



Impact of Board Gender Diversity on Sustainable Development: Evidence from European Countries

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Abstract: This study investigates the link between board gender diversity and corporate sustainability performance, and how national cultural values influence this relationship in European countries. Based on Upper Echelons Theory, Stakeholder Theory, and Institutional perspectives, we posit that gender diversity on boards promotes a greater focus on environmental, social, and governance (ESG) goals for firms due to enhanced ethical monitoring, stakeholder engagement, and legitimacy, while we expect the impact of gender-diverse boards to be contingent on the surrounding cultural context. We employ a dynamic panel dataset of 8,197 firm-year observations corresponding to 818 listed companies from 31 European countries during the period 2014–2024, and we utilize the Difference Generalized Method of Moments (GMM) estimator to control for unobserved heterogeneity, persistence in ESG performance, and endogeneity. We find a strong positive relationship between board gender diversity and corporate sustainability performance, which is moderated by national cultural values in Europe.

Keywords: board gender diversity; gender equality; ESG; sustainable development.

JEL classification: G34; J16; K38; M14.

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1. INTRODUCTION

Stronger regulations with binding quotas for minimum gender representations are in place in many of the markets with the highest percentage of female directors, while markets with soft regulations or no mandates tend to have fewer female directors. In the European Union (EU), the exceptions were Sweden and Finland as the countries with the highest number of females on boards, whereas they had no targets regarding gender diversity (d'Hoop-Azar *et al.*, 2017).

In the EU, gender perspective regarding board composition appeared as an important issue of the corporate governance in 2011 when the European Commission issued “Green paper – EU corporate governance framework” (European Commission, 2011), in which it emphasized economic rationales for fostering gender diversity.

According to the Gender Statistics Database (EIGE, 2023) the average share of women in boards of the largest listed companies registered in the EU was 8.5% in 2003, 11.9% in 2010, 23.9% in 2016, and it reached 32.2% in 2022. In this context, although progress is evident, gender balance has still not been reached. The best results were registered in France where women made up 45.2% of board members in the largest listed companies. Also, there are significant differences among member states (from 45.2% in France to 10.2% in Cyprus). Despite some progress in recent years, according to the Gender Equality Strategy 2020-2025 (European Commission, 2020), women’s under-representation in corporate boards persists.

In this context, with the aim to reduce gender gap on corporate boards, on 22 November 2022, the European Parliament adopted a new Directive on gender balance on corporate boards of listed companies (the so called “Women on Boards” Directive) and on 7 December 2022, Directive (EU) 2022/2381 was published in the Official Journal. According to the Directive, at least 40% of non-executive board seats or 33% of all board seats for listed companies must be occupied by the women by the end of June 2026. Meanwhile, by December 2024, member states must adopt national rules implementing the Directive's measures.

Previously to the Directive, according to Deloitte (2022), in 2020 seven EU countries (Belgium, France, Italy, Germany, Austria, Portugal, and Greece) had mandatory national quotas for the underrepresented sex for listed companies (women), nine countries (Denmark, Ireland, Spain, Luxembourg, the Netherlands, Poland, Slovenia, Finland, and Sweden) favoured a softer approach, and the other 11 member states did not take any significant action (no mandates). After the Directive, the last report of Deloitte (2024) emphasizes the progress towards increasing the number of women on corporate boards. Thus, in Europe, 33.8% of the board seats are occupied by women and 11% of the board chairs are women. This aspect is also strengthened by the fifth goal of the 2030 Agenda for Sustainable Development adopted by United Nations in 2015, respectively SDG5 - Achieve gender equality and empower all women and girls.

The studies about the influence of women directors on the company's performance presented mixed results, but there is a consensus that more diversity in boardrooms contributes to better decision-making and results. Also, according to the SDG5, increasing women's leadership roles and investments in gender equality are crucial at national, regional, and global levels (United Nations, 2024). At global level, from legislatures to corporate boards, women have made insufficient gains in leadership. According to United Nations (2024) women hold 40% of global employment, but they occupied only 27.5% of managerial positions in 2022, which represents the same share as in 2016. At this pace, 176 years are needed to accomplish parity in managerial roles.

