER OF EMPLOYEES	WORKING CAPITAL; STRENGTH; LIQUIDITY; DATE OF INCORPORATION; OPERATING INCOME

When the significant variables for the formation of the groups had been established from the results obtained in the analyses above, we determined the mean descriptive statistic for each, showing the different environmental strategic positioning followed by the companies being studied. If we group the values of these variables into factors, and enlarge the study to the sustainability measurement and dissemination part, the results are as shown in Tables 6 and 7, after which we will examine their features.

Table 7. Summary of the proposed logit model. (Source: Authors.)

VARIABLES	CONGLOMERADO 1	CONGLOMERADO 2	CONGLOMERADO 3	CONGLOMERADO 4
DISCLOSURE SOCIAL AND ENVIRONMENTAL INFORMATION				
REASONS (DMO)	$C_1 = \beta_0 + \beta_1 (DMO_2) + \beta_2 (DMO_5)$	$C_2 = \beta_1 (DMO_5)$	$C_3 = \beta_1 (DMO_3) + \beta_2 (DMO_5)$	$C_4 = \beta_1 (DMO_2)$
MEANS USED (DME)	$C_1 = \beta_1 (DME_1) + \beta_2 (DME_11)$	$C_2 = \beta_0 + \beta_1 (DME_10)$	$C_3 = \beta_0 + \beta_1 (DME_1) + \beta_2 (DME_4) + \beta_3 (DME_7) + \beta_4 (DME_10) + \beta_5 (DME_11)$	$C_4 = \beta_1 (DME_3) + \beta_2 (DME_4) + \beta_3 (DME_11)$
POSSITIVE AND NEGATIVE EFFECTS (DPO)	$C_1 = \beta_0 + \beta_1 (DPO_2) + \beta_2 (DPO_3) + \beta_3 (DPO_4) + \beta_4 (DPO_9)$	$C_2 = \beta_1 (DPO_1) + \beta_2 (DPO_2) + \beta_3 (DPO_3)$	$C_3 = \beta_1 (DPO_1) + \beta_2 (DPO_2) + \beta_3 (DPO_3) + \beta_4 (DPO_4) + \beta_5 (DPO_5) + \beta_6 (DPO_6) + \beta_7 (DPO_7) + \beta_9 (DPO_9)$	$C_4 = \beta_1 (DPO_3) + \beta_2 (DPO_4)$
SOCIAL AND ENVIRONMENTAL KNOWLEDGE (REC_DQC) AND INFORMATION ON SOCIAL AND ENVIRONMENTAL ASPECTS (REC_DQI)	-	-	$C_3 = \beta_1 (DQC_10) + \beta_2 (DQC_11) + \beta_3 (DQI_2) + \beta_4 (DQI_5) + \beta_5 (DQI_6) + \beta_6 (DQI_7)$	-

Table 7. Cont.

STAKEHOLDERS (DGI)	$C_1 = \beta_0 + \beta_1 (DGI_2) + \beta_2 (DGI_9) + \beta_3 (DGI_10)$	$C_2 = \beta_1 (DGI_1) + \beta_2 (DGI_2) + \beta_3 (DGI_3) + \beta_4 (DGI_4) + \beta_5 (DGI_5) + \beta_6 (DGI_6) + \beta_7 (DGI_8) + \beta_8 (DGI_9) + \beta_9 (DGI_11)$	$C_3 = \beta_1 (DGI_4) + \beta_2 (DGI_5) + \beta_3 (DGI_9)$	$C_4 = \beta_1 (DGI_2) + \beta_2 (DGI_5) + \beta_3 (DGI_7) + \beta_4 (DGI_9)$
MEASUREMENT OF COMPANY SUSTAINABILITY				
IMPLEMENTATION AND INTEREST OF FCA (MI)	$C_1 = \beta_0 + \beta_1 (MI_1) + \beta_2 (MI_4)$	$C_2 = \beta_1 (MI_3)$	$C_1 = \beta_1 (MI_2) + \beta_2 (MI_3) + \beta_3 (MI_4)$	-
SIGNIFICANCE OF ENVIRONMENTAL IMPACTS (MIMA_S) AND QUANTIFICATION OF ENVIRONMENTAL IMPACTS (MIMA_V)	-	$C_2 = \beta_0 + \beta_1 (MIMA_S6) + \beta_2 (MIMA_S10) + \beta_3 (MIMA_S11) + \beta_4 (MIMA_V4) + \beta_5 (MIMA_V11)$	$C_3 = \beta_0 + \beta_1 (MIMA_S2) + \beta_2 (MIMA_S8) + \beta_3 (MIMA_S9) + \beta_4 (MIMA_S10) + \beta_5 (MIMA_V8) + \beta_6 (MIMA_V9) + \beta_7 (MIMA_V9)$	$C_4 = \beta_1 (MIMA_S3) + \beta_2 (MIMA_S6) + \beta_3 (MIMA_S11) + \beta_4 (MIMA_V6) + \beta_5 (MIMA_V10)$
SIGNIFICANCE OF ECONOMIC AND SOCIAL IMPACTS (MIES_S) AND QUANTIFICATION OF ECONOMIC AND SOCIAL IMPACTS (MIES_V)	-	$C_2 = \beta_0$	$C_3 = \beta_0 + \beta_1 (MIES_S1) + \beta_2 (MIMA_S3) + \beta_3 (MIMA_V3)$	$C_4 = \beta_0$
POSSITIVE ASPECTS OF FCA (MSPO)	-	$C_2 = \beta_0 + \beta_1 (MSPO_4) + \beta_2 (MSPO_9) + \beta_3 (MSPO_13) + \beta_4 (MSPO_14)$	$C_3 = \beta_0 + \beta_1 (MSPO_1) + \beta_2 (MSPO_3) + \beta_3 (MSPO_4) + \beta_4 (MSPO_6) + \beta_5 (MSPO_8) + \beta_6 (MSPO_14) + \beta_7 (MSPO_19)$	$C_4 = \beta_1 (MSPO_1) + \beta_2 (MSPO_2) + \beta_3 (MSPO_5) + \beta_4 (MSPO_7) + \beta_5 (MSPO_8) + \beta_6 (MSPO_10) + \beta_7 (MSPO_14) + \beta_8 (MSPO_15) + \beta_9 (MSPO_19)$
DIFFICULTIES IN IMPLEMENTING THE FCA (MSDI)	-	$C_2 = \beta_0 + \beta_1 (MSDI_6) + \beta_2 (MSDI_7) + \beta_3 (MSDI_8)$	$C_3 = \beta_1 (MSDI_2) + \beta_2 (MSDI_4) + \beta_3 (MSDI_5) + \beta_4 (MSDI_7) + \beta_5 (MSDI_8) + \beta_6 (MSDI_9) + \beta_7 (MSDI_11) + \beta_8 (MSDI_13)$	$C_4 = \beta_1 (MSDI_1) + \beta_2 (MSDI_3) + \beta_3 (MSDI_5) + \beta_4 (MSDI_6)$
COMPANY CHARACTERISTICS				
Company Characteristics	REC (Recorded)	$C_1 = \beta_0 + \beta_1 (REC_LegalForm) + \beta_2 (REC_ActivitySector)$	-	-
	Z (Discretized)	$C_1 = \beta_0 + \beta_1 (Z_FinancialPerformance) + \beta_2 (Z_NumbEmployees)$	$C_2 = \beta_0 + \beta_1 (Z_Debt)$	$C_3 = \beta_1 (Z_WorkingCapital) + \beta_2 (Z_FinancialStrenght) + \beta_3 (Z_NumbEmployees) + \beta_4 (Z_Active)$
				$C_4 = \beta_1 (Z_WorkingCapital) + \beta_2 (Z_Deadlock) + \beta_3 (Z_EBIT) + \beta_4 (Z_ConstitutionDate) + \beta_5 (Z_OperatingIncome) + \beta_6 (Z_Active)$

