

**THE INFLUENCE OF PRO-ENVIRONMENTAL MANAGERS' PERSONAL  
VALUES ON ENVIRONMENTAL DISCLOSURE: THE MEDIATING ROLE  
OF THE ENVIRONMENTAL ORGANIZATIONAL STRUCTURE**

<https://doi.org/10.1108/SAMPJ-01-2018-0016>

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**Abstract**

**Purpose** –The purpose of this paper is to examine in greater depth the influence of internal factors on the disclosure of environmental information by companies. The influence of pro-environmental managers' personal values on environmental disclosure quality is analyzed and the extent to which the influence of those values is mediated by the practices associated with the environmental organizational structure of the company.

**Design/methodology/approach** –The authors use a partial least squares structural equation model to analyze the relationship between the quality of the environmental information disclosed by 137 environmentally sensitive Spanish firms, their level of commitment towards the environment and the personal values of the directors in charge of those reports.

**Findings** –A central finding of this work is that a positive relationship between the pro-environmental managers' personal values and environmental disclosure quality is fully mediated by the environmental organizational structures of their companies.

**Practical implications** – A better understanding of the relationship between the personal values of managers and corporate environmental reporting quality will contribute to the

design of policies that can enhance firm transparency and accountability, for example, by educating future managers in sustainability values.

**Social implications** –Light is cast on the mechanisms that can enhance corporate transparency and accountability in relation to environmental matters.

**Originality/value** –In this paper, a quantitative study of the internal driving forces of environmental disclosure is conducted, an aspect that has often been ignored in the literature on quantitative voluntary social reporting. The merit of this approach is its contribution to the literature through the analysis of the reasons why powerful actors within firms could (or could not) develop corporate social reporting practices.

**Key Words:** Mediation analysis, Corporate environmental disclosure, Environmental organizational structure, Managers' personal values

## 1. INTRODUCTION.

Previous literature on social accounting has studied corporate characteristics, such as size, sector, and turnover (Fifka, 2013); media attention (Deegan et al., 2002); and stakeholder salience (Cormier et al., 2004; Deegan and Blomquist, 2006; Liesen et al., 2015; Roberts, 1992), as the main driving forces of corporate environmental disclosure (ED). Adams (2002) and Husillos et al. (2011) referred to those characteristics as external factors, in opposition to internal factors, such as organizational structures and personal commitment (Adams, 2002; Adams and McNicholas, 2007; Buhr, 2002; Contrafatto, 2014; Contrafatto and Burns, 2013). Adams (2002) suggested that internal organizational processes and personal attitudes towards ED are key factors requiring further investigation for a better understanding of ED. However, even if aware of those processes, our understanding of ED will remain incomplete without an intertwined analysis of both driving forces; after all, the internal contextual factors have received far less attention than the external factors (Adams, 2002; Husillos et al., 2011). The partial analysis of ED that has focused on external factors could explain the reasons for which it remains “largely unclear why individuals do (and do not) support and develop social accounting (and accountability) and how initiatives are developed or opposed” (Gray et al., 2014, pp. 92-93).

One key element to understand the importance of the internal factors on social and ED by firms revolves around how the personal attitudes, values and commitments of executives are aligned with Corporate Social Reporting (CSR) values (Branco and Rodrigues, 2008; Husillos et al., 2011) and organizational structure (Buhr, 2002; Kotey and Meredith, 1997). Considering the paucity of research in this area, an empirical analysis is performed, in the present study, to explore the extent to which pro-environmental managers’ personal values (MPV) can influence ED quality, and whether that influence is mediated by the environmental organizational structure (EOS). The basis to achieve the main aim of this work is a model informed by insights from structuration theory, which is empirically tested with partial least squares (PLS) structural equation modeling, in a sample of 137 environmentally sensitive Spanish firms.

The rest of this paper is structured as follows. In Section 2, the theoretical model of the study will be presented and the hypothesis developed. In Section 3, the methodology used in the research will be described. The results, after testing the model and our hypothesis,

will be presented, in Section 4. Finally, in Section 5, following a discussion of the main results, some conclusions and final remarks will be presented.

## **2. LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT.**

This section discusses the environmental accounting literature together with some insights from an agency/structure dualism perspective (Giddens, 1984), which guides a hypothesis on the role played by MPV and EOS as determinants of ED quality.

The notion of structure duality, as formulated by Giddens (1979, 1984, 1990), established that both agency (actors' capacity to intervene in the course of social interaction) and structure (the medium/context in which actors are embedded) are paramount for explaining social life. While agency refers to a capacity to intervene in a particular situation, for an understanding of agency, we have to contemplate how structures constrain and enable the exercise of agency. Duality of structure refers to the joint effects of agency and structure. The ideas that have been derived from structure duality have been fruitful in fields such as socio-politics (Baek, 2010; Sewell, 1992; Turner, 2006), organizational studies (Feldman, 2004; Orlikowski, 2000; Whittington, 2010), and accounting (Coad and Glyptis, 2014; Dillard and Pullman, 2017; Roberts and Scapens, 1985; Englund et al., 2018).

Personal values are crucial to understand human agency: they drive human judgement, decisions and actions (Bardi and Schwartz, 2003; Caprara and Steca, 2007; Schwartz, 2010). According to Berson et al. (2008), MPV have an important influence on managers' perceptions and behavior, guiding them in the way they influence corporate environmental responsiveness and performance (Kotey and Meredith, 1997). Personal values and attitudes have been associated with clear impacts on corporate social responsibility initiatives (Hemingway and Maclagan, 2004), environmental responsiveness (Papagiannakis and Lioukas, 2012), corporate environmental performance (Agle et al., 1999; Aragon-Correa, 1998; Ullmann, 1985) and specific corporate environmental aspects, such as the implementation of reverse logistics programs (Álvarez-Gil et al., 2007). The results of these studies largely concur with the literature on qualitative social accounting and recent findings on key organizational actors, such as CSR managers, and their roles in the promotion of social and

environmental reporting initiatives (Adams and McNicholas, 2007; Bebbington, et al., 2009; Contrafatto, 2014; Contrafatto and Burns, 2013). For example, Higgins et al. (2014, p. 1112) attached importance to reflection “on the agency of the manager who sits at the centre of field-level expectations for new reporting behaviours”. This aspect is addressed in our study through the exploration of agency (in terms of MPV) in ED context.