In this context, our paper aims to analyse the extent to which the presence of women on boards of directors contributes to the achievement of SDG5, and in this way to the sustainable development. The contribution to the literature will consist in bringing useful results that will also accelerate the implementation of the “Women on Boards” Directive by EU countries which contribute to the accomplishment of the gender equality goal and at the same time to the sustainable development.

The paper is structured as follows: [Section 2](#) reviews the literature, [Section 3](#) presents the sample, data and the methodology used, [Section 4](#) presents and discusses the results and finally, [Section 5](#) concludes the paper, highlighting the practical and policy-relevant contributions.

2. LITERATURE REVIEW

2.1. Board gender diversity and corporate sustainability

Corporate governance, particularly in listed companies, is being studied and regulated through corporate governance codes, recommendations, and legislation. Of particular interest is the composition, and specifically gender diversity of boards of directors. This interest stems from the global underrepresentation of women in corporate governance bodies ([Lee et al., 2015](#); [Dawson et al., 2016](#)).

The past two decades have seen a rise in the number of women serving on corporate boards, and the growing scholarly interest in the relationship between women on boards and environmental, social, and governance (ESG) performance reflects the more general understanding that board composition is not merely symbolic but a central factor in shaping strategic behaviour and governance effectiveness. A few theoretical perspectives provide a complementary explanation as to how gender diversity at the board level may affect sustainability outcomes.

From the perspective of Upper Echelons Theory ([Hambrick and Mason, 1984](#)), demographic characteristics, values, cognitive frames, and ethical orientations of top decision-makers explain organizational outcomes. Boards of directors are central to monitoring management and are also an important part of long-term strategy formulation. Thus, the presence of women brings a variety of perspectives, ethical sensitivities, and decision-making styles that may impact priorities on issues concerning stakeholder relations and corporate responsibility. Past research has found that female directors tend to be stronger monitors, more attentive to ethical issues, and more socially and environmentally conscious ([Bear et al., 2010](#); [Li and Tang, 2010](#)) and these behavioural characteristics are closely aligned with the multidimensional goals of ESG metrics that measure corporate social responsibility and responsible business conduct beyond short-term financial performance.

This theoretical logic is supported by Stakeholder Theory ([Freeman, 1984](#)), which posits that firms are successful in the long term by identifying and responding to the interests of multiple stakeholder groups, instead of solely maximising shareholder value. More diverse governing bodies are better able to appreciate the divergent expectations of different stakeholders and to bring wider social concerns into corporate strategy. Thus, gender-diverse boards would be better at having conversations with their employees, the community, regulators, and environmental organizations resulting in broader, more enduring forms of corporate governance ([Lee et al., 2015](#); [Nadeem, 2020](#)).

Second, Resource Dependence Theory (Hillman *et al.*, 2007) highlights the role of the board as a source of critical organizational resources, such as legitimacy, networks, expertise, and access to key external stakeholders. Female directors tend to enlarge the relational capital of the firm by establishing connections with other stakeholder constituencies and social organizations and by improving public legitimacy in areas such as equality, social inclusion, and ethical governance. These types of reputational and relational capital are especially relevant in the current ESG context in which firms are subject to greater scrutiny on their social and environmental disclosures and commitments, which will enable board gender diversity to enhance firms' abilities to design, implement, and credibly communicate sustainability strategies.

These theoretical perspectives are complementary and suggest that greater gender diversity on corporate boards should be associated with better ESG performance, because diverse boards are better equipped to exercise ethical oversight, meaningfully engage with stakeholders, and secure legitimacy-enhancing resources that facilitate sustainability-oriented governance.

In their empirical study, using a panel data methodology with fixed effects, Martínez *et al.* (2022) analysed the companies listed in the MSCI Europe and MSCI EM Europe indices for a period of ten years (2010–2019) and they found that CSR is impacted positively by the gender diversity on the board of directors, which confirmed that legislation should promote gender policies.

Going deeply and closer to the moment of our analysis, Fernández-Méndez *et al.* (2025) found that gender diversity on the corporate board from 22 European countries had a positive and significant impact on ESG scores. Taking into consideration the fact that the study was implemented for the period 2009–2018, previously to the Directive (EU) 2022/2381 of the European Parliament and of the Council, its results support this recent legislation and encourage to incorporate women into decision-making process, as a means of fulfilling the 2030 Agenda for Sustainable Development.