Therefore, each cluster is defined by the following characteristics:

(1) Conglomerate 1: “Proactive Image”

- *Positioning with regard to SD:* Innovative/active strategies, with management commitment and the full assumption of legal and moral responsibilities. Even so, although they consider internal changes indispensable (structure and management), this predisposition does not materialize as environmental actions to the necessary degree and with the necessary coherency of action (mainly: environmental policy, environment manager is a high position, environmental protection manual or process and product life cycle analysis). This is why we have called this group “Proactive Image”, instead of proactive, because they seek SD in order to achieve good corporate image (reputation) and social approval (legitimacy).
- *Publication of social and environmental information:* By way of confirmation, this group has the highest results for all stakeholders as recipients of this information (especially locals, customers and ecologists) and with regard to the different means of publication (mainly sustainability and environmental reports, web sites, talks and presentations). However, especially on the fact that, in spite of knowing all the social and environmental impacts of their activities, this does not translate into subsequent rendering of accounts.
- *Measurement of company sustainability:* In spite of the proactivity shown by this group of companies in some of the variables used to determine environmental sustainability, this is the second least likely, after Conglomerate 2 (the least proactive), to have experience of FCA, indicating the increase in price of products and lack of personnel training as the main impediments to its implementation.
- *Company characteristics:* Most are constituted as limited companies, and 94.1% belong to the electricity sector. The environment manager has a management position in 97% of cases (average level 58.8%). They have the highest values in financial, organizational and strategic capacity: the lower proportion which is traded on the stock market consists of the most recently established ones.

(2) Conglomerate 2: Defensive

- *Positioning with regard to SD:* Defensive/non-innovative strategies, where the predisposition of management towards SD is negative, moral responsibility minimum, and the acceptance of legal responsibility neutral. In addition this group has the lowest values with regard to social and environmental initiatives undertaken *i.e.* essentially, publication of information, application for investment grants or the achievement of certification (none of these companies has EMAS certification and the average with ISO certificates is 57%)), also in the benefits brought by achievement of SD, however, the highest in the disadvantages. For these reasons, we call this strategy “Defensive”. Its positive aspect is that it attributes the highest value to worker training, generating good future expectations.
- *Publication of social and environmental information:* Less involvement in publication, shown in the lower values found when the following are considered: (i) the satisfaction of interest groups as a reason for publication (especially, regulators and financiers); (ii) use of different media (traditional, environmental or other alternatives); (iii) the benefits arising from rendering of accounts; (iv) the significance of and information about impacts caused.

- *Measurement of company sustainability:* Strategic passiveness is seen in the lack of experimentation with the use of means of sustainability assessment, in which they see few benefits and a lot of impediments to their introduction. In addition, they give the lowest values with regard to the significance and assessment of the three kinds of impact, especially environmental impact.
- *Company characteristics:* Strategies based on cost and product, where the head of environmental management does not have a management position. It consists of companies in most of the sectors analyzed. It has the lowest values for financial, organizational and strategic capacity.

(3) Conglomerate 3: Leadership (Innovation or Anticipatory)

- *Positioning with regard to SD:* These companies are: (i) *Innovative:* active, innovative business strategies, with the highest values for the introduction of social and environmental initiatives (administrative, studies and certification). They innovate in: full cost accounting (FCA); clean technology (importance attached to the need for investment aid or aid for technology to achieve SD); internal changes (structure, attitudes and values); (ii) *Proactive and anticipatory:* Predisposition to comply with legislation (although to a lesser extent than Conglomerate 1, perhaps, because of the generalized belief in this group that they do not have as much impact as other sectors), and even to anticipate and adopt greater commitment than legally required; (iii) *Leaders:* there is more homogeneous distribution over the sectors comprising this group of companies, it consists of the *leading* companies in each sector of activity. For this reason we have called it “Leadership”.
- *Publication of social and environmental information:* Main motivation for publication: to satisfy all stakeholders (mainly, customers and shareholders), using all available media for this purpose (mainly web site, talks and presentations). They consider the effects of this rendering of accounts to be very positive, though the fact that the values are less high than in Conglomerate 1 may be due to the fact that, in contrast to Conglomerate 1, this group of companies has the highest values with regard to the drawbacks of publishing this kind of information. In addition, like Conglomerate 1, the company knows all the impacts it causes, with the difference that in this conglomerate accounts are also rendered to a high degree, *i.e.*, although they consider it to have disadvantages, they render accounts about most of the economic, social and environmental impacts caused by their activities. This shows that they really seek transparency of information and the discharge of accountability.
- *Measurement of company sustainability:* They consider the significance and valuation of all impacts to be very important, so have the highest proportion of implementation, types of and interest in future experimentation with FCA, indicating its excessive complexity, the lack of suitability of the assessment methods and the lack of personnel training as the main impediments to this.
- *Company characteristics:* It comprises companies in all the sectors. In 47.9% of cases the head of environmental management has a management position (much less than Conglomerate 1). It has the largest proportion of stock-market traded companies. Together with Conglomerate 1, it has the highest values for financial, organizational and strategic capability.

(4) Conglomerate 4: Legalistic

- *Positioning with regard to SD:* Like Conglomerate 1, the perceived legal responsibility is high, and the greater the moral responsibility the higher it is. However, whereas in Conglomerate 1 there was complete predisposition, management here maintains a neutral position. This is why it has been called “Legalistic”. So in matters related to certification, it carries out numerous social and environmental initiatives (especially administrative and diagnostic).
- *Publication of social and environmental information:* With regard to social and environmental aspects, awareness is lower than that of Conglomerates 1 and 3 but, nevertheless, rendering of accounts with regard to them is almost the same as Conglomerate 1 (theoretically more proactive and predisposed), which reinforces nominations imposed. So all stakeholders are targets for this information (mainly town and city councils, insurance companies and, to a lesser extent, investment funds).
- *Measurement of company sustainability:* After Conglomerate 3, it has the highest values for implementation of and interest in FCA, generating good expectations of future experimentation with sustainability measuring tools. The main difficulties found here are also excessive complexity, lack of suitability of the assessment tools and lack of personnel training, in this case the lack of incentives and management support being the least impediment, as a result of their declared neutrality.
- *Company characteristics:* With highly diverse activities, this conglomerate has the lowest figures after Conglomerate 2 for some indicators reflecting the availability of resources (financial, organizational, *etc.*) of these companies (this is not the case for financial profitability (ROI), soundness or debt ratio), which are, on average, the oldest.