The previous discussion suggests that the influence of MPV on ED should be analyzed within the context of an organizational structure, as structure is vital in an understanding of agency potential (Sewell, 1992). Sewel explained that although, in principle, all agents have agency, the capacity of that agency to unfold is facilitated by different structures that empower agents in different ways. Consequently, the same agency will never be ascribed to all agents (in all contexts). The structures that empower agents make themselves manifest in the different rules of the organizational context (practices, routines, commitments, and habits). Only with the support of these structures, can agents see their values, desires, and intentions (Orlikowski, 2000; Sewell, 1992; Whittington, 2010) transformed into actual changes in social interaction. The determinant role of the structure is what leads Giddens to refer to the mediating role of structure in the agency of an actor: structure always underlines agency in social actions (Giddens, 1984). In this regard, the mediating effect of structure on the agency of actors can represent either a structural constraint or enablement, i.e. structure can determine the direction and the intensity of agency effects (Giddens, 1984; see also, Archer, 2003; Willmott, 1999).

Contextualized situations can help elucidate how organizational structures will enable (or constrain) the influence of MPV on ED. In this regard, different studies have shown the relevance of the organizational structure and the way it supports changes championed by managerial intention to introduce new social reporting practices (Adams, 2002; Adams and McNicholas, 2007; Buhr, 2002; Contrafatto, 2014; Contrafatto and Burns, 2013). Buhr (2002) studied two cases in which changes championed by the CSR Manager, consisting of new sustainability reporting (SR) initiatives, were not communicated successfully throughout the organization. A consequence of this lack of internal communication was that the plans to improve the quality of environmental reporting had no effect. Contrafatto and Burns (2013) explained that although “agency is key” (p. 355) (because power is required to affect firms’ decisions), the structural elements meant that CSR managers were able “to gather some momentum” (p. 355), to influence

organizational sustainability practices. Organizational structure represents, for these authors, a “medium” (p. 356) for implementing environmental initiatives such as environmental reporting in the organizations. Thus, the following elements of the organizational structure have all been identified in the literature as having some influence on SR/ED: the authority of the environmental management function in the organizational structure (Buhr, 2002; Contrafatto and Burns, 2013); the corporate sustainability vision of the organization (Adams and McNicholas, 2007; Contrafatto and Burns, 2013); and, the existence of commitments and social/environmental initiatives in the organization (Adams, 2002; Husillos et al., 2011).

However, beyond case studies, little is known about how organizational structures influence the effect of personal factors and initiatives on ED. Using the notion of the duality of structure as a heuristic to disentangle the role played by MPV on the environmental behavior reporting of firms, in the present study, a generalized analysis of the interaction of individual and structural influences is applied to understand the environmental reporting phenomenon. In that respect, the aim of our research is to see whether organizational structure mediates the influence of MPV on ED in a large sample of Spanish firms. To do so the following hypothesis will be tested:

H: The influence of managers’ pro-environmental personal values on environmental disclosure is mediated by the environmental organizational structure.

The model tested is represented in figure 1.

[Figure 1: to be inserted about here]

### **3. RESEARCH DESIGN**

We analysed the relationship between MPV, EOS and ED structural equation modelling using a sample of environmentally sensitive Spanish firms.

### **3.1. Sample selection**

Previous studies have shown that firms belonging to environmentally sensitive industries were especially prone to develop corporate social and environmental reporting practices. They represent, therefore, an appropriate context in which to analyze ED (Criado-Jiménez et al., 2008; Hackston and Milne, 1996; Husillos et al., 2011; Roberts, 1992). Using the Amadeus database, we selected the largest 410 environmentally sensitive Spanish firms in the year 2009, including listed and non-listed companies and keeping only the holding company. To characterize sectors as environmentally sensitive, we considered the industries included in the European Pollutant Release and Transfer Register (European Union Regulation No 166/2006), as well as those included in Wiedmann et al. (2006). The industries considered are listed in the Appendix.

After the selection of the firms, we contacted the person in charge of sustainability or environmental matters in the firms and made certain that this person: was knowledgeable of environmental issues (Lisi, 2015); and, that his/her seniority ensured the capacity to influence corporate environmental decisions. We entered into telephone contact with the manager of each organization to be sure that the person was really taking charge of the environmental issues in the company and arranged a questionnaire interview session. The questionnaire was administered to the managers over the telephone by a marketing research professional experienced at interviewing corporate managers. It was neither possible to identify all the managers nor to obtain an interview with all of them. Finally, 137 usable questionnaires were returned, representing 33 per cent of the population. Their distribution by industry is presented in the Appendix.

We first conducted a power analysis, to explore whether the sample size was appropriate to test the proposed number of paths. The G\* Power test (Faul et al., 2007) yielded a result of 88.92 per cent, for a standard level of significance of  $\alpha = 0.05$ , an effect size of  $f^2 = 0.15$ , and with 9 predictors in excess of the level of 80 per cent recommended by Cohen (1988).