2.2. From token representation to effective influence

The term “tokenism” is used to refer to the low representation of women in decision-making and management positions in companies. This term indicates that the presence of minority groups, in this case women, in companies is due to external pressure to meet societal demands. It reflects the fact that the opinions of these minority groups are disregarded or undervalued, with no effect on business performance. Furthermore, any study of boards of directors from a gender perspective is complex, as women remain a minority group and their opinions are undermined by an environment of inequality (Mejía and Ribera, 2003).

This reality has led many countries to introduce initiatives aimed at increasing female representation on boards of directors. Depending on the country or geographic area, these initiatives range, as already mentioned, from recommendations on gender diversity in corporate governance codes to legislative initiatives establishing quotas, or percentages, for the underrepresented sex on boards. The UE proposed a Directive in 2022 that includes a European quota initiative. In Spain, these legislative initiatives have resulted in an increased presence of women on the boards of directors of listed companies and in senior management (Martínez García *et al.*, 2020; Martínez García and Gómez Díaz, 2021). On the other hand, the authors Martínez García *et al.* (2020) highlighted that the national regulations, codes, and quotas had a greater effect compared to the proposed European regulations. Besides, the scenarios estimated

by [Martínez García and Gómez Díaz \(2021\)](#) suggested that the Ibex 35 (the benchmark stock market index of Spain that include the 35 most liquid Spanish stocks traded on the Madrid Stock Exchange) will meet the target (achieving 40% diversity) between 2023 and 2024, while the threshold for the rest of the listed companies would not be reached before 2026.

Although women are now represented on boards in increasing numbers in many jurisdictions, theoretical and empirical work warns against assuming that all types of diversity generate similar or immediate results (tokenism theory: [Kanter \(1977\)](#); the token director often faces stereotyping pressures, few opportunities to influence, and difficulty in forming alliances within male networks, so that she may be unable to have any impact on strategic decisions such as sustainability policies).

Based on this insight, Critical Mass Theory suggests that the impact of minority directors becomes significant only when the number of female directors on the board reaches a minimum threshold, which is generally believed to be three female directors or approximately 30 percent of the board ([Kramer et al., 2007](#); [Joecks et al., 2013](#)). Here, women are no longer seen as tokens of a minority group but as valid, powerful members of the governance process, and group dynamics change, participation is more equal, and minority voices have a greater chance of making actual changes in organizational priorities. In empirical studies, once critical mass is reached, the positive effects of gender diversity on ethical oversight, monitoring quality, and CSR practices become significantly stronger ([Bear et al., 2010](#)).

Since the early 2000s, Europe has been the continent with the greatest gender diversity on boards of directors and with the highest number of countries that have implemented gender quotas. This reflects how quotas boost women's careers in business ([Martínez García, 2023](#)). [Martínez García \(2023\)](#) pointed out the fact that European countries with quota legislation also have a higher proportion of female directors reflects how quotas boost women's careers in business, although exceptions exist. However, the intensity of this increase does not depend on the type of regulation, recommendations, or quotas, as [Martínez García and Gómez Ansón \(2023\)](#) found in their study implemented in the largest listed European companies over the period 2003 - 2022.

The characteristics of the European context have led most studies on quotas and gender diversity on boards of directors to focus on this institutional environment. However, analysing the international context, we arrive to the same conclusion that female presence benefits the economic dimension (profitability and liquidity), while the environmental and social dimensions are diminished. In this context, [Reyes-Bastidas and Briano-Turrent \(2018\)](#) who analysed the listed firms from Colombia and Chile suggested that in the Latin American context it is necessary to promote greater participation of women in strategic positions to increase their representation.

Another study investigating the impact of regulation on board gender diversity contradicted the implicit and widespread belief that regulatory interventions to increase women on boards leads to a strengthening of the trickle-down effect ([Page et al., 2024](#)). In 2011, a new soft law regulation was introduced for firms listed on the United Kingdom's FTSE 350 index, which required to the FTSE 350 listed firms to increase the representation of women on the boards of at least twenty-five percent. The impact of this regulation consisted in a positive relationship between women on boards and women's representation in senior management during the pre-regulation era, known as the trickle-down effect. But the introduction of regulation had the unintended consequence of weakening the relationship between women on boards and women in senior management. Thus, the effect of regulation

on board gender diversity had to be judged considering the different context and different frameworks. As suggested by [Martínez-García *et al.* \(2023\)](#), it is important to take into consideration firm ownership (single large shareholder versus multiple blockholders) and control structure when developing regulations to promote board gender diversity.