There are two aspects common to all the conglomerates with regard to measurement of sustainability: (1) The possibility of comparing the sustainability of companies or sectors is considered its least important benefit; (2) They attribute greater significance and possible valuation to social and economic impacts, compared with environmental ones, the least significant and least value being the “social impact of products.” Both these matters reflect companies’ reluctance to *motu proprio* commitment and suggest the need to propose a minimum level of compulsion to achieve global sustainability.

3.2.4. Results of the Hypothesis Testing

Based on the results of the empirical analysis and on the literature analyzed, we carried out different hypothesis tests to try to determine the discriminating elements for the strategic positioning adopted by companies in relation to SD. Table 8 shows the elements which were shown to be significant and directly determinant for that positioning.

4. Conclusions

SD has become the most pragmatic, popular way to seek global sustainability mainly because more extreme positions are not socially, economically or politically acceptable, and to the fact that it includes a broad umbrella of options allowing its interpretation in very different ways as the possible result of very different actions.

Table 8. Determinants of strategic positioning with regard to Sustainability Development.

STRATEGIC POSITIONING WITH REGARD TO SUSTAINABLE DEVELOPMENT	
Aspects related with the strategy adopted with regard to SUSTAINABILITY DEVELOPMENT	
✓	Proactivity and strategic innovation (results similar to Aragón-Correa [64], Sharma & Vredenburg [79], Bhargava & Welford [87], Shrivastava [88], Shrivastava [89], Guimarães & Liska [90], Hart [91], Judge & Douglas [92], Porter & van der Linde [93], Walley & Whitehead [94], Epstein & Roy [175]).
✓	High hierarchical position of the head of environmental management.
✓	Predisposition of management (results similar to Estes [46], Aragón-Correa, García & Hurtado [77], Bansal & Roth [80], Banerjee, Iyer & Kashyap [81], Murillo <i>et al.</i> [82], Menon & Menon [83], Banerjee [84], Schendel & Hofer [85]).
✓	Responsibility (legal y moral) to the environment shown by the company (results similar to Fernández & Larrinaga [10], Aragón-Correa [64], Hunt & Auster [68], Roome [69], Sadgrove [71], Vastag, Kerekes & Rondinelli [72], Gladwin [73], Yip [74], Epstein & Roy [75], Likierman [76], Bansal & Roth [80], Murillo, Garcés & Rivera [82], Pettigrew, Woodman & Cameron [175], Volberda & Elfring [176], Whittington [177], Whittington, Pettigrew & Thomas [178], Schaefer & Harvey [179]).
✓	Effective striving towards Sustainability Development.
✓	Environmental commitment (<i>measured through the introduction of coherent initiatives at all strategic levels</i>) (Results similar to: [64,77–79].)
Publication of social and environmental information	
✓	Effective striving to improve reputation, legitimacy and stakeholder satisfaction.
✓	Use of specific, traditional and alternative means.
✓	Effects of publication, both positive (image, discharge of accountability) and negative (misinterpretation or the source of claims, costs or contingencies).
✓	Knowledge and the need to render accounts.
✓	Pressure from interest groups related with the business activity.
Measurement of business sustainability	
✓	Introduction of and interest in experimentation with business sustainability measurement tools.
✓	Significance and possibilities of assessment of impacts caused.
✓	Effects of measurement of sustainability, both positive (utility, availability and possibility) and negative (individual assessment and attribution, predominance of financial criteria and lack of approval and adaptation).
Company characteristics	
✓	<i>Type of Corporation.</i>
✓	<i>Sector of Activity</i> (results similar to Banerjee, Iyer & Kashyap [81], Roberts [141], Bravo, Fraj & Mature [180], Hackston & Milne [181], Jaffe & Stavins [182]).
✓	<i>Stock Market Trading</i> (results similar to Feldman, Soyka & Ameer [183]).
✓	<i>Financial capabilities of the company, represented by: Return on Investment, Working Capital, Financial Strength, Liquidity, EBIT, Operating Revenue or Debt Ratio</i> (results similar to Klassen & McLaughlin [78], Judge & Douglas [92], Porter & van der Linde [93], Ullmann [140], Aza [184], Cormier & Gordon [185], Delaney & Huselid [186], Guerra [187], Hart & Ahuja [188], Russo & Fouts [189], Margolis & James [190], Youndt, Snell, Dean & Lepak [191]).
✓	<i>Age of the company, represented by: Amortization and Incorporation Date</i> (results similar to Ullmann [140], Roberts [141], Cochran & Wood [192]).
✓	<i>Size, represented by: Assets and number of employees</i> (results similar to Aragón-Correa [64], Klassen & McLaughlin [78], Sharma & Vredenburg [79], Russo & Fouts [189], Sharma & Henriques [193]).

In this context, analysis of 192 large Spanish companies belonging to sectors constrained by the Kyoto Protocol returned us four, highly differentiated strategies with regard to SD, which run from (a) defensive or reactive strategies, where introduction of social and environmental measures is low key because of a negative predisposition towards environmental protection; to (b) legalistic strategies, simply involving scrupulous compliance with legislation, considered as above the moral responsibility of the company; (c) proactive image strategies, in which, although there is a high perception of and commitment to SD, the actions carried out are especially intended to promote the company's image and reputation; and (d) leadership strategies, in which the behavior is of leadership and anticipation and where transparency together with discharge of accountability become really effective, and the

company renders accounts of practically the economic, social and environmental impacts (positive and negative) it causes. We have found that adoption of greater strategic proactivity is directly related with greater:

- Publication of social and environmental information.
- Involvement in achievement and measurement of the company's contribution to SD.
- Impact of business activity.
- Strategic innovation and proactivity.
- Financial, organizational and strategic capabilities of the company and greater public exposure.

We have found that, there is a great deal of talk about the need to measure the “SD result” or determine the “sustenance level of the activity,” or to render accounts based on transparency and discharge accountability. Therefore, immediate measures should be taken in all fields, because: (i) there has not been much practical application, mainly because of companies' reluctance to declare the non-sustainability of their activities, with the consequent effect on their image and reputation, and (ii) empirical accounting research has been insufficient, sporadic and unconnected, because, based on such a “politically plastic” concept, it needs to play a far more active, participatory and dialogic role, even turning researchers into (co) creators of a kind of accounting which deals with understanding. This means that it needs to be developed by experts with experience of this subject, in a limited number of companies which are receptive to the idea.

Acknowledgements

I would like to thank D. Antonio Fernández Fernández contributions made to this research. I would also like to acknowledge the suggestions made by two anonymous reviewers. All of them have substantially improved this paper.