### **3.2 Methods and Variable measurement.**

The theoretical constructs in our model were operationalized through variables measured

using two methodological tools – a questionnaire and a thematic content analysis. First, a questionnaire was designed that inquired into MPV, and organizational structure in terms of environmental practices. An initial version of the questionnaire was drafted with items taken from the previous literature. This version was shared with three academics with expertise in either the research topic or the methodology, and was pre-tested with four managers from the population under study. Their suggestions led us to reword and reorder some of the items in the questionnaire, to ensure that the scales captured the theoretical constructs under analysis and were adapted to the cultural context of the study. The questionnaire was drafted and administered in the Spanish language.

The data on the ED activity of the 137 firms were gathered from their environmental, sustainability and CSR reports, as well as from their annual reports, corresponding to the fiscal year 2008. The questionnaire was administered in the Spring of 2009, on the understanding that those reports were elaborated around the time the managers responded. We downloaded the reports from the GRI database and corporate websites and then conducted a thematic content analysis (Abbott and Monsen, 1979; Gray et al., 1995), to measure the quality of the environmental information disclosed by the firms. A thematic content analysis is an attempt to scrutinize the information disclosed by firms (Guidry and Patten, 2010), by confirming the presence/absence of certain items in all the reports in the sample.

Greater reliability was added to the coding through an independent analysis of a quarter of the sample organizations' reports by both a second and a third coder. Following Beck et al. (2010), we calculated Krippendorff's alpha, showing appropriate inter-coder reliability levels ( $\alpha = 0.895 > 0.800$ ; Beck et al., 2010; Hayes and Krippendorff, 2007).

### **3.2.1. Environmental disclosure (ED).**

An index developed by Clarkson et al. (2008) was applied to measure the quality of environmental information disclosed by the firms. This disclosure index is formed by 45 indicators structured around seven categories (for more details see Clarkson et al., 2008, pp. 311-312).

The coding procedure for each of the indicators that constituted those seven ED categories consisted of a 1/0 value for presence/absence of ED, except for the environmental



performance indicators with a value between 0 and 6 depending on the quality of the information reported (Clarkson et al., 2008). The quality of the environmental information of each of the seven categories was calculated as the percentage results from [sum of the items of category X/maximum possible score in the item category X].

A question addressing the level of implementation of environmental reporting practices in organizations was also included in the questionnaire to test the reliability of the data gathered from the corporate environmental managers through the questionnaire. In that respect, we found a significant correlation at the 1 per cent level (Pearson's correlation coefficient was 0.420,  $p < 0.01$ ) between different sources (the value given by the managers in the questionnaire and the value from the content analysis of the actual environmental/sustainability reports quality).

### **3.2.2. Managers' Personal Values (MPV).**

Schwartz and Bilsky (1987) defined MPV as follows: "concepts and beliefs; about desirable end states or behaviours; that transcend specific situations; guide selection or evaluation of behavior or events; and are ordered by relative importance" (Hemingway and Maclagan, 2004, p. 36). The values chosen to measure MPV in the present study are values associated with support for environmental goals (Schwartz, 1992; Egri and Herman, 2000): universalism, defined as the "understanding, appreciation, tolerance and protection for the welfare of all people and for nature" (Schwartz, 2003, p. 268), and benevolence, defined as the "preservation and enhancement of the welfare of people with whom one is in frequent personal contact" (Schwartz, 2003, p. 268). These values are characteristic of self-transcendence (Bardi and Schwartz, 2003), i.e. personal concerns over self-transcendence in society. As it concerns environmental issues, Egri and Herman (2000) found that the leaders of nonprofit and for-profit environmental organizations in Canada and the USA have more self-transcendent values than the leaders in industrial and public sector organizations. This variable has also been used to explain environmental responsiveness (Papagiannakis and Lioukas, 2012), and environmental strategy (Fernández et al., 2006). We drew on the original questionnaire developed by Schwartz (2003), to measure self-transcendence values. Table I presents the English version of questions on a Likert scale (from 1: strongly disagree to 7: strongly agree) that measure universalism and benevolence.

[Table 1: to be inserted about here]

### **3.2.3. Environmental organizational structure (EOS).**

EOS was approached through the most relevant corporate environmental practices in the previous literature (Adams, 2002; Adams and McNicholas, 2007; Buhr, 2002; Contrafatto, 2014; Contrafatto and Burns, 2013). It was assumed that more highly developed environmental practices in an organization would require higher levels of environmental commitments, dynamics, habits and routines in these organizations. Table II presents the six environmental dimensions addressed in this study (communication of environmental issues, environmental management systems, supply chain and life cycle analysis, environmental consideration in administrative work, employee training and environmental risk assurance) and the questionnaire questions that were used to measure the level of implementation of EOS practices, together with the references to the relevant literature. EOS1, EOS2, and EOS3 were computed as the arithmetical average of the two relevant questions in each case. EOS is deemed a formative variable. The items were valued using a seven-point Likert scale (from 1-Activities not developed and no plan to develop them to 7-The company represents a model to be followed in the implementation of this practice)

[Table 2: to be inserted about here]

### **3.2.4. Control variables**

We controlled for variables that have in the literature been associated with ED: financial performance (Hahn and Kühnen, 2013 for a review), stockmarket listing (Cormier and Magnan, 2003; Clarkson et al., 2008) and financial risk (Cormier and Magnan, 2003; Cormier et al., 2004). Financial performance was captured by the ratio return over assets (ROA). Listing status refers to the presence of the firm on the Spanish stock market. Financial risk was measured by the debt ratio of the firm. All data about the control variables were extracted from the SABI database (Sistemas de Análisis de Balances Ibéricos<sup>[1]</sup>).

ROA and debt ratio were modeled as continuous variables, and listing as a dummy

variable. The variable listing has a value of 1 when the company is listed on the Spanish stock market and 0, if otherwise.