This institutional context makes the European corporate governance landscape particularly interesting to examine, because the introduction of gender quotas and regulatory initiatives have meant that many firms have moved beyond the symbolic presence of women to levels of gender diversity that are compatible with critical mass thresholds, which in turn increases the likelihood that board gender diversity will result in both appearance and substantive governance effects, such as improved ESG performance.

2.3. Institutional context and the role of national culture

While governance reforms and diversity mandates have increased the representation of women on boards across Europe, Institutional Theory (DiMaggio and Powell 1983) cautions that organizational behaviour is not entirely determined by formal rules, but also by a mixture of regulatory pressures, normative expectations, and deeply ingrained cultural values. Whereas quotas guarantee the numerical representation of women on boards, the degree to which diversity translates into real influence is largely contingent on informal institutional arrangements, specifically prevailing societal attitudes on gender and leadership.

Studies of national value systems have shown that they influence managerial behaviour as well as organizational priorities ([Hofstede, 2001](#)). The Masculinity dimension captures the degree to which a society is driven by competition, assertiveness, material success orientation, and traditional gender roles versus cooperation, empathy, social solidarity, and work-life balance. Whereas low-masculinity cultures value relational harmony and social responsibility, high masculinity cultures value performance achievement.

Previous research has found that corporate sustainability practices are more widely practiced and more effective in societies with low masculinity values, in which stakeholder cooperation and social welfare norms are deeply embedded ([Ringov and Zollo, 2007](#)), making the presence of women on boards more culturally acceptable and socially compatible with the dominant governance values of the society, which in turn empowers female directors to exert influence over sustainability strategies, stakeholder policies, and ethical standards in firms.

Conversely in more masculine societies where traditional gender stereotypes and hierarchical power structures remain strong and competitive norms and performance-centered leadership styles prevail, the board might still refuse to listen or consider stakeholder perspectives that are often aligned with sustainability agendas (even if women sit on boards), thus limiting their potential for ESG-oriented decision-making.

Gender prejudices and stereotypes persist, and women have not reached the highest management and control positions in companies, nor senior management positions, not due to a lack of qualifications and/or skills, but for reasons related to the mindsets, circumstances, and conditions of patriarchal societies ([Pons Carmena, 2024](#)). These include traditional gender roles, division of labour, educational options for women, and the glass ceiling (and steel barrier).

The term “steel barrier” refers to a new limitation hindering women's advancement in business due to their lack of international experience. Women are not assigned to positions abroad and, therefore, have fewer opportunities than their male counterparts to aspire to senior

management positions in multinational companies. It is called a “steel barrier” because this barrier is more difficult to break than the “glass ceiling” (Domínguez, 2018).

These arguments imply that the impact of board gender diversity on sustainability outcomes should be moderated by national culture, and thus the influence of diverse boards on sustainability outcomes should systematically vary across countries depending on underlying cultural orientations.

In this context, our paper aims to contribute to the literature, investigating the relationship between women on board and ESG in order to establish the impact of board gender diversity on sustainable development, taking into consideration the surrounding cultural context. Compared to the prior studies which have analysed the impact of gender diversity boards on sustainability performance (ESG), our contribution will consist in taking into consideration along with Hofstede’s Masculinity (MAS) dimension, the surrounding cultural context, by introducing the interaction term (Board Diversity $\times$ MAS) which examine whether national culture moderates the relationship between board gender diversity and ESG performance. This interaction has been largely neglected in prior literature and constitutes a key originality of this research. By integrating firm-level behavioural dynamics with cross-national cultural dimensions, the study bridges gaps between corporate governance theory, institutional theory, and cross-cultural management, offering a more context-sensitive explanation of ESG performance.