Conflict of Interest

The author declares no conflict of interest.

References

1. PNUMA. Programa de las Naciones Unidas para el Medioambiente: Perspectivas del Medioambiente Mundial GEO4 Medioambiente para el Desarrollo. Documento en línea. 2007. Available online: <http://www.pnuma.org/> (accessed on 10 February 2013).
2. Wackernagel, M.; Rees, W.E. *Our Ecological Footprint: Reducing Human Impact on the Earth*; New Society Publishers: Philadelphia, PA, USA, 1995.
3. Nieto, M.; Fernández, R. Responsabilidad Social Corporativa: La última innovación en management. *Univ. Business Rev. Actualidad Económica* **2004**, 28–39.
4. Shocker, A.D.; Sethi, S.P. An approach to developing societal preferences in developing corporate action strategies. *Calif. Manag. Rev.* **1973**, 97–105.
5. O'Donovan, G. Environmental disclosures in the annual report: extending the applicability and predictive power of legitimacy theory. *Account. Audit. Account. J.* **2002**, 15, 344–371.

6. Husillos, F.J. Una aproximación desde la teoría de la legitimidad a la información medioambiental revelada por las empresas españolas cotizadas. *Rev. Esp. Financ. Contab.* **2007**, *36*, 97–121.
7. Gray, R.; Kouhy, R.; Lavers, S. Corporate social and environmental reporting: A review of the literature and a longitudinal study of UK disclosure. *Account. Audit. Account. J.* **1995**, *8*, 44–77.
8. Lindblom, C.K. The Implications of Organizational Legitimacy for Corporate Social Performance and Disclosure. In Proceedings of the Critical Perspectives on Accounting Conference, New York, NY, USA, 13–15 June 1994.
9. Bebbington, J.; Thomson, I. *RR48: Business Conceptions of Sustainability and the Implications for Accountancy*; Certified Accountants Educational Trust: London, UK, 2001.
10. Fernández, M.; Larrinaga, C. Percepciones sobre Contabilidad de Costes Ecológicos Completos: Análisis empírico en el sector energético español. *Rev. Esp. Financ. Contab.* **2006**, *131*, 225–254.
11. Pearce, D.W. The limits of cost benefit analysis as a guide to environmental policy. *Kyklos* **1976**, *29*, 97–112.
12. Goldsmith, E.; Allen, R.; Allaby, M.; Davoll, J.; Lawrence, S. *A Blueprint for Survival*; Penguin: London, UK, 1972.
13. Pearce, D.; Markandya, A.; Barbier, E.B. *Blueprint for a Green Economy*; Earthscan Publications Ltd.: London, UK, 1989.
14. Jones, M.J. Social and environmental report assurance: Some interview evidence. *Account. Forum* **2010**, *34*, 20–31.
15. Turner, R.K. Sustainable global features. Common interest, interdependency, complexity and global possibilities. *Futures* **1987**, 574–582.
16. Gray, R. Accounting and environmentalism: An exploration of the challenge of gently accounting for accountability, transparency and sustainability. *Account. Organ. Soc.* **1992**, *17*, 399–425.
17. Bebbington, J.; Gray, R. An Account of Sustainability: Failure, Success and a Reconceptualisation. *Crit. Perspect. Account.* **2001**, *12*, 557–605.
18. Larrinaga, C.; Bebbington, J. Accounting change or institutional appropriation?—A case study of the implementation of Environmental Accounting. *Crit. Perspect. Account.* **1991**, *12*, 269–292.
19. Bebbington, J.; Gray, R.; Hibbitt, C.; Kirk, E. *Full Cost Accounting: An Agenda for Action*; Certified Accountants Educational Trust: London, UK, 2001.
20. Jasch, C. *Environmental Management Accounting Procedures and Principles*. Available online: <http://www.env.go.jp/policy/kaikei/sympo/04.pdf> (accessed on 10 February 2013).
21. Savage, G.T.; Nix, T.W.; Whitehead, C.J.; Blair, J.D. Strategies for assessing and managing organisational stakeholders. *Acad. Manag. Exec.* **1991**, *5*, 61–75.
22. Parker, L.D. Twenty one years of social and environmental accountability research: A coming of age. *Account. Forum* **2011**, *35*, 1–10.
23. Gray, R.H. *Accounting for the Environment*; Paul Chapman Publishing: Londres, UK, 1993.
24. Brown, J. Democracy, sustainability and dialogic accounting technologies: Taking pluralism seriously. *Crit. Perspect. Account.* **2009**, *20*, 313–342.
25. Silva, S.D.; Aibar, B. La Regulación Contable Medioambiental: Análisis comparativo entre Portugal y España. *Polytech. Stud. Rev.* **2007**, *6*, 253–290.

26. Gray, R.H. The social accounting Project and Accounting Organizations and Society: Privileging engagement, imaginings, new accounting and pragmatismo ver critique? *Account. Organ. Soc.* **2002**, *27*, 687–708.
27. Larrinaga, C.; Carrasco, F.; Correa, C.; Llena, F.; Moneva, J.M. Accountability and accounting regulation: The case of Spanish environmental disclosure standard. *Eur. Account. Rev.* **2002**, *11*, 723–740.
28. Atkinson, G. Measuring corporate sustainability. *J. Environ. Plan. Manag.* **2000**, *43*, 235–252.
29. Staniskis, J.K.; Stasiskiene, Z. Environmental Management Accounting in Lithuania: Exploratory study of current practices, opportunities and strategic intents. *J. Clean. Prod.* **2006**, *14*, 1252–1261.
30. Burrit, R.L.; Schaltegger, S. Eco-efficiency in corporate budgeting. *Environ. Manag. Health* **2001**, *12*, 158–174.
31. Burritt, R.L.; Saka, C. Environmental Management Accounting applications and eco-efficiency: case studies from Japan. *J. Clean. Prod.* **2006**, *14*, 1262–1275.
32. Ittner, C.D.; Larcker, D.F. Empirical managerial accounting research: Are we just describing management consulting practice? *Eur. Account. Rev.* **2002**, *11*, 787–794.
33. O'Dwyer, B. The construction of a social account: A case study of overseas aid agency. *Account. Organ. Soc.* **2005**, *30*, 279–296.
34. Boyce, G. Public discourse and decision making: Exploring possibilities for financial, social and environmental accounting. *Account. Audit. Account. J.* **2000**, *13*, 27–64.
35. Gray, R.; Dey, C.; Owen, D.; Evans, R.; Zadek, S. Struggling with the praxis of social accounting: Stakeholders, accountability, audits and procedures. *Account. Audit. Account. J.* **1997**, *10*, 45–60.
36. Morgan, D.L. *Focus Groups as Qualitative Research*; Sage: London, UK, 1988.
37. Mouck, T. Financial reporting, democracy and environmentalism: A critique of the commodification of information. *Crit. Perspect. Account.* **1995**, *6*, 535–553.
38. Starik, M.; Rands, G.P. Weaving an integrated web: Multilevel and multisystem perspectives of ecologically sustainable organizations. *Acad. Manag. Rev.* **1995**, *20*, 908–935.
39. United States Environmental Protection Agency (US EPA). *An Introduction to Environmental Accounting as a Business Management Tool: Key Concepts and Terms*; US EPA Office of Pollution Prevention and Toxics: Washington, DC, USA, 1995.
40. Meadows, D.H.; Meadows, D.L.; Randers, J. *Beyond the Limits: Global Collapse or a Sustainable Future*; Earthscan Publications Ltd.: London, UK, 1992.
41. Ballou, B.; Heitger, D.L.; Landes, C.E.; Adams, M. The future of corporate sustainability reporting. *J. Account.* **2006**, *202*, 65–74.
42. Milne, M.J.; Tregida, H.; Walton, S. Words not actions! The ideological role of sustainable development reporting. *Account. Audit. Account. J.* **2009**, *22*, 1211–1257.
43. Monteiro, S.; Aibar, B. Las prácticas de contabilidad medioambiental en las grandes empresas que operan en Portugal. *Rev. Iberoam. Contab. Gest.* **2009**, *13*, 1–16.
44. Linowes, D.F. Socio-economic accounting. *J. Account.* **1968**, *126*, 37–42.
45. Ramanathan, K.V. Toward a theory of corporate social accounting. *Account. Rev.* **1976**, *51*, 516–528.