### **3.3. Econometric model**

The proposed structural equation model was tested by applying PLS. Smart PLS3 mathematical software was used to calculate the relations (Ringle et al., 2015). This application is based on a technique that tests the psychometric properties of the scales used in the research model to measure the variables, while evaluating the relationships between the different variables of such a model (Chin, 1998). A growing number of studies (Chapman and Kihn, 2009; Elbashir et al., 2011; Husillos and Álvarez Gil, 2008; Lisi, 2015, 2016; Pondeville et al., 2013) have used the potential of this computational technique to test complex models in the field of accounting (Lee et al., 2011).

This technique was applied rather than other covariance-based ones (e.g. LISREL, AMOS), for three reasons. First, PLS is suitable for small samples: the minimum recommendation is 100 cases (Reinartz et al., 2009). The second reason for using PLS in this research is the presence of some formative variables (Chin, 2010). The final reason is that different types of variables can be measured in the same model (e.g. categorical, ordinal, range or ratio scales).

A composite model (Henseler et al., 2014; Rigdon, 2012) was chosen to measure the influence of MPV on ED with PLS. This measurement technique is highly recommended when working with PLS path modeling, both for reflective and formative variables<sup>[2]</sup> for details, see Rigdon, 2012). In relation to the details considered when applying the PLS application, the “path weighting scheme” method was followed in which “a value of (at least) 300 as the maximum number of iterations” (Roldán-Salgueiro and Cepeda-Carrion, p. 66) is chosen. In this iteration process, “each sample is obtained by sampling with replacement from the original data set until the number of cases are identical to the original sample set”(Chin, 1998, p. 320).

A further reason for applying PLS is the need to test the EOS mediating effect. The mediating effects can be tested with Smart PLS3 in a single model (Nitzl et al., 2016; Yang-Spencer et al., 2013). Baron and Kenny (1986) proposed a mediation analysis in a two-model procedure, i.e. identifying a significant direct effect between the independent

and the dependent variables in a first model and exploring mediation in a second model, with the pre-requirement of a significant direct effect in the first model. However, it has been proven (Nitzl et al., 2016) that, with no such requirement, a mediation analysis can be conducted in a single model. Smart PLS3 can be used to test mediating effects in a single model through the calculation of a linear regression based on a “multiple-mediator model” containing two basic steps:

- (1) determining the significance of indirect effect,
- (2) determining the type of effect and/or of mediation (see more detail in Nitzl et al, 2016, pp.1852-1857).

#### **4. RESULTS.**

In this section, the results of the structural equation analysis are presented. A three-stage analysis was conducted (Henseler et al., 2016a; Roldán-Salgueiro and Cepeda-Carrion, 2016): goodness-of-fit of the global measurement model; measurement model of the composites (collectively called “measurement model”); and measurement of the structural model. It should be noted that before conducting these measurements with PLS, a preliminary evaluation of the data was conducted and, following Hair et al. (2017), it was checked that the missing data for any item did not exceed 15 per cent.

##### **4.1. Global measurement model**

We calculated the value of the Standardized Root Mean Square Residual (hereafter SRMR), to test the goodness-of-fit of the Global measurement model, by applying a bootstrapping process (the resampling technique generated 5,000 resamples<sup>[3]</sup>. The result yielded a suitable SRMR = 0.065, as a model is considered to have a good fit with an SRMR < 0.08 (Hu and Bentler, 1998).

##### **4.2. Measurement model**

An analysis to confirm the composite validity of the measurement model was conducted. By reason of the differences between reflective and formative composites (while in the former different indicators – items in the questionnaire – are caused by that composite, in

the latter a set of indicators are the cause of the composite), validity and reliability tests are not conducted in the same manner (Petter et al., 2007).

### *Reflective composites*

Reliability and convergent validity measurements of the reflective composites (MPV and ED) are displayed in table 3 (panel A).

[Table 3: to be inserted about here]

Reliability was tested through the analysis of the loadings values, the composite reliability values (CR) and Cronbach's alpha (Chin, 2010). All the loading values, the CR values and the Cronbach's alpha values were greater than or close to 0.7 (Chin, 2010; Hair et al., 2014) and therefore considered acceptable.

As regards validity, convergent validity demonstrates that each reflective composite is suitable only for the theoretical construct that is measured (Henseler et al., 2009). Convergent validity was confirmed (Table III) on the basis of the Average Variance Extracted (AVE) values ( $>0.5$ ) (Chin, 1998). Finally, a discriminant validity test ensured that each theoretical composite differed sufficiently from each other (Henseler et al., 2009). To that end, the Fornell and Larcker (1981) criterion was confirmed: the square roots of the AVE (diagonal values presented in this Table IV) of each construct was greater than its correlation with any other composite.

In view of the criticism of the Fornell–Larcker criterion, we also present the discriminant validity value for the reflective composites (Table IV) by calculating the heterotrait-monotrait ratio (HTMT) to measure discriminant validity (Henseler et al., 2016b) between reflective composites. An HTMT of  $<0.85$  was considered suitable, as suggested by Henseler et al. (2016b).

[Table 4: to be inserted about here]

### *Formative composites*

The validity of the formative composite (EOS) was evaluated by ruling out multicollinearity problems between formative items and by calculating the tolerance levels (Table III, panel B). Following Roberts and Thatcher (2009), the variance inflation factor (VIF) was calculated to test multicollinearity. VIF values were appropriate in all cases (VIF < 3.3). Suitable tolerance levels were also confirmed; above 0.10 in all cases (Hair et al., 2014). Overall, these results suggest that the six items are salient contributors to the variable representing the EOS construct.

Subsequently, the contribution of the formative indicators (contribution of each item to the theoretical construct) was evaluated (Table III, panel B). This evaluation differs from the case of the reflective items, because it requires us to consider not only the relative contribution of the formative composite item (loading), but also the item's absolute contribution (weight) (Hair et al., 2014; Henseler et al., 2009). In fact, as the number of formative items increases, the average value of the weights decreases, as does the likelihood of finding relatively significant weights. In this sense, Hair et al. (2014) contended that a formative item can be relatively significant, if its weight is significant; or absolutely significant, if its weight is not significant but its loading is significant and closer or greater than 0.5. Accordingly, the six indicators used in this study were found to contribute significantly to the formation of the EOS construct (see footnote; Table III).