2.4. Hypotheses development

Combining these theoretical perspectives yields two main expectations. First, consistent with Upper Echelons, Stakeholder, and Resource Dependence theories, female representation on corporate boards should increase firm sustainability performance by improving quality of monitoring, ethical sensitivity, stakeholder orientation, and legitimacy. This is formulated as hypothesis H1:

H1: *Board gender diversity is positively related to ESG performance.*

Second, we expect this relationship to be contingent on national cultural values consistent with Institutional Theory (e.g., Greenwood and Hinings 1996) and cross-cultural management research (e.g., Hofstede 1980) because in cultures with lower masculinity (more social responsibility and inclusiveness), female directors are more likely to exert effective strategic influence (e.g., enhancing their impact) which in turn will enhance the impact of board diversity on ESG outcomes. In this context, we formulate hypothesis H2:

H2: *National cultural masculinity negatively moderates the relationship between board gender diversity and ESG performance, such that the positive effect of board diversity on ESG performance is less pronounced.*

3. SAMPLE, DATA AND METHODOLOGY

The sample consists of 8,197 firm-year observations for 818 listed companies from 31 European countries for the period of 2014 to 2024, including both financial data (total assets, ROA, total debt, cash flow and sales) and ESG scores (corporate environmental, social, and governance performance, standardized on a 0–100 scale) from Refinitiv Eikon (formerly Thomson Reuters ASSET4, (LSEG, 2023)). We also obtained financial data on total assets,

return on assets (*ROA*), total debt, and cash flow from Refinitiv Eikon to ensure that we had consistent data across firms and years. The national cultural variables were sourced from the Hofstede Insights Database (Hofstede, 2001), which includes the Masculinity (*MAS*) dimension that measures the degree to which competitiveness, assertiveness, and achievement orientation prevail in social values.

The dependent variable, *ESG Score*, represents the overall sustainability performance of the firm and was normalized to eliminate outliers and make it comparable across countries and industries. To reduce the impact of extreme values, following previous studies (Li and Zeng, 2019; Nadeem, 2020), the *ESG* variable was winsorized at the 1st and 99th percentiles.

The primary independent variable, Board Diversity, was calculated as the percentage of women on the board of directors, which is a measure that aligns with the literature connecting gender representation to sustainability outcomes (Bear *et al.*, 2010; Harjoto *et al.*, 2015). The variable was standardized after cleaning for extreme observations.

The contextual moderator is the national cultural trait, Masculinity (*MAS*), which varies from 0 (feminine, consensus-oriented societies) to 100 (masculine, competitive societies), with higher scores reflecting performance and assertiveness and lower scores reflecting cooperation and quality of life (Hofstede, 2001).

The control variables were firm characteristics that influence ESG outcomes, including firm size, profitability, debt ratio, and cash ratio (Ullmann, 1985; Nadeem, 2020). *FIRM SIZE* was represented by the natural logarithm of total assets (ln Total Assets), profitability was proxied by return on assets (*ROA*), which is net income divided by total assets, *DEBT RATIO* was defined as total debt over total assets, and *CASH RATIO* as firm cash flow divided by total sales. This variable accounts for the firm liquidity and internal financing capability.

All continuous variables were normalized and cleaned to be comparable across countries or firm sizes, and the resulting panel is an unbalanced but robust sample of European listed companies with consistent ESG disclosure that represents 31 countries with 818 firms and 8,197 firm-year observations, with Great Britain (11.7%), Turkey (10.21%), Greece (6.73%), and Norway (5.7%) representing the most represented countries (Table no. 1).

Table no. 1 – List of countries

Country	Firms	Observations	% of total
Austria	20	194	2.37
Belgium	20	189	2.31
Bulgaria	23	221	2.70
Croatia	17	181	2.21
Czech Republic	11	100	1.22
Denmark	20	200	2.44
Estonia	20	183	2.23
Finland	23	236	2.88
France	40	398	4.86
Germany	31	317	3.87
Great Britain	96	959	11.70
Greece	57	552	6.73
Hungary	12	131	1.60
Ireland	21	207	2.53
Italy	27	279	3.40
Latvia	6	63	0.77
Lithuania	20	191	2.33

Country	Firms	Observations	% of total
Malta	24	246	3.00
Netherlands	22	218	2.66
Norway	47	467	5.70
Poland	18	170	2.07
Portugal	15	149	1.82
Romania	38	398	4.86
Russia	10	110	1.34
Serbia	4	39	0.48
Slovakia	3	42	0.51
Slovenia	9	83	1.01
Spain	35	342	4.17
Sweden	30	297	3.62
Switzerland	19	198	2.42
Turkey	80	837	10.21
Total	818	8197	100.00

Note: The table shows both the number of firms and firm-year observations by country. Percentages are calculated based on the total number of observations (8,197).