46. Estes, R.W. Socio-economic accounting and external diseconomies. *Account. Rev.* **1976**, *47*, 284–290.
47. Milne, C. *Handbook of Environmental Law*; Royal Forest and Bird Protection Society: Wellington, FL, USA, 1992.
48. Rubenstein, D.B. *Environmental Accounting for the Sustainable Corporations: Strategies and Techniques*; Westport, CT: Quorum Books: London, UK, 1994.
49. Canadian Institute of Chartered Accountants (CICA). *La Comptabilisation du coût Complet du Point de vue de L'environnement*; CICA: Toronto, Canada, 1997.
50. Boone, J.; Rubentein, D.B. Natural solution: Full Cost Accounting can help companies to integrate environmental considerations into decision making. *CA Mag.* **1997**, *130*, 18–22.
51. Howes, R. *Environmental Cost Accounting: An Introduction and Practical Guide*; CIMA Publishing/Elsevier: London, UK, 2002.
52. Baxter, T.; Bebbington, J.; Cutteridge, D. Sustainability Assessment Model: Modeling Economic, Resource, Environmental and Social Flows of a Project. In *The Triple Bottom Line, does it All Add up?: Assessing the Sustainability of Business and CSR*; Henriques, A., Richardson, J., Eds.; Earthscan: London, UK, 2003.
53. Antheaume, N. Valuing external costs-From theory to practice: Implications for full cost environmental accounting. *Eur. Account. Rev.* **2004**, *13*, 443–464.
54. Antheaume, N. Full Cost Accounting: Adam Smith meets Rachel Carson? In *Sustainability Accounting and Accountability*; Unermann, J., O'Dwyer, B., Bebbington, J., Eds.; Routledge: London, UK, 2007.
55. Figge, F.; Hahn, T. Sustainable Value Added-Measuring Corporate contributions to sustainability beyond eco-efficiency. *Ecol. Econ.* **2004**, *48*, 173–187.
56. Gauthier, C. Measuring corporate social and environmental performance: The extended life-cycle assessment. *J. Business Ethics* **2005**, *59*, 199–206.
57. Herborn, K. A full cost environmental accounting experiment. *Account. Organ. Soc.* **2005**, *30*, 519–536.
58. Bebbington, J.; Macgregor, B. *Modelling and Accounting for Sustainable Development*; RICS Foundation: London, UK, 2005.
59. Taplin, J.R.D.; Bent, D.; Aeron-Thomas, D. Accounting for the social dimension of sustainability: Experiences from the biotechnology industry. *Business Strategy Environ.* **2006**, *15*, 347–360.
60. Bebbington, J.; Brown, J.; Frame, B.; Thomson, I. Theorizing engagement: The potential of a critical dialogic approach. *Account. Audit. Account. J.* **2007**, *20*, 356–381.
61. Xing, Y.; Horner, R.; El-Haram, M.; Bebbington, J. A framework model for assessing sustainability impacts of urban development. *Account. Forum* **2009**, *33*, 209–224.
62. Frame, B.; Cavanagh, J. Experiences of sustainability assessment: An awkward adolescence. *Account. Forum* **2009**, *33*, 195–208.
63. Gray, R. Is accounting for sustainability actually accounting for sustainability and how would we know? An exploration of narratives, of organisations and the planet. *Account. Organ. Soc.* **2009**, *34*, 47–62.

64. Aragón-Correa, J.A. Strategic proactivity and firm approach to the natural environment. *Acad. Manag. J.* **1998**, *41*, 556–567.
65. Henriques, I.; Sadorsky, P. The relationship between Environmental Commitment and Managerial Perceptions of Stakeholders Importance. *Acad. Manag. J.* **1999**, *42*, 87–99.
66. Álvarez, M.J.; de Burgos, J.; Céspedes, J.J. Un análisis exploratorio de las estrategias medioambientales y el contexto organizativo de los hoteles españoles. *Cuad. Econ. Dir. Empresa* **2001**, *8*, 5–32.
67. Illinich, A.; D’aveni, R.; Lewin, A. New organizational forms and strategies for managing in hypercompetitive environments. *Organ. Sci.* **1996**, *7*, 211–220.
68. Hunt, C.B.; Auster, E.R. Proactive environmental management: Avoiding the toxic trap. *Sloan Manag. Rev.* **1990**, *31*, 7–18.
69. Roome, N. Developing environmental management strategies. *Business Strategy Environ.* **1992**, *1*, 11–24.
70. Winsemius, P.; Guntram, U. Responding to the environmental challenge. *Business Horizons* **1992**, *35*, 12–20.
71. Sadgrove, K. *The Green Manager’s Handbook*; Gower Pub. Co: Aldershot, UK, 1993.
72. Vastag, G.; Kerekes, S.; Rondinelli, D.A. Evaluation of corporate environmental management approaches: A framework and application. *Int. J. Prod. Econ.* **1996**, *43*, 193–211.
73. Gladwin, T. The Meaning of Greening: A Plea for Organizational Theory. In *Environmental Strategy for Industries: International Perspectives on Research Needs and Policy Implications*; Fischer, K., Schot, J., Eds.; Island Press: Washington, DC, USA, 1993; pp. 37–61.
74. Yip, G.S. Global strategy...in a world of nations? *Sloan Manag. Rev.* **1989**, *31*, 29–41.
75. Epstein, M.; Roy, M.J. Managing corporate environmental performance: A multinational perspective. *Eur. Manag. J.* **1998**, *16*, 284–296.
76. Likierman, A. *Rights and Obligations in Public Information*; University College Cardiff Press: Cardiff, UK, 1986.
77. Aragón-Correa, J.A.; García, V.J.; Hurtado, N.E. Un modelo explicativo de las estrategias medioambientales avanzadas para pequeñas y medianas empresas y su influencia en los resultados. *Cuad. Econ. Dir. Empresa* **2005**, *25*, 29–52.
78. Klassen, R.; McLaughlin, C. The impact of environmental management on firm performance. *Manag. Sci.* **1996**, *42*, 1199–1214.
79. Sharma, S.; Vredenburg, H. Proactive corporate environmental strategy and the development of competitively valuable organizational capabilities. *Strateg. Manag. J.* **1998**, *19*, 729–753.
80. Bansal, P.; Roth, K. Why companies go green: A model of ecological responsiveness. *Acad. Manag. J.* **2000**, *43*, 717–736.
81. Banerjee, S.B.; Iyer, E.S.; Kashyap, R.K. Corporate environmentalism: Antecedents and influence of industry type. *J. Market.* **2003**, *67*, 106–122.
82. Murillo, J.L.; Garcés, C.; Rivera, P. Estrategia empresarial y medioambiente: Opinión de un grupo de expertos. *Univ. Business Rev. Actual. Econ.* **2004**, *4*, 52–63.
83. Menon, A.; Menon, A. Enviropreneurial marketing strategy: The emergence of corporate environmentalism as market strategy. *J. Market.* **1997**, *61*, 51–67.