### **4.3. Structural model**

Having tested the validity and the reliability of the measurement models, we proceeded to evaluate the hypothesis tested in the structural equation model, through the analysis of the path coefficients mediation analysis, and the measurement of the predictive relevance of the PLS path model with two statistical tests (R<sup>2</sup> and Stone–Geisser's Q<sup>2</sup>).

#### *Evaluation of the path coefficients*

Path coefficients can be interpreted as standardized regression coefficients (Hair et al., 2014). Their statistical evaluation in PLS is done with a bootstrapping procedure with a minimum replacement of 5,000 samples (Hair et al., 2011), and a one-tailed test ( $t = 4.999$ ), as the hypothesis tested in the model (H) specifies the sign of the relationship between the variables.

[Table 5: to be inserted about here]

Table V presents the coefficients for the three paths (a, b, c) shown in the model including the control variables. H is approached as the combination of path a and path b, i.e. the indirect effect of MPV over ED, in contrast with the direct effect represented by path c (see Figure 2). It is important to consider that the total effect of MPV over ED includes both the direct (path c) and the indirect (path a x path b) path effects. As Table V illustrates, two of the three paths (path a and path b) were of statistical significance: MPV directly and positively influenced EOS (path a coefficient 0.307 and  $p < 0.01$ ) and EOS directly and positively influenced ED (path b coefficient 0.202 and  $p < 0.05$ ), but MPV had no direct influence on ED (path c,  $p > 0.10$ ). We included control variables in the model, with which to study the effects of control paths in the measurement of the model. These control paths are portrayed in Table V (effect of ROA, listing, and debt ratio variables in both ED and EOS). Among the control variables, none of the financial variables affected ED ( $p > 0.10$ ), but the listing of companies on the stock market did have a positive and significant influence on both EOS ( $p < 0.05$ ) and ED ( $p < 0.001$ ).

Considering the results presented above, the lack of any direct influence of MPV over ED is confirmed, which is consistent with the hypothesis that the variable EOS plays a mediating role between MPV and ED, because MPV positively influences EOS (path a, see Figure 2) and, at the same time, EOS positively influences ED (path b, see Figure 2). However, this hypothesis needs to be confirmed (see below in section “Mediation analysis”).

#### *Predictive power of the structural model*

Finally,  $R^2$  and  $Q^2$  values were calculated<sup>[4]</sup> to measure the predictive power of the structural model and specifically, the predictive power of the endogenous variables (EOS and ED). Table V also displays suitable  $R^2$  values for each endogenous variable (0.148 for EOS, and 0.380 for ED). For a model to have predictive power, Falk and Miller (1992) recommended a minimum value of 0.10 for  $R^2$ , whereas Chin (1998) considered a value equal to or greater than 0.19 acceptable, depending on the field. For example, while

marketing studies require higher levels (Lee et al., 2011), values of  $R^2 \leq 0.10$  are considered acceptable in accounting studies (Lisi, 2015). Additionally, a value of  $Q^2 > 0$  for the ED composite further confirmed the predictive power of the model (Chin, 1998) [5]

Both the  $R^2$  and the  $Q^2$  values, together with the path coefficients (and the control variables) of the model and their respective t-statistics are schematically depicted in Figure 2.

[Figure 2: to be inserted about here]

### *Mediation analysis*

The potential mediating role of the variable EOS was analyzed (Table VI), by determining the significance of the indirect effect and the type of mediation. Testing the indirect effect was the first step in the analysis of a mediation effect. In the present study, the indirect effect derives from the two paths that, once aggregated, constitute H: path a and path b (Figure 2). PLS bootstrapping results for the combination of path a and path b were considered, to test the significance of the indirect effect. The results show a significance level of 1 per cent for the indirect (and positive) effect, indicating that the EOS plays a mediating role in the relationship between auto-transcendent MPV and ED quality. These results were compared with those obtained by calculating different confidence intervals (hereafter CI) for path a x path b (Table VI, panel A), to confirm the significance of this indirect effect (Nitzl et al., 2016). Following Yang- Spencer et al. (2013), two different CIs were calculated (CI, Bias-corrected CI). Table VI (panel A) shows that neither of these CIs contains the value zero, confirming the significance of the indirect effect (significant at the 1 per cent level).

The second step in the mediation analysis consisted in identifying the type of mediating effect of EOS (Table VI, panel B). In this regard, it is important to bear in mind that the total effect includes both the direct and the indirect effects, yielding the balance between the indirect and the direct effect that will in turn determine the type of mediation (Nitzl et al., 2016). Hence, where both direct and indirect effects are significant there is partial mediation, where the direct effect is insignificant, but the indirect effect is significant,



there is a full mediation. In the present case, the direct effect (path c, MPV-ED) was not significant, but the indirect effect was significant (path a x path b, MPV-EOS x EOS-ED); an analysis that undoubtedly reflects full mediation (Nitzl et al., 2016), hence our acceptance of the proposed hypothesis.

[Table 6: to be inserted about here]

## **5. DISCUSSION, CONCLUSIONS AND FINAL REMARKS.**

This study has combined insights from an agency/structure dualism perspective with the well-established structural equation modeling method, to understand managers' agency in the development of environmental reporting practices within the firm. The findings show that the relationship between pro-environmental MPV and ED is fully mediated by the EOS. In that respect, our research has illustrated that even when there is a willingness among managers to drive a firm in an environmentally friendlier direction, ED quality will not improve as a direct consequence of manager disposition. The influence of pro-environmental MPV on ED quality would depend on the nature of the EOS. In that regard, the improvement of ED practices requires a set of structural trajectories in organizations, involving an array of established sustainability practices, including environmental management systems and training (Husillos et al., 2011). Important measures to understand the motivations for initiating CSR reporting, because the findings in this paper suggest that individual proposals to improve CSR reporting would be fruitless without appropriate enabling structures (Giddens, 1984). It is a conclusion, obtained at the organizational level that is in line with the need for structural elements to improve corporate social and environmental reporting at a broader institutional level (Bebbington et al., 2012).