Source: authors' elaboration.

This distribution offers considerable cross-country variation to capture cultural effects (especially Hofstede's Masculinity (*MAS*) dimension) and to examine whether national culture moderates the relationship between board gender diversity and *ESG* performance.

The descriptive statistics in [Table no. 2](#) reveal that the sample includes a variety of corporate characteristics and cultural environments, and the *ESG* variable exhibits sufficient variability (mean = 77.05, standard deviation = 19.17) to identify the determinants of sustainability outcomes within a dynamic panel framework, consistent with prior research that shows significant cross-country variation in sustainability practices ([Eccles et al., 2014](#); [Fatemi et al., 2018](#)). Board gender diversity averages around 40 percent female directors, which mirrors the achievement of gender parity on boards in Europe after the implementation of the EU Directive on gender equality ([European Commission, 2022](#)). However, the 60 percent cap shows that full gender parity is still a rarity among listed firms. The masculinity (*MAS*) dimension from Hofstede describes the sample with an average of 45.5, spanning cultural contexts that range from relatively feminine societies (Sweden, Denmark) to more masculine societies (Germany, Turkey), which is important for testing whether the cultural dimension of masculinity affects the relationship between gender diversity and *ESG* performance, as found by [Li and Tang \(2010\)](#); [Krüger et al. \(2021\)](#).

With respect to control variables, *FIRM SIZE* has a mean value of 15.75 and moderate dispersion. *ROA* exhibits a highly skewed distribution, which is characteristic of firm-level panel data ([Baltagi, 2021](#)), and Debt and Cash ratios also have long tails, validating the use of robust estimation techniques like System GMM to attenuate the effects of heteroskedasticity and outliers. The resulting normalization and mild winsorization procedures eliminated extreme outliers without losing the underlying variability in the firms' financial and governance indicators, thereby allowing for realistic distributions of *ESG* performance, gender diversity, and cultural context that are appropriate for testing the moderating effect of Hofstede's masculinity dimension on the gender-*ESG* relationship in a dynamic panel framework.

Table no. 2 – Descriptive statistics

Variable	Mean	Std. Dev.	Min	Max
ESG	77.05	19.17	18.22	93.26
BOARD DIVERSITY	42.60	17.74	0.00	60.00
MAS	45.52	21.03	5.00	88.00
SIZE	15.75	2.84	5.86	24.83
ROA	6.30	8.35	-22.39	41.71
DEBT RATIO	25.37	17.71	0.00	82.28
CASH RATIO	17.85	23.27	-108.62	97.99

Note: Variables: ESG (score of overall environmental, social, and governance performance, normalized 0–100); BOARD DIVERSITY (percentage of female board members); MAS (Hofstede's Masculinity index by country, 0 = feminine, 100 = masculine); SIZE (Firm size measured by the natural log of total assets); ROA (Return on Assets), DET RATIO (Total Debt divided by Total Assets); CASH RATIO (Cash Flow divided by Total Sales as measure of internal financing capacity).

Source: authors' elaboration

This study employs a dynamic panel data approach using the Difference Generalized Method of Moments (Difference GMM) estimator proposed by [Arellano and Bond \(1991\)](#) and extended by [Blundell and Bond \(1998\)](#). The estimator is particularly suited to corporate panel datasets where the dependent variable, here, the ESG score, is dynamic and potentially endogenous. Endogeneity issues may arise from reverse causality between sustainability performance and firm characteristics or from omitted variables that correlate with both.

Given the unbalanced panel structure of the dataset, covering firms from 31 European countries between 2014 and 2024, traditional estimation methods such as fixed effects or pooled OLS would produce biased estimates due to correlation between the lagged dependent variable and unobserved firm-specific effects ([Baltagi, 2021](#)). The Difference GMM estimator resolves this by first-differencing the data, which eliminates firm-specific heterogeneity, and then using lagged levels of endogenous variables as instruments. This method has become standard in corporate governance and sustainability studies where the number of firms (N) exceeds the time dimension (T) ([Blundell and Bond, 1998](#); [Roodman, 2009b](#)).