84. Banerjee, S.B. Managerial perceptions of corporate environmentalism: Interpretations from industry and strategic implications for organizations. *J. Manag. Stud.* **2001**, *38*, 489–513.
85. Schendel, D.; Hofer, C. *Strategic Management: A New View of Business Policy and Planning*; Little Brown: Boston, MA, USA, 1979.
86. Gonzalo, P. Comunicación interna: Hacia un nuevo diálogo con los profesionales. *Harv. Deusto Business Rev.* **2004**, *10*, 54–59.
87. Bhargava, S.; Welford, R. *Corporate Environmental Management*; Earthscan Publications Ltd.: London, UK, 1996.
88. Shrivastava, P. The role of corporations achieving ecological sustainability. *Acad. Manag. Rev.* **1995**, *20*, 936–960.
89. Shrivastava, P. Environmental technologies and competitive advantage. *Strateg. Manag. J.* **1995**, *16*, 183–200.
90. Guimarães, T.; Liska, K. Exploring the business benefits of environmental stewardship. *Business Strategy Environ.* **1995**, *4*, 9–22.
91. Hart, S.L. A natural-resource-based view of the firm. *Acad. Manag. Rev.* **1995**, *20*, 986–1014.
92. Judge, W.D.; Douglas, T.J. Performance implications of incorporating natural environmental issues into the strategic planning process: An empirical assessment. *J. Manag. Stud.* **1998**, *35*, 241–262.
93. Porter, M.C.; van der Linde, C. Toward a new conception of environment-competitiveness relationship. *J. Econ. Perspect.* **1995**, *9*, 97–118.
94. Walley, N.; Whitehead, B. Its not easy being green. *Harv. Business Rev.* **1994**, *72*, 46–52.
95. Moroncini, A. *Strategie Environnementale des Entreprises*; Presses polytechniques et universitaires romandes: Lausanne, Switzerland, 1998.
96. Fineman, S. Constructing the green manager. *Br. J. Manag.* **1997**, *8*, 31–38.
97. Buysse, K.; Verbeke, A. Proactive environmental strategies: A stakeholders management perspective. *Strateg. Manag. J.* **2002**, *24*, 453–470.
98. Freeman, R. *Strategic Management: A Stakeholder Approach*; Pitman Publishing: London, UK, 1984.
99. Welford, R.J. *Cases in Environmental Management and Business Strategy*; Rtman Publishing: London, UK, 1994.
100. Association of Chartered Certified Accountants (ACCA). *Accounting Sustainability Briefing Paper 5*; KPMG: London, UK, 2005.
101. Almansa, C.; Calatrava, J. Reconciling sustainability and discounting in Cost-Benefit Analysis: A methodological proposal. *Ecol. Econ.* **2007**, *60*, 712–725.
102. Bromley, D.B. The ideology of efficiency: Searching for a theory of policy analysis. *J. Environ. Econ. Manag.* **1990**, *19*, 86–107.
103. Goulder, L.H.; Kennedy, D. Valuing Ecosystem Services: Philosophical Bases and Empirical Methods. In *Nature's Services: Societal Dependence on Natural Ecosystems*; Daily, G.C., Ed.; Island Press: Washington, DC, USA, 1997.
104. Brower, R.; Vanek, R. Integrated ecological, economic and social impact assessment of alternative flood control policies in the Netherlands. *Ecol. Econ.* **2004**, *50*, 1–21.
105. Sagoff, M. Review of Property Rights and Eminent Domain. *Environmental Ethics* **1989**, *11*, 179–189.

106. Navrud, S. *Pricing the European Environment*; Scandinavian University Press: Oslo, Norway, 1992.
107. Neumayer, E. The ISEW- not an index of sustainable economic welfare. *Soc. Indic. Res.* **1999**, *48*, 77–101.
108. Lind, R.C. *Discounting for Time and Risk in Energy Policy*; John Hopkins University Press: Baltimore, MD, USA, 1982.
109. Vatn, A.; Bromley, D. Choices without prices without apologies. *J. Environ. Econ. Manag.* **1994**, *26*, 129–148.
110. Baumann, H.; Cowell, S. An evaluative framework for conceptual and analytical approaches used in environmental management. *Greener Manag. Int.* **1999**, *26*, 109–122.
111. Bennet, M.; James, P. Environment-related management accounting: Current practice and future trends. *Greener Manag. Int.* **1997**, *17*, 32–51.
112. Bennet, M.; James, P. Making environmental management count: Baxter International's environmental financial statement. *Greener Manag. Int.* **1997**, *17*, 114–127.
113. Clift, M.; Bourke, K. Study on Whole Life Costing Report Prepared for DETR; Report Number CR 366/98; Construction Research Communications Ltd.: Watford, UK, 1999.
114. Spitzer, M.; Elwood, H. *An Introduction to Environmental Accounting as a Business Management Tool: Key Concepts and Terms*; EPA: Washington, DC, USA, 1995.
115. Sterner, T. *Policy Instruments for Environmental and Natural Resource Management*; Resources for the Future Press: Washington, DC, USA, 2002.
116. Curran, M.A. Life Cycle Assessment: A review of the methodology and its application to sustainability. *Curr. Opin. Chem. Eng.* **2013**, in press.
117. Lämsiluoto, A.; Järvenpää, M. Greening the Balanced Scorecard. *Business Horizons* **2010**, *5*, 385–395.
118. Choi, D.Y.; Gray, E.R. Socially responsible entrepreneurs: What do they do to create and build their companies? *Business Horizons* **2008**, *51*, 341–352.
119. Marrewijk, M.V.; Were, M. Multiple levels of corporate sustainability. *J. Business Ethics* **2002**, *44*, 107–119.
120. Schaltegger, S.; Wagner, M. Managing Sustainability Performance Measurement and Reporting in an Integrated Manner. Sustainability Accounting as the Link between the Sustainability Balanced Scorecard and Sustainability Reporting. In *Sustainability Accounting and Reporting*; Schaltegger, S., Bennett, M., Burritt, R., Eds.; Dordrecht: Springer, Germany, 2006; pp. 681–698.
121. Hopwood, A. Accounting and the environment. *Account. Organ. Soc.* **2009**, *34*, 433–439.
122. Global Reporting Initiative (GRI). Sustainability Reporting Guidelines. 2000. Available online: <http://www.globalreporting.org/> (accessed on 10 February 2013).
123. Lange, G.M. Environmental accounting: Introducing the SEEA-2003. *Ecol. Econ.* **2007**, *61*, 589–591.
124. Fowler, S.J.; Hope, C. A critical review of sustainable business indices and their impact. *J. Business Ethics* **2007**, *76*, 243–252.
125. Walter, C.; Stützel, H. A new method for assessing the sustainability of land-use systems (II): Evaluating impact indicators. *Ecol. Econ.* **2009**, *68*, 1288–1300.