This paper has therefore confirmed previous findings on the crucial role that internal factors play in the development of ED practices (Adams, 2002) and has enriched the previous literature, showing the importance of the proper "assembly" (Husillos et al., 2011) of different driving forces at different levels within the organization to enhance organizational change. Our findings have provided insights into the organizational context of environmental/ sustainability agency among managers to improve corporate

environmental reporting. The results have confirmed and generalized for a big sample of firms, the conclusions of previous qualitative case-based literature (Buhr, 2002; Contrafatto and Burns, 2013; Contrafatto, 2014): managerial aspirations to produce some change in SR/ED requires the support of organizational structures. We have shown generalizable evidence of how the existence of an EOS is the channel through which the environmental values that the managers express have a positive impact on the CSR transparency of their firms. In particular, we have illustrated this phenomenon regarding corporate ED quality in the Spanish context.

In this paper, there is an answer to a call for the adoption of new innovative empirical approaches grounded in structuration theory (Englund and Gerdin, 2014). Our study of agency on environmental reporting within the firm is the first (to the best of our knowledge) to explore environmental reporting practice, through the combination of content analysis, statistical modeling and surveys, following a mixed-method research approach. Our methodological approach reveals the complex driving forces in the nature of social and environmental reporting. Specifically, the relevance of understanding the conditions needed to assemble the different forces, at different levels of analysis, derives from their importance for the production of the organizational change that is required to improve social and environmental performance and reporting. The finding of an EOS mediation over the pro-environmental MPV-ED relationship also calls into question the “routine research”, carried out in the social and environmental accounting field, as described by Gray and Laughlin (2012, p. 238). Researchers should broaden the research method portfolio and ambitions, analyzing, for example, internal and external corporate reporting driving forces, in a more creative and robust way. For instance, our research has shown how the mere analysis of the direct relationship between pro-environmental MPV and ED can bring us to incomplete and somehow misleading conclusions on the capacity of organizational actors to exercise agency for change in organizations.

Our results invite an analysis of some practical implications. Prior literature (Hemingway and Maclagan, 2004) has recognized how the values of managers are a representation of those broadly embedded values in society. Accordingly, our findings may act as an argument in favor of the values of sustainability education among future managers.

#### *Limitations and future research*

A limitation of this work is the year chosen for gathering data: 2009. It is true that the relationship between different theoretical constructs might be as valid today as they were ten years ago, but it would be advisable to conduct similar studies to see whether those relationships will still hold over time.

## Notes

1. SABI is a reference for economic and financial company information in Spain and Portugal ([www.bvdinfo.com/en-gb/our-products/companyinformation/national-products/sabi](http://www.bvdinfo.com/en-gb/our-products/companyinformation/national-products/sabi)).

2. Reflective composites are also called type-A composites and formative composites, type-B composites (Henseler et al., 2014).

3. This value helps to prevent misspecification issues in the model, by determining the probability of obtaining a discrepancy between the correlation matrix implied by the model and the empirical correlation matrix (Henseler et al., 2016a).

4. The R2 statistical test is applied in PLS through the same bootstrapping procedure as in the case of the Path coefficients, and the Q2 statistical test was performed by a blindfolding procedure (more details in Chin, 1998).