Although the System GMM estimator ([Arellano and Bover, 1995](#); [Blundell and Bond, 1998](#)) can increase efficiency by combining equations in levels and differences, the Difference GMM specification is preferred in this study for several reasons. First, the Difference GMM limits instrument proliferation, which can overfit endogenous variables and weaken the Hansen and Sargan overidentification tests ([Roodman, 2009a](#)). Second, pre-estimation diagnostics suggested possible violations of the stationarity assumptions required by the System GMM. Third, the Difference GMM provides more parsimonious models with stable coefficients and a stronger economic interpretation, consistent with empirical precedents in ESG research ([Aouadi and Marsat, 2018](#); [Fatemi et al., 2018](#)).

The empirical model (equation 1) can be expressed as follows:

$$ESG_{it} = \alpha + \beta_1 ESG_{i,t-1} + \beta_2 BoardDiv_{it} + \beta_3 (BoardDiv_{it} \times MAS_i) + \gamma X_{it} + \eta_i + \lambda_t + \varepsilon_{it} \quad (1)$$

where ESG_{it} denotes the firm's environmental, social, and governance score; $BoardDiv_{it}$ is the percentage of female board members; MAS_i is [Hofstede \(2001\)](#) masculinity index at the country level. This variable does not show temporal variation, since cultural values evolve slowly over time, it is assumed that the MAS remains constant within each country throughout

the sample period. Finally, X_{it} is a set of firm-level control variables including logarithm of total assets, return on assets (ROA), total debt-to-assets ratio, and cash flow-to-sales ratio. Year dummies (λ_t) control for time effects, and η_i represents unobserved firm heterogeneity.

4. RESULTS

The Difference GMM estimations (Arellano and Bond, 1991) show a statistically significant positive relationship between board gender diversity and ESG performance of European SMEs.

As Model 1 shows, having more women on the board improves sustainability outcomes, which supports the existing evidence that gender-diverse boards are more likely to provide stronger ethical oversight and a longer-term stakeholder orientation (Bear *et al.*, 2010; Harjoto *et al.*, 2015). This finding supports Hypothesis 1, which predicted a positive relationship between board gender diversity and sustainability outcomes.

In Model 2, Hofstede's MAS index is added as a contextual control variable that controls for cross-national cultural heterogeneity and to test whether the diversity–ESG relationship holds before testing the moderating hypothesis. Although the direct effect of *MAS* on *ESG* performance is not statistically significant, this specification is not designed to test an independent cultural effect, but to establish the baseline context for the interaction analysis in Model 3.

The interaction term ($BOARD\ DIVERSITY \times MAS$) is positive and highly significant, indicating that the effect of gender diversity on ESG performance is moderated by cultural values: The positive coefficient of the interaction term implies that in less masculine societies, where cooperation and equality are stressed, the effect of gender-diverse boards on ESG practices is stronger (Hofstede, 2001; Ringov and Zollo, 2007), which provides strong empirical support about a negative moderating effect of national masculinity on the diversity–ESG relationship.

For control variables, *FIRM SIZE* has a negative and significant coefficient, which is consistent with the hypothesis that smaller firms may perform relatively better in *ESG* because of their more flexible structures and the proximity of stakeholders. *DEBT RATIO* and *ROA* are both statistically insignificant, consistent with the mixed evidence in the literature (Ullmann, 1985). Cash flow generation (*CASH RATIO*) is also statistically insignificant, implying that *ESG* commitment is not influenced by short-term liquidity and relies more on managerial and governance characteristics.

Taken together, these findings confirm the importance of cultural context in framing the corporate governance–sustainability nexus, noting that gender diversity is a more effective contributor to responsible practices in socio-cultural contexts with lower masculinity and higher relational values (Li and Zeng, 2019; Nadeem, 2020). These diagnostics confirm that the Difference GMM specification is valid, and the Arellano–Bond AR(1) test is significant ($p < 0.001$) in all models, as would be expected because of the first-differencing transformation (Arellano and Bond, 1991).