126. Lamberton, G. Accounting for sustainable development—A case study of City Farm. *Crit. Perspect. Account.* **2000**, *11*, 583–605.
127. Jones, M.J.; Matthews, J. *Accounting for Biodiversity: A Natural Inventory of the Elan Valley Nature Reserve*; Certified Accountants Educational Trust, ACCA Occasional Research Paper, No.29; ACCA: London, UK, 2000.
128. Jones, M.J. Accounting for biodiversity: Operationalising environmental accounting. *Account. Audit. Account. J.* **2003**, *16*, 765–789.
129. Bebbington, J. Sustainability assessment modelling at BP. *Advances in Environmental Accounting*. In Proceedings of the ACCA/Environment Agency Seminar, London, UK, 31 May 2001.
130. Bebbington, J.; Brown, J.; Frame, B. Accounting technologies and sustainability assessment models. *Ecol. Econ.* **2007**, *61*, 224–236.
131. Griffiths, E. Environmental accounting in the construction industry. In Proceedings of the ACCA/Environment Agency Seminar, *Advances in Environmental Accounting*, London, UK, 31 May 2001.
132. Carroll, A.B. Corporate social responsibility. *Business Soc.* **1999**, *38*, 268–295.
133. Porter, M.; Kramer, M. Strategy and Society: The link between competitive advantage and Corporate Social Responsibility. *Harv. Business Rev.* **2006**, *12*, 78–92.
134. Crane, A.; Matten, D. *Business Ethics*, 2nd ed.; Oxford University Press: Oxford, NY, USA, 2007.
135. Joyner, B.E.; Payne, D. Evolution and Implementation: A study of values, business ethics and Corporate Social Responsibility. *J. Business Ethics* **2002**, *41*, 297–311.
136. Larrinaga, C. Consideraciones en torno a la relación entre la contabilidad y el medio ambiente. *Rev. Esp. Financ. Contab.* **1997**, *26*, 957–991.
137. Hedberg, C.J.; von Malmberg, F. The global reporting initiative and corporate sustainability reporting in Swedish companies. *Corp. Soc. Responsib. Environ. Manag.* **2003**, *10*, 153–164.
138. Joseph, C.; Taplin, R. The measurement of sustainability disclosure: Abundance versus occurrence. *Account. Forum* **2011**, *35*, 19–31.
139. Ullmann, A.A. Data in search of a theory: A critical examination of the relationships among social performance, social disclosure and economic performance of the U.S. firms. *Acad. Manag. Rev.* **1985**, *10*, 540–557.
140. Roberts, R.W. Determinants of corporate social responsibility disclosure. *Account. Organ. Soc.* **1992**, *17*, 595–612.
141. Cormier, D.; Gordon, I.; Magnan, M. Corporate environmental disclosure: Contrasting management's perceptions with reality. *J. Business Ethics* **2004**, *49*, 143–165.
142. Patten, D. Intra-industry environmental disclosures in response to the Alaskan oil spill: A note on legitimacy theory. *Account. Organ. Soc.* **1992**, *17*, 471–475.
143. Patten, D.M. Variability in social disclosure: A legitimacy-based analysis. *Adv. Public Interest Account.* **1995**, *6*, 273–285.
144. Patten, D.M. The accuracy of financial reports projections of future environmental capital expenditures: A research note. *Account. Organ. Soc.* **2005**, *30*, 457–468.
145. Deegan, C.; Rankin, M. Do Australian companies report environmental news objectively? An analysis of environmental disclosures by firms prosecuted successfully by Environmental Protection Authority. *Account. Audit. Account. J.* **1996**, *9*, 50–67.

146. Brown, N.; Deegan, C. The public disclosure of environmental performance information—a dual test of media agenda setting theory and legitimacy theory. *Account. Business Res.* **1998**, *29*, 21–41.
147. Deegan, C.; Rankin, M.; Voght, P. Firms’ disclosure reactions to major social incidents: Australian evidence. *Account. Forum* **2000**, *24*, 101–130.
148. Deegan, C.; Rankin, M.; Tobin, J. An examination of the corporate social and environmental disclosures of BHP from 1983–1997: A test of legitimacy theory. *Account. Audit. Account. J.* **2002**, *15*, 312–343.
149. Williams, S.M. Voluntary environmental and social accounting disclosure practices in the Asia-Pacific Region: An international empirical test of Political economy theory. *Int. J. Account.* **1999**, *34*, 209–238.
150. Owen, D.L. The need for environmental accounting standards. *Account. Forum* **1994**, *17*, 32–46.
151. Llena, F.; Moneva, J.M.; Hernandez, B. Environmental disclosures and compulsory accounting standards: The case of Spanish annual reports. *Business Strategy Environ.* **2007**, *16*, 50–63.
152. Bebbington, J.; Larrinaga, C.; Moneva, J.M. Legitimizing reputation/the reputation of legitimacy theory. *Account. Audit. Account. J.* **2008**, *21*, 371–374.
153. Cooper, D.J.; Sherer, M.J. The value of corporate accounting reports: Arguments for a political economy of accounting. *Account. Organ. Soc.* **1984**, *9*, 207–232.
154. Tinker, T.; Niemark, M. The role of annual reports in gender and class contradictions at General Motors. *Account. Organ. Soc.* **1987**, *12*, 71–88.
155. Lehman, C.; Tinker, T. The ‘real’ cultural significance of accounts. *Account. Organ. Soc.* **1987**, *12*, 503–522.
156. Tinker, A.M.; Lehman, C.; Neimark, M. Corporate Social Reporting: Falling down the hole in the middle of the road. *Account. Audit. Account. J.* **1991**, *4*, 28–54.
157. Malmi, T. Activity-based costing diffusion across organizations: An exploratory empirical analysis of Finnish firms. *Account. Organ. Soc.* **1999**, *24*, 649–672.
158. Ax, C.; Bjornenak, B. Bundling and diffusion of management accounting innovations – the case of the balanced scorecard in Sweden. *Manag. Account. Res.* **2005**, *16*, 1–20.
159. Bhattacharya, K. Tomorrow’s world. *Manag. Account.* **1990**, 32–33.
160. Comision Mundial del Medio Ambiente y Desarrollo (CMMAD). In *Nuestro Futuro Común*; Alianza Editorial: Madrid, España, 1987.
161. Horváth, P. *Dominar el Advance Budgeting: Cómo aplicar sistemas avanzados de presupuestación*; Barcelona: Ediciones Deusto, España, 2007.
162. Bogsnes, B. *Implementing Beyond Budgeting/Unlocking the Performance Potential*; Wiley & Sons: Washington, DC, USA, 2009.
163. Carrasco, F.; Larrinaga, C. Organizaciones, contabilidad y el entorno natural: Una perspectiva andaluza. *Rev. Esp. Financ. Contab.* **1995**, *24*, 393–416.
164. Shields, M. Research in Management Accounting by North Americans in the 1990’s. *J. Manag. Account. Res.* **1997**, *9*, 1–61.
165. Bouma, J.; Wolters, T. Environmental Management and Management Accounting: A survey among 84 European Companies. In *Eco-Management Accounting*; Bartolomeo, M., Bennet, M.,