5. Only applicable in dependent reflective-type composites (Roldán-Salgueiro and Cepeda-Carrion, 2016), in our case: ED.

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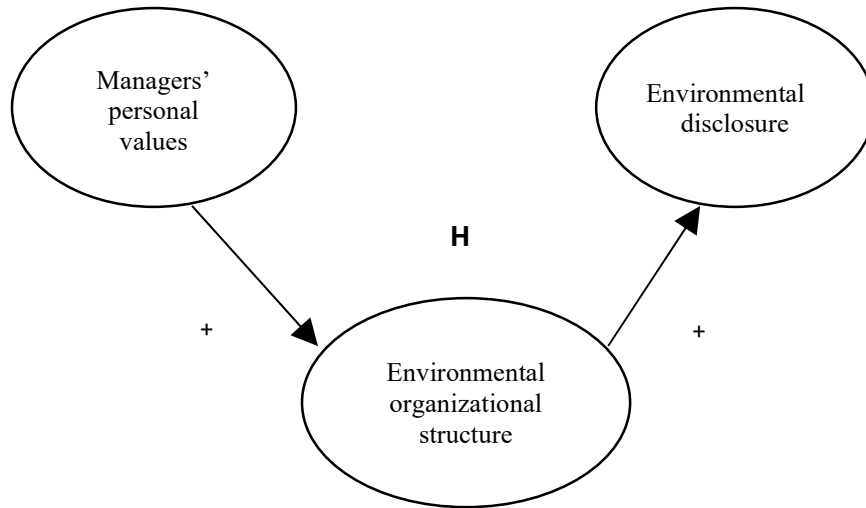
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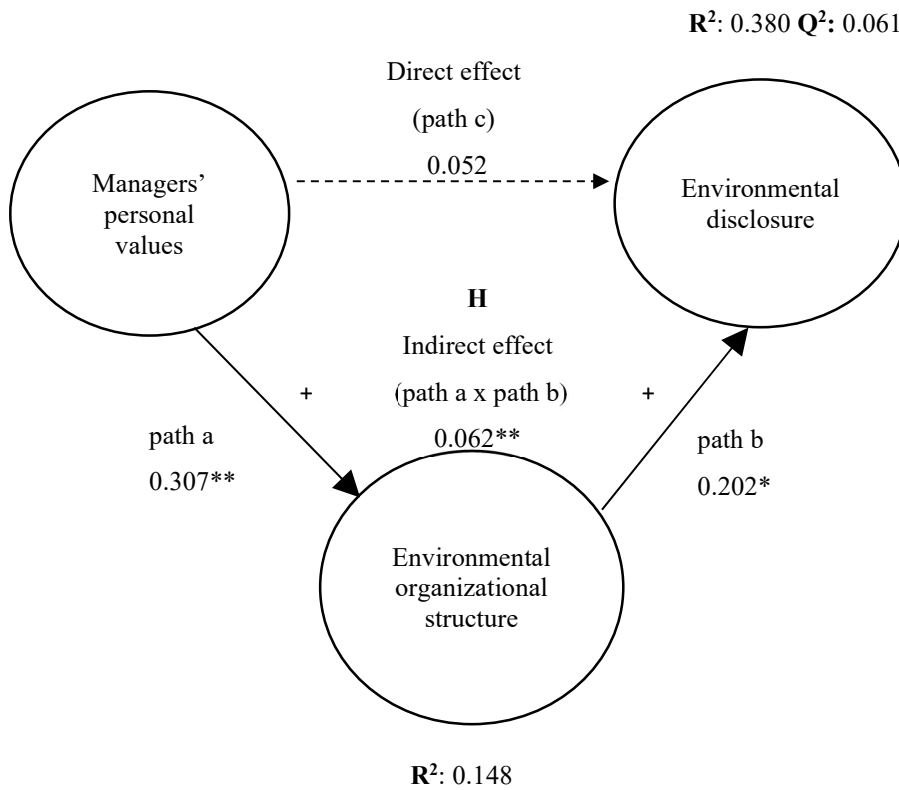
**FIGURES**

Figure 1. Graphical representation of the hypothesis.



solid lines represent H

Figure 2. Structural model (main model) and results.



\*, \*\* and \*\*\* denote significant path coefficients at 0.05, 0.01, 0.001 significance levels.

dotted line represents direct effect, solid lines represent indirect effect: H

control variables are not indicated in this figure (see more detail in table 5)

## TABLES

**TABLE 1 - DISAGGREGATION OF INFORMATION ABOUT PERSONAL VALUES**

Variable	Personal values	Items	Items from European Social Survey (ESS) (Schwartz, 2003)
<i>Self-Transcendence</i>	<i>universalism</i>	MPV1	“He thinks it is important that every person in the world be treated equally. He wants justice for everybody, even for people he doesn’t know” (PVAL.2)
		MPV2	“It is important to him to listen to people who are different from him. Even when he disagrees with them, he still wants to understand them” (PVAL.4)
		MPV3	“He strongly believes that people should care for nature. Looking after the environment is important to him” (PVAL.9)
	<i>benevolence</i>	MPV4	“It's very important to him to help the people around him. He wants to care for other people” (PVAL.5)
		MPV5	“It is important to him to be loyal to his friends. He wants to devote himself to people close to him” (PVAL.8)

All the items are valued using a Likert scale (1–7): (1= strongly disagree... 4 = neutral... 7 = strongly agree)



**TABLE 2 – DISAGGREGATION OF INFORMATION ABOUT ENVIRONMENTAL ORGANISATIONAL STRUCTURE (EOS) IN TERMS OF ITS APPROACH TO SUSTAINABILITY.**

<b>Dimension</b>	<b>Environmental practices</b>	<b>Supported by</b>
<b>EOS1: Communication of environmental issues</b>	Q1: “Sponsorship of natural environmental events”.	Aragón-Correa, Matías-Reche and Senise-Barrio (2004) Chamorro, Rubio and Miranda (2009) Martín-de Castro, Amores-Salvadó, and Navas-López (2016)
	Q2: “Use of natural environmental arguments in marketing”.	Aragón-Correa, Matías-Reche and Senise-Barrio (2004) Hillestad, Xie and Haugland (2010) Martín-de Castro et al. (2016)
<b>EOS2: Implementation of environmental management systems</b>	Q4: “Monitoring and evaluation procedures, and proposals regarding appropriate corrective actions”	Aragón-Correa, Matías-Reche and Senise-Barrio (2004) Ullmann (1985) Lisi (2015)
	Q5: “Filters and controls on emissions and discharges”	Aragón Correa, Matías-Reche and Senise-Barrio (2004) Porter and Linde (1995) Thitakamol, Vewab and Aroonwilas (2007)
<b>EOS3: Supply chain and life cycle analysis</b>	Q6: “Purchasing manual with ecological guidelines”	Aragón Correa, Matías-Reche and Senise-Barrio (2004) Henri and Journeault (2008) Henri and Journeault (2010)
	Q9: “Natural environmental analysis of product life cycle”	Aragón-Correa et al., (2004) Baumgartner and Ebner (2010) Finkbeiner, Schau, Lehmann and Traverso, (2010)
<b>OS4: Environmental aspects in administrative work</b>	Q3: “Natural environmental aspects in administrative work”	Aragón Correa, Matías-Reche and Senise-Barrio (2004) Berry and Rondinell (1998) Cho and Patten (2007) Yang Spencer and Adams (2013) Fernández, Junquera and Ortiz (2006)
<b>EOS5: Employee training</b>	Q7: “Training to employees and managers in the environmental field”	Aragón-Correa, Matías-Reche and Senise-Barrio (2004) Daily and Huang (2001) Linnenluecke and Griffiths (2010) von Geibler, Liedtke, Wallbaum, and Schaller (2006)

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<b>EOS6: Pollution insurance</b>	Q8: "Pollution damage insurance"	Aragón-Correa, Matías-Reche and Senise-Barrio (2004) Henri and Journeault (2008) Henri and Journeault (2010)
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The question used for scoring the dimension: "To what extent, these activities are implemented in your organization?"