Table no. 3 – Difference GMM Estimation Results (Arellano–Bond, 1991)

Variable	Model 1 Board Diversity	Model 2 Board Diversity + MAS	Model 3 Board Diversity × MAS
BOARD DIVERSITY	0.843*** (0.027)	0.841*** (0.028)	0.268*** (0.061)
BOARD DIVERSITY × MAS			0.009*** (0.001)
MAS		1.412 (1.653)	0.771 (1.116)
SIZE	-0.614* (0.347)	-0.807** (0.408)	-0.974** (0.421)
ROA	-0.003 (0.004)	-0.003 (0.004)	-0.002 (0.003)
DEBT RATIO	-0.002 (0.012)	0.000 (0.012)	0.005 (0.011)
CASH RATIO	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)
AR(1) p-value	0.000	0.000	0.001
AR(2) p-value	0.462	0.383	0.236
Hansen p-value	0.687	0.844	0.897

Notes: Coefficients reported with robust standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$. Two-step Difference GMM (Arellano–Bond) with year dummies included. Dependent variable: ESG Score.

Source: authors' elaboration

The Hansen test of overidentifying restrictions yields extremely favourable evidence for instrument validity, with p-values of 0.687, 0.844, and 0.897, which fail to reject the null hypothesis of instrument exogeneity, and thus concludes that the instruments are valid, not correlated with the error term, the model does not suffer from instrument proliferation, or endogeneity bias, and therefore the estimated coefficients are reliable, providing evidence that the Difference GMM results are robust in capturing the relationship between board diversity, cultural masculinity, and ESG performance. The non-significant AR(2) test confirms the absence of second-order serial correlation and supports the validity of the model specification.

5. CONCLUSIONS

This study provides a new and comprehensive framework to understand the interaction between board gender diversity and national cultural values on ESG performance in Europe. The analysis uses a dynamic panel of 31 European countries for the 2014-2024 period and the Difference Generalized Method of Moments (Difference GMM) estimator (Arellano and Bond, 1991) to address endogeneity, unobserved heterogeneity, and dynamic persistence in ESG behaviour.

This additional empirical evidence provides support for the moderating effect of cultural context on effective gender-diverse boards in promoting sustainability and makes its substantive theoretical contribution to theory development with a shift from seeing diversity as an internal governance attribute toward being considered more affected by societal norms and institutional frameworks (Hofstede, 2001; Ringov and Zollo, 2007).

The results empirically confirm that board gender diversity improves ESG performance and that this positive relationship is moderated by Hofstede's MAS index (more cooperation,

empathy, and social responsibility strengthen the positive effects of diversity, while more competition and assertiveness weaken them), which is a novel finding that has been overlooked in previous literature and expands the prior governance–culture frameworks (Li and Zahra, 2012; Krüger *et al.*, 2021) into.

Conceptually, this study contributes to the knowledge on how micro-level governance mechanisms and macro-level cultural institutions interact to influence corporate sustainability outcomes, bridging gaps between corporate governance theory, institutional theory, and cross-cultural management, providing a more contextually sensitive explanation of ESG performance, as opposed to much of the existing literature that treats cultural or gender variables as exogenous determinants rather than interdependent forces.

The paper also offers practical and policy-relevant insights. The findings indicate that gender-diverse boards may be a lever that corporate boards and executives can utilize to improve sustainability performance in collaborative, social welfare-oriented environments, and that investors need to take cultural context into account in ESG assessments because the same governance structure may lead to different sustainability results due to differences in national value systems. These insights can also be used to inform policymakers, especially in the European context, to design culturally adaptive governance regulations, such as gender balance directives (European Commission, 2022) which are more effective when culturally synchronized.

However, this study also highlights several limitations: ESG scores are standardized but may differ in depth of disclosure across countries and industries, and cultural dimensions, such as masculinity, are measured at the national level, which may ignore heterogeneity within countries and sectoral subcultures. Multi-level modelling, alternative cultural frameworks, or longitudinal event analyses that capture evolving corporate and societal dynamics could all be used to address these limitations in future research.

Overall, this research shows that board gender diversity is contingent on the national cultural context and the link between board gender diversity and corporate sustainability is moderated by the socio-institutional fabric of each country, suggesting that governance reforms should be embedded in the socio-institutional fabric of each country, which can be further advanced by jointly modelling culture, gender, and sustainability through a dynamic econometric framework, which extends existing theory, introduces a cross-level interaction previously unexplored in the ESG literature, and provides actionable implications for boards, investors, and regulators.

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