- Bouma, J., Heydkamp, P., James, P., Walle, F., Wolters, T., Eds.; Kluwer Academic Publishers: Dordrecht, Holanda, 1999.
166. Bartolomeo, M.; Bennet, M.; Bouma, J.J.; Heydkamp, P.; James, P.; Wolters, T. Environmental Management Accounting in Europe: Current practice and future potential. *Eur. Account. Rev.* **2000**, *9*, 31–52.
167. Sarmiento, M.; Durão, D.; Duarte, M. Study of environmental sustainability: The case of Portuguese polluting industries. *Energy* **2005**, *30*, 1247–1257.
168. Ditz, D.; Ranganathan, J.; Banks, R. *Green Ledgers: Cases Studies in Corporate Environmental Accounting*; World Resources Institute: Washington, DC, USA, 1995.
169. Bouma, J.; Wolters, T. Developments in Eco-Management Accounting: An Analysis of the Case Studies. In *Eco-Management Accounting*; Bartolomeo, M., Bennet, M., Bouma, J., Heydkamp, P., James, P., Walle, F., Wolters, T., Eds.; Kluwer Academic Publishers: Dordrecht, Holanda, 1999.
170. Larrinaga, C.; Carrasco, F.; Correa, C.; Caro, F.J.; Páez, M.J. The role of environmental accounting in organizational change. An exploration of Spanish companies. *Account. Audit. Account. J.* **2001**, *14*, 213–239.
171. Albelda, E.; Correa, C.; Carrasco, F. Environmental management systems as an embedding mechanism: A research note. *Account. Audit. Account. J.* **2007**, *20*, 403–422.
172. Monteiro, S.; Aibar, B. Environmental disclosures in the annual reports of large companies in Portugal. *Soc. Environ. Account. J.* **2005**, *25*, 15–18.
173. Hair, J.F.; Andeson, R.E.; Tatham, R.L.; Black, W.C. *Análisis Multivariantes*, 5th ed.; Prentice Hall Iberia: Madrid, España, 1995.
174. Gluch, P.; Baumann, H. The life cycle costing (LCC) approach: a conceptual discussion of its usefulness for environmental decision-making. *Build Environ.* **2004**, *39*, 571–580.
175. Pettigrew, A.; Woodman, R.W.; Cameron, K.M. Studying organizational change and development: Challenges for future research. *Acad. Manag. J.* **2001**, *44*, 697–713.
176. Volberda, H.W.; Elfring, T. *Rethinking Strategy*; SAGE: London, UK, 2001.
177. Whittington, R. *What is Strategy, and does it Matter?* Cengage Learning, EMEA: London, UK, 2001.
178. Whittington, R.; Pettigrew, A.M.; Thomas, H. Conclusion: Doing More in Strategy Research. In *Handbook of Strategy and Management*; Pettigrew, A.M., Thomas, H., Whittington, R., Eds.; Sage Publications: London, UK, 2001; pp. 475–487.
179. Schaefer, A.; Harvey, B. Stage models of corporate greening: A critical evaluation. *Business Strategy Environ.* **1998**, *7*, 109–123.
180. Bravo, R.; Fraj, E.; Mature, V. La estrategia de “ecologismo de empresas” en el sector de bienes de consumo final. *Univ. Business Rev. Actual. Econ.* **2006**, *9*, 58–73.
181. Hackston, D.; Milne, M. Some determinants of social environmental disclosures in New Zealand companies. *Account. Audit. Account. J.* **1996**, *9*, 77–108.
182. Jaffe, A.B.; Stavins, R.N. Dinamic incentives of environmental regulations: The effects of alternative policy instruments on technology diffusion. *J. Environ. Econ. Manag.* **1995**, *29*, 43–63.
183. Feldman, S.L.; Soyka, P.A.; Ameer, P. Does improving a firms environmental management system and environmental performance result in a higher stock Price? *J. Invest.* **1997**, *6*, 87–97.
184. Aza, G.M. La ética en la actividad empresarial. *Esic Market* **1995**, *1*, 121–128.

185. Cormier, D.; Gordon, I. An examination of social and environmental reporting strategies. *Account. Audit. Account. J.* **2001**, *14*, 587–616.
186. Delaney, J.T.; Huselid, M.A. The impact of human resource management practices on perceptions of performance in for-profit and nonprofit organizations. *Acad. Manag. J.* **1996**, *39*, 949–969.
187. Guerra, R.M. La ética empresarial como teoría de la performance social de la empresa. *Esic Market* **1996**, *92*, 139–148.
188. Hart, S.; Ahuja, G. Does it pay to be green? An empirical examination of the relationship between emission reduction and firm performance. *Business Strategy Environ.* **1996**, *5*, 30–37.
189. Russo, M.V.; Fouts, P.A. A resource-base perspective on corporate environmental performance and profitability. *Acad. Manag. J.* **1997**, *40*, 534–559.
190. Margolis, J.D.; James, P.W. Social enterprise series No. 19 misery loves companies: Whither social initiatives by business? *Harv. Business Sch. Working Paper Ser.* **2001**, *1*, 1–58.
191. Youndt, M.A.; Snell, S.A.; Dean, J.W.; Lepak, D.P. Human resource management, manufacturing strategy, and firm performance. *Acad. Manag. J.* **1996**, *39*, 836–866.
192. Cochran, P.L.; Wood, R.A. Corporate social responsibility and financial performance. *Acad. Manag. J.* **1984**, *27*, 42–56.
193. Sharma, S.; Henriques, I. Stakeholder influences on sustainability practices in the canadian forest products industry. *Strateg. Manag. J.* **2005**, *26*, 159–180.

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