All the practices are valued using a Likert scale (1–7):

- (1) The company does not do it or does not plan to do it.
- (2) The company would like to do it but still has no plans.
- (3) The company plans to do it.
- (4) The company is starting to implement it.
- (5) The company has made some progresses in the implementation.
- (6) The company has made considerable progress in the implementation.
- (7) The company represents a model to be followed in the implementation of this practice.

**TABLE 3 - ANALYSIS OF THE MEASUREMENTS MODEL**

<b>Panel A: reflective composites</b>				
	<b>Loadings</b>	<b>AVE</b>	<b>CR</b>	<b>Alfa-Cronbach</b>
<b>MPV</b>				
MPV1	0.715			
MPV2	0.761			
MPV3	0.857			
MPV4	0.832			
MPV5	0.822			
		0.639	0.898	0.857
<b>ED</b>				
ED1	0.861			
ED2	0.924			
ED3	0.863			
ED4	0.790			
ED5	0.855			
ED6	0.862			
ED7	0.758			
		0.716	0.946	0.933
<b>Panel B: formative composites</b>				
	<b>Loadings</b>	<b>Weights</b>	<b>VIF</b>	<b>Tolerance</b>
<b>EOS</b>				
EOS1	(0.438)	0.173 <sup>a</sup>	1.038	0.569
EOS2	(0.797)	0.361 <sup>a</sup>	1.015	0.422
EOS3	(0.610)	-0.067 <sup>a</sup>	1.130	0.428
EOS4	(0.454)	0.192 <sup>a</sup>	1.096	0.589
EOS5	(0.713)	0.220 <sup>a</sup>	1.422	0.282
EOS6	(0.816)	0.504 <sup>r</sup>	1.323	0.380

All loadings of reflective (and formative) composites are significant at the 1% level based on a two-tailed test [ $t(0.01;4999) = 2.577$ ]

<sup>r</sup>, denotes formative items relatively significant and <sup>a</sup>, formative items absolutely significant

**TABLE 4 - EVALUATION OF THE DISCRIMINANT VALIDITY.**

<b>Fornell-Larcker criteria</b>			
	MPV	ED	EOS
MPV	<b>0.799</b>		
ED	0.159	<b>0.846</b>	
EOS	0.365	0.318	N/A

<b>Heterotrait-Monotrait Ratio</b>	
	ED
MPV	<b>0.174</b>

N/A: not applicable

**TABLE 5 - PLS STRUCTURAL MODEL: PATH COEFFICIENTS AND PREDICTIVE POWER (N=137)**

<i>Path coefficients (t-value)</i>						
	<b>Paths to:</b>					
<b>Paths from:</b>	(1)	(2)	(3)	(4)	(5)	(6)
(1) MPV	-	0.052	0.307**			
(2) ED		-	-			
(3) EOS		0.202*				
(4) ROA		<i>0.004</i>	<i>-0.039</i>		-	
(5) Listing		<i>0.530***</i>	<i>0.203*</i>	-		
(6) Debt ratio		<i>1.222</i>	<i>-0.027</i>			-

<i>Predictive power of structural model (with control paths)</i>		
	<b>R<sup>2</sup></b>	<b>Q<sup>2</sup></b>
EOS	0.148	N/A
ED	0.380	0.061

Control paths are highlighted in italics.

\*, \*\* and \*\*\* represent significance at the 0.05, 0.01, 0.001 levels based on a one-tailed test [t (0.05; 4999) = 1.645; t (0.01;4999) = 2.327; t (0.001;4999) =3.092] for hypothesis tested in the main model (path coefficients with predicted sign), and two-tailed test [t (0.05;4999) =1.960; t (0.01;4999) =2.577; t (0.001;4999) =3.292] for control paths.

N/A: not applicable.

**TABLE 6 - MEDIATION ANALYSIS**

<b>Panel A: Indirect effect</b>								
Indirect effects	Original sample (O)	Sample mean (M)	Bias	Bootstrapping BC				Sig.
				P. 99, CI		P. 99, CI		
				0.5%	99.5%	0.5%	99.5%	
path a x path b	0.0621	0.0653	-0.0031	0.0035	0.1295	0.0004	0.1264	yes
<b>Panel B: Mediation</b>								
path c	<i>Direct effect</i>		<i>Indirect effect</i>			<i>Type of mediation</i>		
	95% sig	+/-	path a x path b	99% sig	+/-			
0.0520	no	+	0.0621	yes	+	Full mediation		

Notes: P-percentile; CI-confidence intervals; BC-bias corrected; Sig-significance; 5,000 bootstrap samples

## APPENDIXES

### APPENDIX 1- INDUSTRIES INCLUDED IN THE SAMPLE

<i>two-digit NACE codes</i>	<i>Industry</i>	<i>Firms reporting by industry type</i>
13	Manufacture of textiles	1
17	Manufacture of paper and paper products	2
19	Manufacture of coke and refined petroleum products	3
20	Manufacture of chemicals and chemical products	14
22	Manufacture of rubber and plastic products	2
23	Manufacture of other non-metallic mineral products	8
24	Manufacture of basic metals	11
25	Manufacture of fabricated metal products, except machinery and equipment	6
28	Manufacture of machinery and NCOP equipment	7
29	Manufacture of motor vehicles, trailers and semi-trailers	18
35	Electricity, gas, steam and air conditioning supply	5
41	Construction of buildings	30
42	Civil engineering	5
47	Retail trade, except of motor vehicles and motorcycles	13
49	Land transport and transport via pipelines	8
51	Air transport	4
Total firms:		137